

Potential impacts of EU sugar reform on the Fiji sugar industry

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This article seeks to determine the short to medium-term impact of EU Sugar Protocol reforms on Fiji's sugar industry. The expected impact on the livelihoods of sugarcane producers, the area remaining under cane, sugar cane output and sugar production are derived under various price scenarios using industry census production data and farm economic survey data collected from 2003 to 2004. The paper also analyses the implications of the expected reduction in the protocol price for the miller's financial viability. The policy implications of the various impacts are examined.

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The Fiji sugar industry is under a heavy cloud, particularly because of expected reforms to the European Union's Common Agricultural Policy. Reform of the Common Agricultural Policy will not only affect beet-sugar producers in Europe but also cane producers elsewhere in the world. In particular, it will affect Sugar Protocol 3 of the Lomé Convention, under which Fiji, like other African, Caribbean and Pacific (ACP) countries, has enjoyed stable export prices of two to three times the world market price

and guaranteed import quotas into the European countries.

The Sugar Protocol has been in force since the first Lomé Convention was signed in 1975, replacing the United Kingdom's Commonwealth Sugar Agreement of 1951. The Agreement gave the former British colonies preferential access to the United Kingdom and Canadian sugar markets. However, when the United Kingdom entered the European Community in 1971, it negotiated a continuation of the agreement's



preferences, which led to the Sugar Protocol of the Lomé Convention. According to the Sugar Protocol, 'the [European] Community undertakes for an indefinite period to purchase and import, at guaranteed prices, specific quantities of cane sugar, raw or white, which originate in the ACP countries'.

When the Lomé Convention expired in 2000, the original terms of the Sugar Protocol were retained in the new Cotonou Agreement, although that agreement marks a significant break from the past. To be compatible with WTO rules, it acknowledges the need for the gradual liberalisation of trade between the European Union and ACP countries. The Cotonou Agreement calls for Economic Partnership Agreements to be negotiated during the 'preparatory period', which will end on 31 December 2007 at the latest. New trading arrangements are expected to be in force by 1 January 2008 (ACP Sugar Group 2001).

Fiji also received an additional annual EU export quota at a guaranteed price, albeit one slightly lower than the Protocol prices, under the Special Preferential Sugar arrangement. This five-year government-to-government agreement was reached in June 1995. It was subsequently renewed for a further five years in 2001, with the firm commitment that price support would be further reduced annually and the scheme totally phased out by 30 June 2006 (ACP Sugar Group 2001).

The Sugar Protocol and the Special Preferential Sugar guarantee each ACP country that is party to the Lomé Convention a maximum export quota to the European Union at prices fixed within the subsidised price range obtained by sugar producers within the European Union. The ACP price is expected to be between the reference price (minimum) and the import parity price (maximum) and reflect considerations of economic factors in the ACP countries (Article 5.4 of the ACP–EU Sugar Protocol).

In practice, the ACP sugar exporting countries have received the same price as sugar producers in the European Union have received under the Common Agricultural Policy because the import parity price has consistently been lower than the reference price. The EU Common Agricultural Policy sugar policy restricts imports from non-ACP countries, and it is largely because of such restrictions that the European Union is under considerable pressure from larger, lower-cost sugar producing nations, such as Brazil, Australia and Thailand, to reform its sugar policy.

It is generally accepted that the Sugar Protocol, and other such preferential agreements, distorts international trade in sugar. The combined effects of the sugar policies of the United States, the European Union and Japan are estimated to have depressed the world price by 33 per cent and increased its variability by 28 per cent (Borrell and Duncan 1993). Several earlier studies indicated that partial or full liberalisation of the EU farm-support policies could result in an increase in world sugar prices by between 7 and 18 per cent (Borrell and Duncan 1990; Roberts 1982; Tyers and Anderson 1987). More recently, it has been predicted that the world price could increase by 38 per cent following removal of subsidies and other support in sugar-producing nations in the European Union and elsewhere (Borrell and Pearce 1999).

Pressure on the European Union to reform its sugar policy has increased, particularly since the Uruguay Round of trade negotiations in the early 1990s and the formation of the Global Alliance for Sugar Trade Reform and Liberalization in Seattle in November 1999. The 13 sugar-producing nations that formed the Alliance¹ have called for a WTO agreement on agriculture that includes positive, progressive and meaningful reform of sugar trade policies (Males 2000). More recently, the situation



came to a head as far as the ACP countries are concerned following the dispute lodged with the WTO by Brazil, Australia and Thailand in July 2003, arguing that EU subsidies contravened WTO rules. The WTO ruled in their favour, signaling the eventual removal of their sugar regime and ultimately the Sugar Protocol. In late 2005, the European Commission Parliament is expected to consider several options for reducing their subsidy of beet sugar prices, which will have a flow-on effect on the conditions of cane sugar trade with the ACP countries.

Developing economies, too, have argued for agricultural trade liberalisation. Past studies of developing economies have shown that distortions in world agricultural policies have had major negative effects on production and employment (OXFAM 2002; Sharma et al. 1996) and that the removal of agricultural protectionism in industrialised countries could lead to an increase in social welfare in developing economies (Diaz-Bonilla and Rea 2000; Goldin and Knudsen 1999). It is generally argued that the reduction in agricultural subsidies in industrial economies will lead to increased production and exports of agricultural and agro-industrial products and increased income in developing economies. Farmer income is also expected to increase (Sharma et al. 1996).

In the light of mounting pressure in the context of the WTO Doha Round of negotiations, it is certain that reform of the EU Sugar Regime, and with it the reform of the Sugar Protocol, is inevitable. It seems unlikely, however, that the Sugar Protocol will be totally abandoned (Duncan 2002). Consequently, those countries that have comparative advantage in producing and exporting sugar and/or have already taken the policy reforms necessary for them to become more competitive internationally will no doubt stand to benefit immediately from

the reform of the Common Agricultural Policy. Although access to the EU market is unlikely to increase until EU trade barriers are substantially reduced, in the short term reduction in the European Union's subsidised exportable surplus is expected to result in increases in the world sugar price (Borrell and Pearce 1999).

Fiji, like some other ACP countries that benefited extensively from the more than three decades of preferential access under the Lomé Convention, has not taken serious steps to improve its ability to compete in the international market. For too long, Fiji looked more toward influencing international trade policies than to improving the efficiency of its sugar industry, probably owing in part to the dominance of political considerations over robust informed analysis in decision-making about the industry. The government also appears to have been distracted by millers' claims that the industry's poor performance was due to increased cane burning by the growers, and thus eschewed assessment of the root causes of the industry's inefficiency, which in fact can be found at all stages of the production-harvesting-transport-milling chain (Lal 2003a; Landel Mill Commodities Studies Ltd 1991).

Reforms have been lacking on the domestic front, despite ACP countries being given clear signals about the need for reform when the Cotonou Agreement was signed. The objectives of the Cotonou Agreement and the Special Preferential Sugar Agreement centred on the gradual integration of the ACP countries into the world economy. According to the ECDPM, these countries seemed to have 'suffer[ed] from a seminal weakness' in arguing for keeping 'non-reciprocal, discriminatory preferences' (ECDPM 1998) during their negotiations with the European Union, wishfully hoping the benefits would continue.



Benefits of Sugar Protocol prices

Fiji is a small sugar producer by world standards, accounting for only about 0.3 per cent of the 136 million tonnes of sugar produced internationally. The sugar industry has, however, been an important part of the Fiji economy, contributing about 8 per cent of gross domestic product (GDP) and 22 per cent of total exports. The industry's main focus is on producing sugar for export to the European Union, United States and Japan, with small amounts consumed domestically and in the Pacific region (Figure 1). Directly and indirectly it accounts for about 25 per cent of the workforce, primarily in the rural areas of Fiji.

The guaranteed quotas and preferential prices received from the European Union and the United States have been the main drivers of the industry for the past three decades. Under the Sugar Protocol and the Special Preferential Sugar Agreements, Fiji has had an annual guaranteed maximum access quota to the European Union of 195,600 tonnes of raw sugar, or the equivalent of 165,380 tonnes in white sugar. The United States has also provided a guaranteed quota of 9,000

tonnes of raw sugar at prices higher than the world market price. Sugar prices received by Fiji have been stable and, if anything, have increased in nominal terms in local currency, due to devaluation of the Fiji dollar.

