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THE BARBADOS DAIRY INDUSTRY

An Attempt at Diversification and Import Substitution

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INTRODUCTION

This paper examines the development of the Barbados Dairy Industry to date and notes its limited contribution to the economy. The scope for further development is considered and the desirability of promoting this development questioned.

RECENT DEVELOPMENTS IN THE DAIRY INDUSTRY

The existence of a monocrop agricultural economy with an uncertain future prompted Government to promote diversification and the lack of suitable export alternatives led to a programme of import substitution.

Of the land-using enterprises chosen for development, dairying received major emphasis. The high and increasing cost of dairy imports and the potentially high output per acre led to this choice. Imports increased by 50 per cent in volume to 33.9 million pounds of fresh milk equivalent from 1960 to 1966, while over the same period the cost of imports increased by 10 per cent to \$3.0 million.

Manufacturing

A milk plant (the Pine Hill Dairy) was established with "pioneer" status in 1966 to process and distribute locally produced milk. Facilities were also provided for the reconstitution of milk powder into evaporated and condensed milk. (The New Zealand Dairy Board, one of the world's main producers of milk powder, is a major shareholder in the Plant.)

Supplies of milk to the Plant increased steadily from the opening in April 1966, but from 1967 to 1968, the increase was less than eight per cent.

Condensed milk has been successfully manufactured at the Plant and sales have increased steadily. Evaporated milk was at first made successfully, but problems developed with the equipment and since that time all evaporated milk has been imported—the Milk Plant being the sole agent.

As the cheapest source of milk available to the public (Table 1), milk powder was imported by several agents and constituted about 25 per cent of total milk consumption (Table 2). In 1968, the Plant was granted the sole importing rights for milk powder and since that time, supplies of milk powder have been withheld from stores. The majority of consumers have changed to evaporated milk—now the cheapest source of milk.

Total sales by the Plant have increased rapidly and were approximately \$4.5 million in 1968. However, the import content of these sales was high: only labour, services (electricity, water, etc.) and fresh

milk are of local origin; even sugar is imported. Wages and salaries paid to staff were \$300,000.00 and \$590,000.00 was paid out to farmers for fresh milk.

Production¹

Although intake by the Plant increased from 1966 to 1967, it appears that the total supply of locally produced milk (that is, including that not sold through the Plant) has not increased significantly. Rather, production has been relocated and the industry restructured.

In the first instance some dairies were expanded by the purchase of cows from small farmers, and subsequently, imported stock have replaced some local animals. Since the initial increase in herd size, however, the total number of cows on farms supplying milk to the Plant has remained the same.

Prior to the opening of the Plant and the emphasis by Government on diversification, commercial milk production was centred in and around Bridgetown—close to the main market. Cows kept on small farms were mainly to be found in the areas least suitable for cane—the Low Rainfall Areas and the Scotland District—while the minimum number of animals to comply with the Local Food Production (Defence) Order 1942, was maintained in the better sugar producing areas. Fodder for all of these cows was cut from land unsuitable for cultivation during the wet season, while cane tops were available during the dry season.

Since the establishment of the Milk Plant, a number of dairies have been established in the marginal sugar cane areas, and it is on these farms that the majority of the improved pastures in the Island are to be found. The area planted in grassland which was formerly in sugar cane is approximately 500 acres—including two Government stations. (No land has been taken out of cane in order to plant grass in the regions of high cane yield.) The estimated reduction in sugar production from this land is 12,700 tons of cane or 1,270 tons of sugar.

The number of cows in city dairies has been reduced and this trend is expected to continue. Also the number of cows on small farms is estimated to have declined as owners have sold their animals to farms supplying milk to the Plant.

In spite of the relocation, grassland production is neither common nor efficient and milk production

¹ All statistics refer to farms supplying milk to the Milk Plant, unless otherwise stated.

is still based largely on concentrate feeding and traditional sources of fodder.

The gross annual income from milk production in 1968 was \$590,000.00 (14.75 cents per pound) and in order to produce this output approximately \$196,000.00 of feedingstuff ingredients and compounded feedingstuffs were imported. A further \$36,000.00 of feedingstuffs were imported in order to rear replacement stock.

Whereas the production of milk has remained relatively constant the number of persons employed on dairy farms has decreased as milking machines have become more common and milk delivery has been taken over by the Milk Plant. The annual wage bill in 1968 for workers on dairy farms was approximately \$100-120,000.00.

Milk Prices and Subsidies

By maintaining a high farmers' price for milk in order to encourage production, and a reasonable retail price to encourage consumption, it has been necessary to subsidise the Industry. This has been carried out through the Milk Plant, which is now the sole agent for milk in the Island. The cost of collection, processing, packaging and distribution is subsidised from the higher retail price paid by the public for evaporated and condensed milk: high profits from this department of the Plant off-setting losses in the fresh milk section. Thus when the price paid by the public for evaporated and condensed milk was increased by 2 cents per tin¹ in early 1968, this was partly to offset the effects of devaluation but also to give a bigger margin to the Milk Plant. The beneficiaries of this increase were dairy farmers and the consumers of fresh pasteurised milk — a luxury product.