Effectively, through the preferential prices, Fiji has received an annual income transfer equivalent to about 2.9 per cent of gross domestic product (Levantis, Jotzo and Tulpule 2003). One of the direct consequences of this support was the expansion of the sugar industry. Annual production increased from about 125,000 tonnes of sugar in the pre-Lomé period (1968–73), to over 400,000 tonnes in the 1990–95 period—the peak production period. In this time, sugarcane output increased by almost 150 per cent, from an annual production of 1.5 million tonnes to 3.8 million tonnes (see Table 1).

In a country largely reliant on primary industries, but isolated from major markets and with few alternative sources of livelihood, the Sugar Protocol has helped rural households avoid falling below the poverty line and contributed to increased employment in rural areas (Akram-Lodhi 1998; Barrack and May 1997).² Akram-Lodhi also argues that it helped drive up the capital

Figure 1 Key destinations for Fiji sugar, 2002

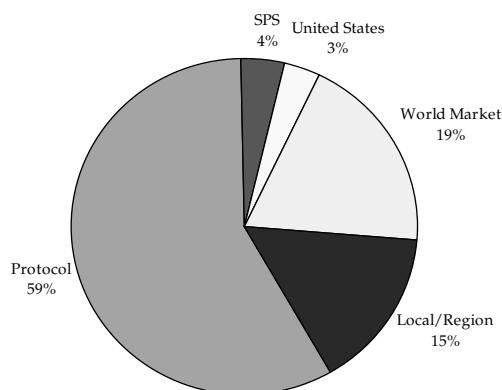




Table 1 Expansion of the Fiji sugar industry, 1974–2003

	Registered contracts	Active growers	Registered cane land (hectares)	Area cut (hectares)	Sugarcane output	Sugar output
1974	16,546	n.a.	n.a.	44,848	2,118,490	279,115
1976	16,994	n.a.	74,322	47,000	2,276,240	293,519
1986	22,183	20,746	89,027	70,068	1,576,123	196,455
1996	22,600	20,600	90,597	73,929	4,379,215	457,120
2003	20,372 ^a	17,363	75,158	60,986	2,611,999	305,941

^a SIT register 2003 (In 2005, SIT gave a figure of 18,600, but this does not match with SITs' own 2003 database)

Source: Cane Accounting System, Fiji Sugar Corporation. There is some discrepancy between Fiji Sugar Corporation records and statistics reported in Fiji Bureau of Statistics, 1990. *Current Economic Statistics Bulletin*, Fiji Bureau of Statistics, Suva, January.

value of agricultural land, providing landowners with higher rental earnings.

While such benefits were realised, the higher prices also encouraged distortionary effects in the use of scarce resources and the environment. The area under sugarcane has expanded by growers moving into more marginal steep to very steep land—land that has largely otherwise been considered unsuitable for cultivation (Kumar and Prasad 2004; Leslie and Ratukalou 2002; Twyford and Wright 1965).

Any changes in the Protocol prices will have significant impacts on sugarcane and sugar production, the livelihood of farmers, the regional rural economies largely reliant on the sugar industry, and the national economy. There may, however, be some positive impacts on the environment as farmers are forced to move out of marginal, and thus high-cost areas; although high-cost sugarcane producers are not necessarily located only on marginal lands (Lal and Rita 2005).

The commodity firm LMC International notes that Fiji's sugar industry, along with those in Mauritius, Belize and Guyana, could become financially unviable as sugar trade

is liberalised (LMC International and Management 2004). Levantis et al. (2003) estimated that Fiji's GDP could decrease by 1.1 per cent if Fiji lost its EU 'subsidy', without any compensatory aid. Sugar output may decline by about 12 per cent unless alternative forms of compensatory aid alleviate the decline. Levantis et al. (2003) also predicted significant structural changes in employment in Fiji, particularly affecting the rural poor. This assessment was based on computable general equilibrium modeling, which takes a long-term (10–15 years) view of the aggregate effects and allows for flow-on impacts in the rest of the economy. Levantis et al. (2003) and other studies (Akram-Lodhi 1998; Barrack and May 1997), however, do not examine the short to medium-term effects on the livelihood of registered growers and cane cutters, and others directly involved in the sugar industry, or the immediate impact on sugarcane and sugar production.

The primary objective of this study, therefore, is to assess the effects of expected (likely) changes to the ACP–EU Sugar Protocol on the Fiji sugar industry, particularly on the financial viability of the



sugarcane farms, on sugarcane and sugar output, and on the livelihoods of cane farming households. Static financial analysis is used to determine the short-term impacts of expected changes in the Sugar Protocol. The paper also examines the potential impact of the expected changes in sugar prices on the financial viability of the miller, before discussing key policy implications of the results.

The Fiji sugar industry

The magnitude of the impact of changes in Sugar Protocol conditions will depend on the current level of efficiencies in the industry, including on-farm, harvest and transport, and milling and processing. Efficiencies at different stages of the production chain ultimately determine the unit cost of sugarcane and sugar production, and will ultimately determine the proportion of farms that will remain financially viable and the financial viability of the miller. The subsidised price, as noted earlier, encouraged the industry to expand, but it also gave a false sense of security and provided a buffer for inefficiencies that crept in over time in both the farming and the milling and processing sectors. This kind of response to trade preferences is all too common throughout the sugar-producing countries, such as Mauritius, Cuba, Philippines and the Dominican Republic (Stoeckel and Borrell 2001).

Fiji's sugar industry comprises a large number of small farms and a sole miller owning four mills. The miller, Fiji Sugar Corporation, and the growers collectively share proceeds from the sale of sugar and molasses, net of marketing costs (freight, bulk storage and local transport), research and extension, and other industry related costs on a 70:30 sharing formula³ stipulated in the Master Award (Kermode 1989). Farmers meet their costs of farming and harvest from their share of the proceeds, while the miller pays

for milling and processing and rail transport. The miller also provides an allowance (which is less than the actual cost) for the delivery of cane by road.

Sugarcane farming

Sugarcane farming is a relatively homogenous activity throughout the country although farm and farmer characteristics are diverse. Sugarcane, which prefers a warm environment and moist soils for vegetative growth and mild, dry conditions and low night temperatures for sucrose accumulation, is largely found in the drier parts of Fiji where there are distinct dry and wet seasons. The cane belt stretches from the southwest to the northeast of Viti Levu island and is also found in the north central parts of Vanua Levu island.

The cane production technology remains very similar to that adopted when sugarcane farming was introduced in Fiji in the late nineteenth century, though farm and farmer characteristics have changed, particularly following the 1987 coups. Sugarcane farming is entirely rain-fed. It is largely based on small family farms, established during the days of the Colonial Sugar Refinery (CSR) company at the turn of the twentieth century, on land leased from indigenous Fijians. In 2003, there were 20,372 registered growers, of which 85 per cent supplied cane to the mills.⁴ In 2003, total cane production was 2.6 million tonnes from 60,853 hectares of land (Table 2).

Farms occupy about 4.5 hectare each on average. In 2003, about 35 per cent of growers harvested over 4 hectares of cane and almost one quarter harvested less than 2 hectare (Table 3). Average production per grower was 169 tonnes, and the average industry yield was 42 tonnes per hectare, although this varies by mill area. Over one-quarter of farms have annual yields lower than 35 tonnes per hectare, and 65 per cent of farmers produce 50 tonnes per hectare or less (Table 4). There is also a substantial difference in the amount

**Table 2 Number of growers, area cut, and total production by mill area, 2003**

Mill	Growers	Area cut	Tonnes
Lautoka	6,298	20,348	890,499
Rarawai	5,288	18,634	836,728
Labasa	3,936	16,757	638,851
Penang	1,841	5,114	243,603
All Mills	17,363	60,853	2,609,681

Source: Cane Accounting System, Fiji Sugar Corporation, Lautoka.

Table 3 Number of farms in different categories of farm size, 2003 (hectares)

Mill	Grower No	<2	2-4	4-6	>6
Lautoka	6,298	1,641	2,692	1,437	528
Rarawai	5,288	970	2,409	1,380	529
Labasa	3,936	865	1,206	1,011	854
Penang	1,841	677	749	315	100
All Mills	17,363	4,153	7,056	4,143	2,011

Source: Lal, P. and Rita, R. 2005. Sugarcane production in Fiji: farmer profile and farm profitability, Draft Survey Report, Lautoka.

Table 4 Number of growers in each yield class and mill

Mill	<35 t/ha	35-50t/ha	50-85t/ha	>85t/ha	Total	Yield t/ha
Lautoka	1,799	1,624	1,717	148	5,288	42
Rarawai	1,988	1,163	721	64	3,936	44
Labasa	567	511	586	177	1,841	37
Penang	567	511	586	177	1,841	50
All	6,792	5,185	4,817	569	17,363	43

Source: Lal, P. and Rita, R. 2005. Sugarcane production in Fiji: farmer profile and farm profitability, Draft Survey Report, Lautoka.

Table 5 Total cane output by mill area for each yield class, 2003 (tonnes)

Mill	<35 t/ha	35-50 t/ha	50-85 t/ha	>85 t/ha	Mill total
Lautoka	174,646	282,248	386,686	46,919	890,499
Rarawai	138,737	259,138	395,890	42,963	836,728
Labasa	184,732	238,993	198,649	16,477	638,851
Penang	29,209	62,603	119,416	32,375	243,603
All	527,324	842,981	1,100,641	138,734	2,609,681

Source: Lal, P. and Rita, R. 2005. Sugarcane production in Fiji: farmer profile and farm profitability, Draft Survey Report, Lautoka.



of cane produced by yield class by mill area, with most of the cane produced by farms that belong to the 50–85 tonnes per hectare yield class (Table 5). Such differences in farm characteristics influence their unit cost of production and have a significant bearing on farmers' incomes and their ability to cope with the projected decline in preferential prices.

The Fiji Sugar Corporation

The Fiji Sugar Corporation is the largest publicly listed company on the South Pacific Stock Exchange, with the Fiji government holding 68 per cent of the shares. The Corporation has an annual gross turnover of F\$250 million, which directly depends on its efficiency in processing and milling sugarcane supplied by the growers, the volume of cane throughput, and the proportion of sugar sold in the various markets. Each mill has its own catchment of growers, and the Corporation manages harvest and transport schedules according to its milling capacity.

The Fiji mills have the capacity to process 3–4 million tonnes of cane and produce 500,000–550,000 tonnes of sugar per annum (Booker Agriculture International Limited 1981). In the past 15 years, the four mills have processed 2.1–4.4 million tonnes of sugar cane annually, producing 256,000–520,000 tonnes of raw sugar and a small quantity of molasses. More recently, the mills have been running below both capacity and the optimal efficiency level. In 2003, 2.6 million tonnes of sugarcane were processed into 305,914 tonnes of sugar and 107,450 tonnes of molasses, largely for export. The average ratio total cane to total sugar over the past five years was 10.21, which is a function of the cane quality as well as the efficiency of milling and processing. Total throughput, milling efficiency, the quality of cane, and price all influence the profitability of the mills and the growers.

Potential impact of a reformed Sugar Protocol

The impact of the reformed Protocol prices will depend on the extent and depth of changes the European Commission makes to the Common Agricultural Policy and the effect this has on the Sugar Protocol.

Sugar Protocol conditions and projected Fiji sugar prices

As discussed earlier, the expected Protocol conditions will no doubt depend on the outcome of debate within the European Union, the WTO dispute panel's rulings, the outcome of the Doha Round of trade negotiations, and the negotiations between the European Union and the ACP countries. While the nature of the reduction in the Sugar Protocol price and quotas is unclear, it seems unlikely that the Sugar Protocol will be totally abandoned (Duncan 2002).

Recently, four options for reform (Table 6) were identified by the European Commission at the Special ACP Ministerial Conference on Sugar, held in Fiji on 21–24 July 2003. These options reflect different degrees of reform that may be required to make the Protocol compatible with WTO rules.

The European Commission considers that options 3 and 4 are the only realistic alternatives (ACP Group of States 2003; European Commission 2003). For the ACP countries, there are substantive differences between these two options. Option 3 relies on controlled supply quotas, albeit at reduced levels. A moderate reduction in price and price stability could be expected. Essentially, the proposal reflects a 'managed market scenario', in which the ACP countries would have stability in market access and price—basically safeguarding the benefits of the Sugar Protocol (ACP Group of States 2003). Option 4 foresees the total removal of



Table 6 Sugar regime reform scenarios

1. Status quo

- Maintain current regime beyond 2006
- Maintain current price structure at about three times world market price

2. Deregulation

- Abolition of support prices, production quotas, import duties and tariffs
- Complete loss of value of preferential access
- World market price
- High price volatility
- ACP country exports to be replaced by low cost countries, such as Brazil, Australia and Thailand
- Price cuts with proposed compensation for ACP and LDC producers (and EU producers compensated with Direct AID on the CAP model)

3. Fixed quotas

- Modified version of 'Status quo', with supply management for preferential imports
- Beet quotas to be reduced sharply with trade off with the LDC and the Balkans
- All sources of supply to have quotas and thus would establish a predictable balanced supply—managed market, offering reasonable price and stability
- Intervention prices could remain high but at greatly reduced level

4. Price reduction

- Phased elimination of everything, except import duties
 - Price response (vs volume response in 'Fixed quotas')
 - No minimum beet guaranteed price
 - Import parity market
 - Price determined by DOHA (Market Access and Tariff Reduction)
 - Greater decrease in price
 - Linkage to world market would lead to price volatility
 - Unpredictable supply and thus expect deficits and surpluses
 - Likely loss of significant ACP production
 - Issue of compensation and safeguard benefits via industry or government
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Source: ACP 2003. Workshop on the Sugar Protocol in the Context of Economic Partnership Agreements, in Particular the Implementation of Article 36(4) of the Cotonou Agreement, 23–24 June. ACP/63/044/03 Rev 1, Brussels; 2. Tabled at the Eighth Special ACP Ministerial Conference on Sugar, 21–24 July 2003, Sigatoka, Fiji.; European Commission 2003. 'A brief guide to the European Union sugar policy', Eighth Special ACP Ministerial Conference on Sugar, Sigatoka, Fiji, 21–24 July.



quotas and a substantial price reduction. Exporters and producers would also face price volatility, although some minimum custom duties, or import tariffs compatible with the WTO, could be expected.

The ACP countries favour Option 3, provided quantitative restrictions are put on Everything But Arms (EBA) exports, which they believe will result in reasonably high and stable prices within the context of managed Protocol markets. The European Commission is believed to favour Option 4 (European Commission 2003). If one assumes EU sugar policy is formulated so that prices are set close to what is acceptable under the European Union's WTO tariff commitments, then safeguard duties are likely to remain a feature of EU border protection (LMC International and Management 2003:15).

LMC International suggests that one of two scenarios is possible: a 20 per cent cut in tariffs or a 36 per cent reduction in tariffs (LMC International and Management 2003). Recently leaked EC documents suggest the ACP quota will be retained (Fiji Sugar Marketing 2004), although the Protocol price is expected to be considerably reduced. Signals from the European Commission suggest that the ACP countries should expect

a gradual reduction in sugar prices. The latest information available from the European Union suggests the price will be reduced five per cent in 2006, 24.6 per cent in 2007, 27.8 per cent in 2008 and 39 per cent by 2009. That is, the current guaranteed price would be reduced to 524 euro per tonne of raw sugar from 1 July 2005 and to Euro320/tonne from 1 July 2009.

Thus, at the exchange rate of 1 euro = F\$1.852, Fiji could expect a price from 1 July 2005 of F\$970 per tonne for the guaranteed quota of 172,500 tonnes of sugar exported under the Sugar Protocol and F\$912/tonne for the 11,000 tonnes of Special Preferential Sugar exports to the European Union.⁵ These prices will fall in 2007 to F\$709 per tonne in Protocol prices. By July 2009, the price is expected to be F\$560 per tonne of raw sugar; the current quota is expected to be retained. The Special Preferential Sugar quota will be phased out by 2006. It is expected that Fiji will continue exporting to other destinations as per current arrangements. The expected sugar price scenarios are summarised in Table 7.

Industry revenue depends on the volume of sugar produced, the proportion of sugar sold in the different markets, and the prices received. At a minimum, Fiji can expect

Table 7 Market destination for Fiji sugar and expected prices, 2005–2009 (F\$)

Destination	F\$ equivalent			
	2005	2006 ^a	2007	2009
United Kingdom/European Union	970	934	709	560
Special Preferential Sugar exports ^a	912	-	-	-
United States	623	623	623	623
World	325	325	325	325
Employees	305	305	305	305
Domestic and regional	463	463	463	463

^a Special Preferential Sugar quota disappears after 2005.

Source: Fiji Sugar Marketing, pers. comm., August 2005.