The situation was aggravated when, having been granted the sole importing rights for milk powder in mid-1968, the Milk Plant, with Government's consent, withheld supplies of powder from stores. Unable to purchase milk powder, the majority of consumers now buy evaporated milk sold at the inflated price.

To summarise the results of the dairy development programme so far :

- 1) Employment has been created in the Milk Plant, and has been maintained for a reduced number of workers on dairy farms.
- 2) Retail prices of evaporated and condensed milk have been increased in order to subsidise fresh milk production and consumption.
- 3) Milk production has been reorganised partly, with farms being established in marginal sugar areas.

- 4) The acreage under sugar has been reduced in order to plant grass, but milk production remains based on imported concentrates.

FUTURE PROSPECTS

Although the performance of the dairy industry to date is not impressive it may be argued that the first three years of operation were a transition period. What then are the future prospects for the industry and its contribution to the economy ?

Demand

Imports of milk products have shown a significant increase in recent years (of 50 per cent from 1960 to 1966) but since 1964 imports per capita have been very stable and there is some indication that consumption may have reached a temporary ceiling (Figure 1). Should imports continue to rise only at the same rate as the population increase this would be at the relatively low rate of 1.3 per cent per year.

On the basis of these figures it is estimated that by 1975, unless there is a significant change in consumption patterns or in the production of the local industry, imports will have risen to \$3.4 million (assuming import prices remain constant) or 38.15 million pounds of fresh milk equivalent.

Import Substitution

In Table 3 are set out the savings in milk imports which would be made and the increases in local production that would be necessary in order to achieve various levels of import substitution. In 1968 production was approximately 4.0 million pounds.

The resources which would be required in 1975 to achieve these levels of production are set out in Table 4. Improved standards of technology, which should be in practice by that time, are assumed.

Since all of the cultivable land in the Island is now in use, the effects of the appropriation of land for a new enterprise must be studied.

Output per Acre

At existing prices there is an incentive for farmers in dry marginal cane areas to begin milk production as gross margins per acre from milk are considerably higher than from cane (Table 5). In the higher rainfall areas where cane yields are greater, grassland production and hence the stocking rate would also be higher. With a stocking rate of one cow per acre the gross margin from dairying would be approximately \$400-450.00 per acre, whereas cane yielding 35 tons per acre would give only about \$300.00 per acre. Thus even in the high rainfall regions dairying appears capable of competing with the well established cane farming in terms of profitability.

¹ Of the increase on condensed milk, 0.5 cent was granted to distributors.

Balance of Payments

The possible effects on the balance of payments of a reduced cane acreage are, however, not so encouraging.

Cane yielding 25 tons per acre produces approximately 2.5 tons of sugar. Sold under the Commonwealth Sugar Agreement (approximately \$240.00 per ton) the foreign exchange earnings would be \$600.00 per acre. Even at the current world market price or the price suggested at the last International Sugar Agreement Conference (\$150.00 per ton) the export earnings would be \$375.00 per acre.

On the other hand the savings in milk imports would be considerably less. One pound of fresh milk equivalent (as powder) can be bought on the world market (c.i.f. Barbados) for about five cents. With an average output per acre of 5,600 pounds¹ the direct import saving per acre would be only \$280.00. Furthermore, part of this output is derived from imported concentrates, the cost of which would be approximately \$136.00 per acre of land utilised for milk production.²

Thus the net effect on the balance of payments per acre of land transferred from sugar cane to dairying at current prices would be a loss of \$456.00 (loss of exports \$600.00 and additional imports \$136.00: saved imports \$280.00) or \$231.00 if the price of sugar was only \$150.00 per ton. Furthermore, this figure takes no account of the imports of specialist capital equipment which would be required for an expanded dairy industry.

Employment

There is an annual voluntary reduction in the agricultural labour force, evidence of which can be seen in the increasing numbers of St. Lucians and Vincentians allowed into the Island each year to assist in the sugar harvest. Sugar producers are responding to this reduced supply of labour and its

¹ An additional 25 per cent of the acreage required for the milking cows is required for replacements; thus output equals 7,000 pounds per 1.25 acres or 5,600 pounds per acre.

² The ratio of milk to concentrate is 3 pounds : 1 pound concentrate; however, taking account of the concentrates required for replacement stock, the ratio is 2.6:1. The total concentrate requirement per acre is therefore 5,600 divided by 2.6, or 2,105 pounds. At an import cost of 6.5 cents per pound, the cost is \$136.00.

higher cost, through increased wage rates, by turning to mechanisation of planting, cutting and loading. Employment in the sugar industry can therefore be expected to fall still further even if the acreage under sugar cane remains the same.

Employment per unit of land in dairying is considerably less than in sugar, but has the advantage of being constant throughout the year, whereas sugar workers are employed for only three days per week for several months of the year. An expansion of dairying will therefore reduce rather than increase employment and cannot be considered as a solution to the growing unemployment problem. Furthermore, like plantation work, working with cows is apparently not an attractive job, for even with the present small dairy industry good men are scarce.