Table 8 Industry net revenue, miller's revenue, growers' revenue and cane price, 2005, 2007 and 2009

	Protocol price scenarios		
	2005 EU Price = 524 5.1 per cent decline	2007 EU price=395 25 per cent decline	2009 EU price = 320 39 per cent decline
Industry price (raw sugar) (F\$ per tonne)	970.00	709.00	695.00
Cane output (million tonnes)	3.00	2.20 ^a	1.70 ^a
TCTS	9.15	9.15	9.15
Sugar output	328,188.00	..	..
Total industry net revenue (F\$ million)	223.00	180.00	89.00
Miller's revenue (F\$ million)	67.00	52.00	47.00
Growers' revenue (F\$ million)	156.00	122.00	109.00
Cane price (F\$ per tonne)	52.09	41.99	36.15

^a estimated from the number of farms that become non-viable (see Table 11).

Source: Authors' estimation based on industry cost and price data from Fiji Sugar Marketing (pers. comm, May 2004 and August 2005, respectively) and industry cost data.

income from the EU and US markets, plus income from domestic sales, assuming the industry at least fulfills its contractual obligations and meets its domestic needs.

In the 2005 season, the industry is projected to produce 3.002 million tonnes of cane. Assuming a TCTS (ratio of total cane to total sugar) of 9.15, this will yield a raw sugar output of 328,188 tonnes (pers comm. Fiji Sugar Marketing).⁶ If, under this scenario, Fiji met its obligations under the various trade agreements and sold the surplus on the open world market, its gross revenue from sugar and other by-products would be F\$226 million. Subtracting industry costs from this leaves F\$223 million to be divided between the miller—F\$67 million (30 per cent) for the miller and F\$156 million for the growers (70 per cent). Table 8 shows alternative price scenarios under different Sugar Protocol conditions. Two scenarios are assumed. In the first, the first, the Protocol price is reduced by five per cent and by a further 25 per cent

by mid 2007. The second scenario includes a further reduction of 14 per cent by 2009, resulting in a total reduction of 39 per cent.

Impact of Protocol price reforms on growers

As there is less than a year left before the first reduction in Protocol prices is expected to come into force, its potential impact on growers is of immediate policy relevance. Of primary concern are the number of farms that will become unviable and the expected reduction in cane output. Analysis of gross margins—cane income minus farm cash costs—can reveal the number of non-viable farms in the short run. If the gross margin is negative, farmers will not be able to meet their cash costs and will make financial losses. Cane income is defined as total revenue derived from the supply of cane to the mills, excluding any penalties paid for burnt cane. Farm cash costs are defined as out-of-pocket costs of production, harvest and transport. Cash costs do not include imputed costs of

Table 9 **Average gross revenue under different Protocol prices**

	2005		2008		2009	
	F\$970/tonne		Price decline—25% F\$709/tonne		Price decline—39% F\$590/tonne	
	Current	Relative SE	Revenue	Relative SE	Revenue	Relative SE
Lautoka	8,011	2.94	6,458	2.94	5,560	2.94
Rarawai	9,465	3.44	7,630	3.44	6,569	3.44
Labasa	9,527	4.51	7,680	4.51	6,612	4.51
Penang	7,708	6.18	6,213	6.18	5,349	6.18
All	8,791	1.97	7,086	1.97	6,101	1.97

Note: SE is standard deviation/square root of sample size.

Source: Lal, P. and Rita, R. 2005. Sugarcane production in Fiji: farmer profile and farm profitability, Draft Survey Report, Lautoka.

Box 1

Determining the impacts—extrapolating from survey sample to the population

The gross margin was estimated for each grower by deducting total cash costs from total cane income expected under each Protocol price scenario (summarised in Table 8).

Cane income is estimated using the Fiji Sugar Corporation's production figures and the expected cane price under each scenario.

Farm costs are derived from the farm economic survey completed under the ACIAR project. Farm inputs, costs and outputs were collected for the 2003 season using a stratified sample of 10 per cent of active growers selected from the population of active growers (see Lal and Rita's (2004b) survey report for details).

The number of farms in the survey sample with gross margins below zero was then determined, together with the reduction in output and the decline in area under cane.

Using this gross margin information, the effect of the expected reduction in Protocol prices was determined for each mill in terms of the number of farms that would become non-viable (that is cash net income or gross margin is less than zero).

The number of non-viable farms in each mill area was determined by extrapolating the sample data to the population of farms in each mill area. This is a valid approach (Mendenhall et al. 1986) since a statistically large sample size was used in the survey and growers were randomly selected from the Sugar Industry Tribunal's grower register and the Fiji Sugar Corporation census production database using a stratified sampling strategy.



Table 10 Unit cash and total cost by yield class (F\$ per tonne)

Yield class (t/ha)	Cash costs (F\$/t)	Standard error	Total cost (F\$/t)	Standard error
< 35	46.0	1.3	54.5	1.3
35–50	35.5	0.5	41.5	0.5
50–85	32.3	0.4	36.5	0.5
>85	30.4	1.6	34.2	1.7

Source: Lal, P. and Rita, R. 2005. Sugarcane production in Fiji: farmer profile and farm profitability, Draft Survey Report, Lautoka.

family labour or bullock/tractor time. The method used to determine the industry-wide impact is summarised in Box 1.

Cane income

For the expected Protocol price of 524 euros (F\$970) per tonne, the national average gross income per farm is F\$8,791 (RSE⁷ of 1.97) (Table 9). There are some differences between the mills, reflecting farm size, total farm production and the number of growers in the different production and yield classes. Labasa and Rarawai farmers had the highest average income per farm at about F\$9,500. Penang farmers had the lowest average gross revenue at F\$7,700 and this area also has the largest variation in revenues (RSE of 6.18).

With the Protocol price declining by 25 per cent, average cane income decreases by about 20 per cent to F\$7,080 per farm. If the Protocol price were to be reduced by 39 per cent (in 2009), farmers should expect to see their gross cane income decline by about 30 per cent to F\$6,100 per farm (Table 9).

Unit costs of production

Farming efficiency and land quality strongly determine farming costs and the expected gross margin for a farm. Based on the 2003 farm survey, the average unit cash cost per tonne of cane is F\$38, with 95 per cent of the farms falling within the range of F\$36.70–

38.60 (Table 10). If all costs—that is, cash costs plus imputed costs of family labour and other inputs—are included, the average unit total cost is F\$44 per tonne (RSE of 0.03).

Variations in farm costs are due to differences in land quality, farm management skills, the use of family and hired labour, family-owned and hired bullocks and tractors, and the use of substitute cutters. Decreasing use of family-owned inputs, including labour, has also generated higher production costs through poor farming practices, including general ignorance of good farming practices, such as poor timing of input applications, and poor accountability on the part of the hired agents.

Shortages of rural labour in certain sectors have pushed up labour costs, with growers not only making larger cash payments to hired labour but also incurring higher in-kind costs in the form of one or two meals plus yagona per worker per day. In addition, farm costs are also dependent on whether cane is delivered to the mills by rail or lorry, since the miller pays the cost of rail transport while most of the lorry cost is borne by the growers. In 2003, 63 per cent of cane was delivered by road, which added an average transport cost, net of transport allowances, of about F\$6 per tonne (Rita 2004). Rail growers forced to convert to lorry transport because of rail problems saw their



costs increase by F\$1.50 to F\$3 per tonne, after deducting the lorry conversion allowance provided by the Fiji Sugar Corporation.

Gross margins and non-viable farms

In the 2004–05 season, about 9 per cent of the farms had gross margins equal to zero or less, which means that these farmers cross-subsidise their cane farming. This is confirmed when one considers other household income. Taking into account non-cane farm income and off-farm income, the ‘gross margins’ of almost all grower households are positive.

Assuming there are no changes in farm management practices and the costs of sugarcane production remain constant, a 25 per cent drop in the Protocol prices will result in probably around 23 per cent of growers having negative or zero gross margins (Table 11). In total, 4,000 farms are expected to become non-viable, reducing the area under cane by about 11,946 hectares and reducing the cane output by 377,700 tonnes. This would result in a decline in sugar output by about 41,200 tonnes (14 per cent), assuming the TCTS ratio of 10.21 is retained (this assumes no further cross-subsidisation of cane farming).

If the price declines by 39 per cent and the other assumptions still apply, 42 per cent of growers are expected to have negative or zero

gross margins. That is, approximately, 7,320 farms will become unviable, reducing the area under cane by about 24,300 hectares and output by almost 854,654 tonnes (Table 11).

Looking at the situation in more detail, Lautoka and Labasa mill areas will be worst affected. In 2008, when the price decreases by 25 per cent, 25 and 31 per cent respectively of growers in these mill areas can be expected to be non-viable. From these two mill areas alone, 2,800 growers can be expected to lose their primary source of livelihood. Rarawai and Penang mill areas could expect to lose a slightly lower proportion of farms—15 per cent and 20 per cent, respectively. By 2009, if no improvements in farm efficiency are forthcoming Lautoka and Labasa mill areas will again be most affected. The Labasa impact could be slightly exaggerated due to the loss in production caused by Cyclone Ami followed by drought in the 2003 season.

Generally speaking, a relatively larger proportion of farms belonging to lower-yield classes is likely to become unviable when the Protocol price decreases because of their higher unit cost of production (Table 10). When the Protocol price is reduced by 25 per cent, 43 per cent of growers belonging to the less than 35 tonnes per hectare yield class become financially unviable, whereas only 19 per cent of farms belonging to the 35–50

Table 11 Decline in numbers, output and area following decline in Protocol prices by 25 and 39 per cent

Protocol scenario	No. of growers	Area (hectares)	Sugarcane output (tonnes)	Sugar output (tonnes)
Price decline—25 per cent	3,997 (23 per cent)	11,946 (19 per cent)	376,999 (14 per cent)	41,202 (14 per cent)
Price decline—39 per cent	7,323 (42 per cent)	24,130 (40 per cent)	854,645 (33 per cent)	93,404 (33 per cent)

Note: Bracketed figures reflect percentage of the expected 2003 statistics.

Source: Authors' calculations.



tonnes per hectare category became unviable. Over 90 per cent of farmers in the greater than 50 tonnes per hectare yield class are likely to survive. Similarly, when the price is reduced by 39 per cent, 65 per cent of growers in the less than 35 tonnes per hectare category become unviable, whereas only 26 per cent of the growers belonging to the 35–50 tonnes per hectare category have less than or zero gross margin.

Poverty implications of the trade liberalisation

The proposed changes in the Sugar Protocol prices will have a dramatic impact on the livelihood of sugar cane farmers, their dependents, and the economy of Fiji, unless action is taken to improve efficiency at all stages of the industry.

In the short term, a large number of rural families will fall below the relative poverty line. According to the UNDP (1997), the average poverty threshold for Fiji is an annual income of F\$4,500. Adjusting this for the opportunity cost of using the land for residential purposes and subsistence farming (based on the survey results), the relative poverty line is about F\$2,500, which

is equivalent to what a labourer would earn working at F\$10 per day, five days a week for 50 weeks a year.

Therefore, a large number of growers will lose this source of livelihood and will have to find alternative sources of income. In addition, with the decline in cane output, the number of cutters employed can also be expected to decrease. If the 2003 cutter efficiency were maintained, it is projected that 2,497 and 5,660 cutters will lose employment in 2008 and 2009, respectively. Assuming that substitute cutters are the first ones to lose their jobs, this means that, with a Protocol price decline of 25 per cent, about 86,494 cane growers and cutters' families, or 18 per cent of families directly dependent on sugarcane income, will have to find alternative sources of income. This figure will jump to over 12,983 or 36 per cent of grower and cutter families, when the price decline is 39 per cent.⁸

Those farms that remain viable will, on average, find their gross cane income declining by almost 43 per cent from its 2003 level to F\$2,027 in 2008. When the Protocol price is reduced by 39 per cent, the average farm gross margin will be as low as F\$1,150—almost 64 per cent of the 2003 level (Table 12). Thus,

Table 12 Number of viable farms, cane output and area under 25 and 39 per cent reduction in Protocol prices

	25 per cent reduction				39 per cent reduction			
	Number ('000)	Production ('000 t)	Area ('000 ha)	Gross margin (F\$)	Number ('000)	Production ('000 t)	Area ('000 ha)	Gross margin (F\$)
Lautoka	4.72	747.8	16.0	1,767	3.49	585.2	12.0	1,148
Rarawai	4.48	762.3	16.3	2,383	3.68	652.0	13.5	1,588
Labasa	2.71	504.7	12.3	1,765	1.72	330.8	7.7	1,145
Penang	1.48	220.0	4.3	2,329	1.20	193.4	3.7	1,729
All	13.37	2,232.7	48.9	2,027	10.04	1,755.0	36.7	1,369

Source: Authors' calculations.



Table 13 Impact of Protocol prices on cane farming as a business: number of viable businesses, and expected business profit

	25 per cent decline in price		39 per cent decline in rice; world price increase by 30 per cent	
	Number of farms	Average profit (F\$)	Number of farms	Average profit (F\$)
Lautoka	3,611	1,525	2,144	1,044
Rarawai	3,478	1,875	2,414	1,203
Labasa	1,943	1,517	977	1,046
Penang	1,134	2,170	890	1,493
All	10,143	1,705	6,373	1,158

Source: Authors' calculations.

many of those whose farms remain viable in gross margin terms will find that their net income is well below Fiji's poverty threshold.

In some cases, the impact of the decline in the Protocol prices may be cushioned by non-cane farm and off-farm income. Of the survey sample, 25 per cent of farm households reported having earned non-cane income from at least one member working off-farm as a labourer, salesperson, clerk, or some other job (Lal and Rita 2005). Average annual off-farm income per family was F\$4,800, with 95 per cent of growers earning between F\$4,500–5,100 from such activity. Penang mill area growers are least likely to have other sources of income because there are fewer opportunities in the area for non-cane and off-farm income due to greater distance from urban centres and markets.

The above net income and average gross margin estimates need to be qualified. The cash costs estimates do not include annual debt repayments, which most growers have. In 2003, 97 per cent of farmers had payments deducted at source for repayment of loans, goodwill, and so forth. Most had annual debt repayments of F\$2,000–5,000. The national average debt repayment was almost F\$3,000 (RSE of 2.3) per farm (Lal and Rita 2005).

Twenty-five per cent of farms had agricultural debt of over F\$4,300. Because of the difficulty in separating out lump sum repayments of principal from annual repayments,⁹ however, debt expenditures were not included in the farm cash cost estimates. If these costs were included, many more cane farmers would likely to be in very difficult circumstances after the reduction in Protocol prices.

Further, it should be remembered that gross margin estimates are based only on cash costs. They do not include imputed costs of family labour or family bullock/tractor use, and thus gross margin estimates do not give a full idea about the future viability of cane farming.

Viability based on business profits

Treating sugarcane farming as a commercial venture, the appropriate basis for analysis is the profit from cane growing. Business profit is defined as the total cane income minus total costs, including imputed costs of family labour and other inputs, depreciation, and interest on borrowings (McConnell and Dillon 1997). Depreciation is not included in this analysis because family-owned bullock and tractor time and family labour inputs are costed at the market rate. Cane



farming is considered to be viable only if the business profit is greater than zero.

Business profits under the different price scenario are summarised in Table 13. Evaluated in this way, 42 per cent of the farms are projected to be commercially non-viable when the Protocol price is reduced by 25 per cent. Average profit is F\$1,700. When the Protocol price is reduced by 39 per cent, almost 60 per cent of farms are projected to be commercially non-viable. Average profit per farm is estimated to be F\$1,160.

The above analysis is based on the assumption that the Fiji Sugar Corporation remains viable. This is doubtful, however, unless the changes in the mills to be introduced in 2005 bring about the required improvements in efficiency and production cost reductions. This is asking too much in the time available, given the nature of the problems facing the miller.

Impact on the Fiji Sugar Corporation

Projected changes in Protocol prices do not augur well for the Fiji Sugar Corporation, given its recent performance. Its gross revenue is expected to decline by about 20 per cent when the Protocol price is dropped to 25 per cent lower than its current level. If the Protocol price is reduced by 39 per cent,

the Fiji Sugar Corporation's gross revenue will be almost 30 per cent lower. That is, its gross revenue will fall from about F\$67 million to F\$46 million. This gross revenue is considerably lower than its recent total costs of about F\$74 million. Even with the Protocol intact, the Fiji Sugar Corporation has posted an annual loss of about F\$24 million for the past three years.

Therefore, the Fiji Sugar Corporation has to increase its efficiency to break even at current Protocol prices, let alone to improve its cost effectiveness to meet the challenges of meeting the decline in expected gross revenue. It has to reduce its unit costs by almost one-third from the current level of F\$280/tonne (Indian Sugar Technology Mission 2004) to at least F\$180/tonne of raw sugar by 2008. Further, to survive beyond 2008, the unit costs of milling and processing will have to be reduced by almost 50 per cent.