The capital investment per job in dairying would also be high. Investment per cow is at least \$1,000-1,500.00, and with 15 cows per man the cost per job could be no less than \$15,000.00. This does not include the value of land, which in Barbados is rarely less than \$1,500.00 per acre.

Milk Prices and Subsidies

Unless imports of milk products are further restricted, the demand for locally produced milk, based on past experience, will depend largely on price. At the present time local production is subsidised from the inflated price of other milk products, but if production grows substantially, could demand be significantly increased at current prices, or must the price of other milk products be again raised in order to improve the competitive position of fresh milk? But, if by increasing the demand for fresh milk, the demand for milk products is reduced, the subsidy available to lower the price of fresh milk would also be reduced!

CONCLUSIONS

The high returns per acre from dairying make this enterprise an attractive one for the farmer. However, the effect of an expanded dairy industry on the balance of payments, on the cost of milk to the public and on employment, must raise the question whether the further development of the dairy industry is in the best interests of the country. And even if marginal cane land is taken out of sugar production due to lack of profitability, thus invalidating the balance of payments consideration: what price increase to the lower income consumer can be justified in order to obtain small import savings?

Table 1 *Retail Prices of Selected Milk Products : Barbados, 1967*

Product	Unit	Price per Unit	Price per pound of Fresh Milk Equivalent
		(cents)	(cents per pound)
Full Cream Powder ^a	5 lb. tin	500	12.5
Skimmed Milk Powder	1 lb. packet	65	8.0
Sweetened Condensed	14 oz. tin	30	14.9 ^b
Evaporated	6 oz. tin	15	17.4
	14½ oz. tin	29	13.9 ^c
Pasteurised	32 oz. carton	45	22.5
Superpasteurised	8 oz. bottle	15	30.0
	16 oz. bottle	25	25.0
Non-pasteurised	pint (16 oz.)	17	17.0

^a No longer available

^b Increased in April 1968 to 15.9 c. (32 c. per tin)

^c Increased in January 1968 to 14.9 c. (31 c. per tin)

Table 2 *Milk Consumption, by Product and Source : Barbados, 1967*

Product	Source	Total Consumption	Proportionate Consumption
		(thousand pounds)	(per cent)
Powder	Imported	10,207	24.3
Condensed	Imp. powder	5,986	14.3
	Local milk	282	0.6
		6,268	14.9
Evaporated	Imp. powder	3,322	7.9
	Local milk	174	0.4
	Imp. 6 oz. tin	7,722	18.4
	Imp. 14½ oz. tin	3,525	8.4
		14,744	35.1
Past. & Cream	Local milk	2,503	6.0
Superpast. & Milk for Schools	Local milk	750	1.8
Non-past. (estim.)	Local milk	7,496	17.9
Total		41,968	100.0

Source : Pine Hill Dairy

Overseas Trade Report, 1967

Table 3 *Import Savings Obtainable by Different Levels of Local Production, and the Required Increase Over Present Production: Barbados, 1968 — 1975*

	Imports Maintained at Present Level	One-half of Total Imports Replaced	All of Total Imports Replaced
	(.....million dollars.....)		
Import Saving in 1975	0.38	1.70	3.40
	(.....per cent.....)		
Total production increase required	94	580	1050
Annual production increase required	7.6	21.2	29.9

Table 4 *Total Resources Required to Supply Present Production and to Replace Different Levels of Milk Imports: Barbados, 1975*

	Imports Maintained at Present Level	One-half of Total Imports Replaced	All of Total Imports Replaced
Number of cows — @ 7,000 lb/cow/year	1,100	3,296	6,021
Acres — @ 1 cow per acre, plus replacements	1,387	4,120	7,526
Number of men ^a — @ 15 cows per man, plus replacements	83	248	450
Concentrates — @ 1 lb. per 3 lb. of milk, plus replacements (short tons)	1,457	4,566	8,342

^a In direct employment in dairying

Table 5 Estimated Gross Margins per Acre of Sugar Cane and Dairying in Low Rainfall Areas : Barbados

	Sugar Cane	Dairying
	(.....dollars.....)	
Gross Output per acre	450	600
Variable Costs per acre	270-300	320-350
Gross Margin per acre	150-180	250-280

Assumptions :

- a) Sugar — output 25 tons per acre at \$18.00 per ton variable costs—from Hudson
- b) Milk — output 6,000 pounds per cow at 15 cents per pound of milk, and one cow per 1½ acres; variable cost — concentrates : 3,000 pounds per year (fed at the rate of 1 pound per 2 pounds of milk) at 10 cents per pound; labour : 1 man per 15 cows at \$30.00 per week; fertiliser : 6 cwt. sulphate and 2 cwt. phosphate.

¹

Hudson, J. C., A Diagrammatic Method for Determining Profitability of Various Systems of Cane Management and Investigating Yield Relationships to Profitability, Edgehill, Barbados, 1966, (cyclostyled).

Figure 1 Milk Consumption and Income (GDP) per Capita: Barbados, 1960 — 1967