Impact on landowners

In the short term, landowners, mostly indigenous, will be adversely affected as farms become non-viable and lose their source of income. Currently, rental income is deducted at source and thus landowners are paid rents only when growers supply cane

Table 14 Loss in land rent to indigenous landowners under different EU price scenarios

	Native land rent (F\$ million)	Native land rent loss (F\$ million)
2003 native land rent only	6.0 ^a	
25 per cent decline (cash cost)	4.8	1.3 ^b
39 per cent decline (cash cost)	3.5	2.5
25 per cent decline (business cost)	3.5	2.5
39 per cent decline (business cost)	2.2	3.8

^a rent payable was F\$7.99 million but because 75 per cent of growers were active, rent actually deducted was less (Lal and Rita 2005)

^b difference due to rounding off

Source: Authors' calculations.



to the mills. In 2003, total rental income payable to landowners was F\$8 million. Since only 75 per cent of the growers produced cane in 2003, the rent received by indigenous landowners was about F\$6 million (Table 14)

Where farms become non-viable and cease operations, landowners, too, will not receive any rental income. Based on the percentage of active growers in 2003, a change in the EU price by 25 per cent, resulting in a decline in the number of farms by 23 per cent, would also mean on average a decline in rental income to indigenous landowners of about F\$1.3 million. If the price declines by 39 per cent, the rental income would decline by more than one-third, or F\$2.5 million.

In the long run, assuming no effective actions are taken and that land that goes out of cane production is not used for alternative crops, indigenous Fijians could expect to see their rental income decline by one-third, or F\$2.4 million in the first instance. If prices decrease by 39 per cent, the rental income would become F\$2.2 million. That is, indigenous landowners' income will decline to less than one-half, or about 40 per cent of the rental income received in 2003.

Policy implications

Time is running out for the Fiji sugar industry. Severe social problems can be expected in 2007, following the first substantial reduction expected in the Protocol price, unless the Fiji government and other ACP countries are able to have the reduction deferred. With or without a deferral, however, structural adjustment assistance programs are urgently needed in both the farm and mills sectors to assist people who have to leave the industry and in order for the Fiji sugar industry to become viable and internationally competitive.

The government has already put in place a program for improvements to the mills. It has obtained F\$86 million in soft loans (4 per cent interest) and technical assistance from the Indian government to increase efficiency through replacement of key equipment and machinery for the milling and processing of sugar cane (Indian Sugar Technology Mission 2004).¹⁰ However, replacing old and inefficient machinery alone will not lead to efficient milling and processing, since the root causes of the problems in this part of the industry also include poor governance from factory floor all the way to the top management (Lal 2003b; Lal and Rita 2004). Poor governance is largely due to the lack of accountability at all levels of management, resulting in widespread principal-agent problems (Lal and Rita 2004). A change in the culture of work is urgently needed, which mainly depends on the introduction of productivity-based payments at all levels.

The industry should also explore diversification of its products, including manufacture of ethanol for fuel and cogeneration of energy. The supply of green energy using possibly the Clean Development Mechanism under the Kyoto Protocol could provide a profitable way to use the sugar by-product, bagasse, the residue remaining after sugarcane juice is extracted, which is currently being stockpiled, creating environmental problems.

Addressing mill level inefficiency is but one part of the solution. Without structural reforms in the production and harvest sector, Fiji's sugar industry may still not be viable. As a result of the reductions in preferential prices, cane throughput is likely to fall below one-half the current milling capacity. Furthermore, without key institutional changes that improve the relationship between the miller and the growers, including the revenue sharing formulae, the industry may still slide into oblivion.



Farm-level efficiency

The key structural reforms required to minimise the impacts of the decline in Protocol prices include strategies to increase farm yield, and thus reduce unit costs of production and harvest, and institutional reforms that help rationalise the industry.

The farming sector is generally under-performing, with mean technical efficiency of about 63 per cent. Causes of the inefficiency can be found in poor farm management: growers putting a minimal amount of effort into farming, and not planting new cane but relying mainly on ratoon cane. Many farmers did not plant any cane in 2003, although the recommended plant:ratoon crop area ratio is about 25:75. Less than 30 per cent of growers had any plant cane, with the ratio of plant:ratoon crop area averaging 17:83. Most of the growers used much less than the recommended level of inputs, such as fertiliser, herbicide, and the quantity of plant seed per unit area (Lal and Rita 2005). No doubt, uncertainty over lease renewal would have contributed to the poor husbandry and the reluctance on the part of farmers to plant cane. The number of years remaining on a lease is a statistically significant determinant of technical efficiency; the longer the time before lease expiry, the greater is the technical efficiency.

Based on past experience, improvements in farm efficiency are feasible. In 1999, the industry-funded Crop Rehabilitation Program (CRP) led to an increase in average yield from less than 50 tonnes per hectare before 1996 to 61 tonnes per hectare. This was the highest yield achieved in the entire decade (Lal 2003b). However, this was a one-off increase. Subsequent years saw the plant area and the yield decline.

One of the key reasons for the decline following the CRP could have been the lack of ready cash at strategic times during the cane calendar. Under the CRP, farmers were

provided direct farm assistance in the form of cash advances for the purchase of fertilisers and for planting. However, the banks have recently stopped lending to cane farmers because of the uncertainty in the industry, which has meant that many farmers did not have cash to pay for inputs, including paying substitute cutters above the agreed MOGA rates. Some solutions have to be found to allow growers to access cash at strategic times for working capital.

The Indian mission team has advocated improved extension services as key a strategy to increase cane output (Indian Sugar Technology Mission 2004). Such an approach will no doubt be needed in the case of indigenous Fijian farmers, whose past poor performance has been attributed to cultural and social constraints (Reddy 1998; Verebalavu 1998). The number of Fijians taking up commercial farming is expected to increase, as many of the expired leases are not being renewed to sitting tenants but to members of the *mataqali* or other Fijians. Consequently, institutional reforms will be needed that allow Fijians to overcome the constraints imposed by the indigenous communal lifestyle. Amongst possible strategies could be an estate type of arrangement whereby a management body provides all the technical and management input while the contract holder provides labour and land. There are examples of successful institutional experiments initiated by enterprising Fijians, the Naleiwavuvu Land Development Company for example, that could be adapted and replicated elsewhere.

For existing tenants, who mostly have decades of sugarcane farming experience, it is not just a question of improving technical efficiency through an extension program. Other measures are needed to target the root causes of economic and technical inefficiency.

The land tenure issue needs to be resolved urgently. It is well known that land tenure is an important determinant of



economic efficiency. This does not necessarily mean privatisation of communally owned native land (as suggested by many authors, see Prasad and Tisdell 1996; Kasper 2001), but a system of land leasing that ensures a high degree of certainty about lease renewal. Preliminary results suggest that there was no correlation between technical inefficiency and land ownership, but that it was directly correlated with the years remaining in the lease (Rita 2004). Therefore, the government needs urgently to resolve the land tenure issue, regardless of whether the farmers are Indo-Fijians or Fijians. The efficiency of cane farming is strongly linked to the security of tenure, without which banks are reluctant to lend and farmers are hesitant to invest.

Size of farms is also a determinant of technical efficiency, with efficiency in input use increasing with farm size (Rita 2004). Therefore, policies aimed at encouraging amalgamation of farms would increase the chances of the industry surviving. Amalgamation, together with crop diversification, would help growers minimise the risks associated with any increase in price variability as the result of the liberalisation of sugar policies. There are crops that can easily be intercropped with cane, or cropped as a substitute for cane, and which have ready export markets and could be financially viable (ADB TA 3887). Other determinants of inefficiency include the use of hired labour and ethnicity.

Institutional reforms

Targeting technical aspects of the mills will no doubt help address problems that are specific to the mills' operations. However, the underlying causes of inefficiency in the mills need to be addressed. As reported by Lal (Lal 2005), a large part of milling inefficiency is due to principle-agent problems. Agency problems are also found on the farms, with hired labourers often found to shirk work (Lal and Rita 2005).

Furthermore, the cost effectiveness of the sugar cane industry is directly dependent on the combined efficiency of the miller in processing the cane (sugar recovery) and the growers to produce the maximum amount of sugar per volume of cane. The current revenue-sharing mechanism does not reward the miller or the growers for improvements in their own efficiencies, which come at their own private cost (Landell Mills Commodities Studies Ltd 1991).

International experience suggests that significant improvements can be achieved once a performance/quality based payment system is introduced (Todd, Forber and Digges 2004). Such a system would encourage growers to supply quality sugarcane and the miller to increase its sugar recovery efficiency, thus allowing the industry to grow. It would also give incentives to the stakeholders to respond to market forces and achieve dynamic efficiency without ongoing input from the government. The government has considered introducing a cane quality payment system. Moreover, the industry invested in near infra-red based quality assessment equipment at one mill. However, there has not been the political will to implement a cane quality payment system. The main political party in opposition in the Fiji Parliament has opposed its adoption, no doubt for the purpose of keeping sugar industry issues alive for their own political advantage.

Compensatory aid and transferable farm quotas

If the ongoing negotiations with the EU conclude with an Economic Partnership Agreement and compensatory aid or 'quota rent' (Woldekidan 1992)—the difference between the current preferential price and the reformed Protocol price—paid in the form of development aid (ACP Group of Countries 2003; European Commission 2003), the impacts of the decline in prices on the farms and farmers can be reduced by using the



funds to encourage much needed structural adjustment, as well as providing an enabling environment in which alternative income generating activities can develop.

One suggestion is to hypothecate the compensatory aid for such use, rather than the resources being channeled into consolidated revenue. The hypothecated funds could be used to buy out the farmers who are non-productive or are willing to leave the industry. Past and current governments have granted F\$28,000/farmer (under the Chaudhry Labor government) and F\$10,000/farmer (under the Qarase government) payments for exiting farmers, regardless of farm size and output. Such pork-barrelling resulted in government officials handpicking farmers for payment, since more farmers were interested in taking the money than there were funds allocated for the purpose.

Hypothecated compensatory aid could make it possible to establish a rational market-based 'buy out', using the transferable quota/entitlement approach adopted in natural resource management in Australia (see, for example, Lal and Brown (1993) and Geen and Nayer (1989) for individual transferable quotas in southern bluefin tuna, and Pigram et al. (1992) for individual transferable entitlements in water).

This approach could use the existing 'supply contract' that each farmer holds. Currently, each registered grower is assigned a farm basic allotment (FBA) and a harvest quota (FHQ), which is implicitly considered as part of their supply contract under the Master Award. The FBA is attached to the farm and is defined as the average of the last three years' production. The aggregate FBA forms the national basic allotment, which is used each year to determine the farm harvest quota, taking into account the expected market demand for Fiji sugar. In essence, the individual FBA can be considered as an entitlement or property right to produce a quantity of cane, and the FHQ is the annual allowance or quota.

If the FBAs were treated as individual property rights that could be traded, the farmers could have the choice of selling their entitlement or continuing to produce cane. As noted earlier, in 2003 only about 40 per cent of growers produced 200 tonnes of cane or more, with almost one-fifth of growers producing less than 50 tonnes. Many of the small producers continue to produce in order to retain their cane registration status and thus continue to live on the farm.

However, given the parlous state of the industry, the uncertainty over land leases, and the certain decline in the sugar prices, a market for FBAs is unlikely to emerge. For this reason, it is suggested that the total value of the FBA of the industry could be estimated under the assumption that compensatory aid is provided in perpetuity and a 'price' per FBA unit determined, thus setting a 'market price' for a tonne of cane.

There are two options for adjustment. First, with the compensatory aid in hand, the industry could buy out growers wanting to leave sugarcane farming. Through such a process, only producers who expect to make a profit would be left in the industry. Second, producers who wish to remain in the industry could increase their quota levels by purchasing quotas from those who wish to sell. However, the latter option is unlikely to be popular in the short term, given the high level of uncertainty in the industry.

Through the first option, some structure to the adjustment process would be guaranteed and hopefully avoid government intervention or discretion. Such an approach would minimise the possibility of the government 'hand picking' growers given 'exit' money, as seems to have been the case under the current government and the previous Chaudhry government.

The system could be established at little additional cost, since the necessary database exists. Only a clearing-house for the transactions would be needed. The Sugar



Industry Tribunal, which maintains the cane register, could easily provide this service.

Conclusions

Time is running out on the Fiji sugar industry. In the short term, there will be many casualties of trade liberalisation. Many cane farmers will lose their source of livelihood, and many of those who remain financially viable will fall below the poverty line. Their only salvation will be in finding other sources of income. Urban drift will be inevitable, placing additional pressure on already stretched infrastructure.

Unless economic and technical efficiency are improved, farmers will experience a decline in their net incomes by one-half to two-thirds. Landowners will see a significant decline in their rental income. The reduction in the incomes of growers, cutters, and landowners will have flow-on effects in the cane belt and the economy as a whole. Urban centers in the cane belt, which are mostly reliant on sugar revenue, could become ghost towns. Unemployment in rural and urban areas could be expected to increase, as may the social problems associated with unemployment.

In the medium to long term, whether the expected reduction in the Protocol price is deferred or not, Fiji's sugar industry cannot survive without major structural adjustments resulting in economic and technical efficiency gains in all sectors of the industry. The recent decision to invest about F\$86 million mainly in upgrading the mills and improving milling efficiency may improve mill efficiency, but the benefits of this expenditure may be short-lived unless the poor governance that is pervasive throughout management in this sector is also addressed.

While it may be possible for the sugar industry to survive the reduction in Protocol prices, it will be on a scale similar to the pre Lomé Convention days. But survival will be conditional on land tenure problems being

resolved, farms being allowed to increase in size through market mechanisms, and improved governance in the industry, resulting in an efficient and diversified farming sector and an efficient miller. Furthermore, the industry must seriously consider the economic viability of the cogeneration of electricity using bagasse and perhaps ethanol.

In a reformed and considerably reduced industry, growers and the miller will work in harmony and with a common vision of a commercial industry that can compete on the open market without subsidies from the government, the European Union or other trading partners. This outcome rests on the ability of the industry stakeholders, including the major political parties and the government, to put aside their differences and work together to make informed decisions underpinned by rigorous and objective analysis. Without such an approach, Fiji's sugar industry will suffer a slow and painful demise.

Notes

- ¹ Members include Australia, Brazil, Canada, Chile, Colombia, El Salvador, Guatemala, Honduras, India, Nicaragua, Panama, Thailand and South Africa (Canadian Sugar Institute 2000).
- ² The World Bank, quoted by Larson and Borrell (2001:9), noted that preferential access to the European Union and the United States had a limited development impact in Fiji.
- ³ The ratio is adjusted upwards in favour of the growers as the volume of sugar processed increases beyond 375,000 tonnes (Kermode 1989).
- ⁴ More recent statistics are not used in this report because detailed farm-level census statistics had not been checked and validated at the time this paper was finalised.
- ⁵ This is the quantity of Special Preferential Sugar sugar quota in 2006, which under the Cotonou Agreement has been declining and will become zero in 2007.



- ⁶ TCTS of 9.15 is a rather optimistic scenario given the past five-year average has been 10.21 tonnes cane to produce one tonne of sugar. However, with an injection of about F\$100 million to upgrade the mills, it is possible to increase sugar recovery, and thus a TCTS of 9.15 is assumed in determining the mill gate cane price for lorry farms and farm gate price for rail growers.
- ⁷ RSE is relative standard error expressed as a percentage, that is, (standard error/value) x 100.
- ⁸ This is almost 500 times the number of growers who lost their leases due to non-renewal in 2003.
- ⁹ Farmers' recall of the interest rate at which they had borrowed was found to be unreliable, just as they could not remember with any degree of reliability their annual loan payments. This data was thus not included in the financial analysis.
- ¹⁰ Benefit cost analysis done by the Fiji Sugar Corporation suggests negative returns to the investment particularly if the expected decrease in EU prices are factored in.

References

- African, Caribbean and Pacific Group of States, 2003. Workshop on the Sugar Protocol in the Context of Economic Partnership Agreements, in Particular the Implementation of Article 36(4) of the Cotonou Agreement, 23–24 June. ACP/63/044/03 Rev 1, Brussels:2, Eighth Special ACP Ministerial Conference on Sugar, 21–24 July, Sigatoka.
- ACP Sugar Group, 2001. *ACP Sugar Trade*, ACP Sugar Group, Secretariat of the African, Caribbean and Pacific Group of States, Brussels. Available online at <http://www.acpsugar.org/protocols.htm> (accessed 16 May 2005).
- Akram-Lodhi, A.K., 1998. 'Fiji and the sugar protocol: a case for trade-based development cooperation', *Development Policy Reform*, 16(1):39–60.
- Barrack, G. and May, J., 1997. *Fiji and the Sugar Protocol*, European Centre for Development Policy Management, Maastricht.
- Booker Agriculture International Limited, 1981. *Fiji Cane Transport Study: main report*, Government of Fiji, London.
- Borrell, B. and Duncan, R., 1993. 'A survey of world sugar policies', in S.V. Marks and K.E. Maskus (eds), *The Economics and Politics of World Sugar Policies*, University of Michigan Press, Ann Arbor:15–48.
- , 1990. *A Survey of the Cost of World Sugar Policies*, Working Paper, International Economics Department, The World Bank, Washington DC.
- Borrell, B. and Pearce, D., 1999. *Sugar: the taste test of trade liberalisation*, Centre for International Economics, Canberra.
- Canadian Sugar Institute, 2000. 'Global alliance for sugar trade reform meeting', *Sugar News*, 17 October. Available online at <http://www.sugar.ca/17OctPrt.htm> (Accessed 28 May 2005).
- Diaz-Bonilla, E. and Reca, L., 2000. 'Trade and agroindustrialization in developing countries: trends and policy impacts', *Agricultural Systems*, 23:219–29.
- Duncan, R., 2002. 'Fiji sugar: preferential market prospects', Report prepared for the ACIAR-funded project The Fiji Sugar Industry: effects of market reforms and opportunities for growth and diversification, The Australian National University, Canberra.
- European Centre for Development Policy Management, 1998. *Towards an ACP position: exploring ACP responses to the EU proposal for Regional Economic Partnership Agreements*, Lomé Negotiating Brief 4, European Centre for Development Policy Management, Maastricht.
- European Commission, 2003. 'A brief guide to the European Union sugar policy', Eighth Special ACP Ministerial Conference on Sugar, Sigatoka, 21–24 July.
- Fiji Sugar Marketing, 2004a. *EU Sugar*



- Regime Reform*, Fiji Sugar Marketing, Lautoka.
- Geen, G. and Nayer, M., 1989. 'Individual transferable quotas in the southern bluefin tuna fishery: an economic appraisal', in P.A. Neyer, R. Arnason and N. Mollet (eds), *Rights Based Fishing*, Kluwer Academic Publishers, London.
- Goldin, I. and Knudsen, O., 1999. *Agricultural Trade Liberalisation: implications for developing countries*, Organisation for Economic Cooperation and Development, Paris, and the World Bank, Washington, DC.
- Indian Sugar Technology Mission, 2004. *Road to Success for Fiji Sugar Industry, 2004–2007. A Report to the Fiji Government*, Indian Sugar Technology Mission, New Delhi.
- Kasper, W., 2001. 'How to learn racial harmony? Fiji would benefit from rules for a new game', *Pacific Economic Bulletin*, 16(1):136–41.
- Kermode, R.G., 1989. 'Report of sugar industry tribunal', in *Sugar Industry Tribunal Master Award and Report*, Sugar Industry Tribunal, Suva:67–144.
- Kumar, P. and Prasad, B.C., 2004. Environmental impacts of the Lomé Trade Agreement and Fiji's exports', *Fijian Studies: A Journal of Contemporary Fiji*, 2:75–108.
- Lal, P., 2003a. 'Fiji sugar industry reforms—bitter sweet pills', paper presented to the Fiji Cabinet Subcommittee on Sugar, Suva, October.
- , 2003b. Reform for Efficiency Gains: industry status and prospects for reform, Paper presented at the Sugar Cane Growers' Councilors' Workshop, Sugar Cane Growers Council, Lautoka, Fiji.
- , 2005. Agency costs, corporate governance and the Fiji Sugar Corporation, Pacific Islands Forum Secretariat, Suva (mimeo).
- Lal, P. and Brown, D., 1993. 'TTQs in Commonwealth fisheries management: a case study of southern bluefin and southeast fisheries', P. Lal and D. Young (eds), *Use of Economic Instruments in Integrated Coastal Zone Management*, Australian Bureau for Agricultural and Resource Economics, Canberra:29–56.
- Lal, P. and Rita, R., 2004. 'The Fiji sugar industry and good governance—the good, the bad and the ugly lessons', paper presented at the World Sugar Farmers' Conference, Fargo, 27–30 July.
- , 2005. Sugarcane production in Fiji: farmer profile and farm profitability, Draft Survey Report, Lautoka.
- Landel Mill Commodities Studies Ltd, 1991. *A Review of the Sugar Industry in Fiji*, LMC International Ltd, Oxford.
- Larson, D.F. and Borrell, B., 2001. *Sugar policy and reform*, Policy Research Working Paper Series 2602, World Bank, Washington, DC.
- Leslie, D. and Ratukalou, I., 2002. *Review of Rural Land-use in Fiji: opportunities for the new millennium*, Ministry of Agriculture, Sugar and Land Resettlement, Suva.
- Levantis, T., Jotzo, F. and Tulpule, V., 2003. *Ending of EU sugar trade preferences: potential consequences for Fiji*, Current Issues 03.02, Australian Bureau of Agricultural and Resource Economics, Canberra.
- LMC International and Management, O.P., 2004. *Safeguarding the Benefits of the Sugar Protocol to ACP countries*, LMC International, Oxford.
- Males, W., 2000. *Sugar Liberalisation: are there winners and losers?*, 9th International Seminar, International Sugar Organisation, London.
- McConnell, D. and Dillon, J., 1997. *Farm Management System for Asia: a systems approach*, UN Food and Agriculture Organisation, Rome.



- Mendenhall, W., Reinmuth, J.E. and Beaver, R., 1986. *Statistics for Management and Economics*, PWS-Kent Publishing Company, Boston.
- Pigram, J.J., Delforce, R.J., Coelli, M.L., Norris, V., Antony, G., Anderson, R.L. and Musgrave, W.F., 1992. 'Transferable water entitlements in Australia', report to the Land and Water Resources Research and Development Corporation, Centre for Water Policy Research, University of New England, Armidale.
- OXFAM, 2002. *The Great EU Sugar Scam: how Europe's sugar regime is devastating livelihoods in the developing world*, Oxfam Briefing Paper 27, Oxfam, London.
- Prasad, B.C. and Tisdell, C., 1996. 'Getting property rights "right": land tenure in Fiji', *Pacific Economic Bulletin*, 11(1):31–46.
- Reddy, M., 1998. Production economic analysis, PhD, Department of Agricultural and Resource Economics, University of Hawaii, Hawaii.
- Rita, R., 2004. Negotiation support system: a tool for determining agricultural land rent in Fiji, Master Thesis, Asia Pacific School of Economics and Government, The Australian National University, Canberra (unpublished).
- Roberts, I.M., 1982. *EC Sugar Support Protocol and World Market Prices*, Discussion Paper 82/13, Bureau of Agricultural Economics, Canberra.
- Sharma, R., Konandreas, P. and Greenfield, J., 1996. 'An overview of the assessments of the impact of Uruguay round on agricultural prices and income', *Food Policy*, 21(4/5):351–63.
- Stoeckel, A. and Borrell, B., 2001. *Preferential trade in developing countries: bad aid after bad trade*, Rural Research and Development Corporation, Canberra.
- Todd, M., Forber, G. and Digges, P., 2004. 'Cane payment systems', in G. James (ed.), *Sugarcane*, Blackwell Science, Melbourne:181–94.
- Twyford, I.T. and Wright, A.C.S., 1965. *The Soil Resources of the Fiji Islands*, Her Majesty's Printer, Eyre and Spottiswoode Limited, United Kingdom.
- Tyers, R. and Anderson, K., 1987. *Liberalisation of OECD Agricultural Protection in Uruguay Round: effects on quota and welfare*, National Centre for Development Studies, The Australian National University, Canberra.
- United Nations Development Programme, 1997. *Human Development Report 1997: human development to eradicate poverty*, United Nations Development Programme, New York.
- Verebalavu, J., 1998. Indigenous Fijians in business: a study of cane farmers, Master of Arts thesis, Economics Department, University of South Pacific, Suva.
- Woldekidan, B., 1992. *Impact of the EU Sugar Trade Liberalization on the Mauritian economy: a CGE simulation*, Working Paper 92/8, Economic Division, Research School of Pacific and Asian Studies, The Australian National University, Canberra.

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