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# MEAT PRODUCTION IN BARBADOS

## Its Scope for Import Substitution and Diversification

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### INTRODUCTION

The agricultural economy of Barbados has always been centred on sugar, an export crop. It is only within recent years that the Government's policy of diversification and import substitution has led to a real interest in the production of other crops and livestock for domestic purposes. Livestock and food crop production were made mandatory on the large sugar estates by the Defence Order Legislation of 1942 — a wartime measure which is still in operation today. However, it seemed that enough was done to comply with the provisions of the Law, by way of growing the required acreages of food crops or by keeping the necessary quantity and type of livestock, but there was a lack of entrepreneurship in the approach to production. In recent years, the establishment of a milk plant and the possibilities for exporting food crops have stimulated production. In these areas, however, this has not been true for locally produced meats except in the case of poultry, and pork to a very limited extent.

This paper attempts to estimate the requirements for meat in Barbados by 1975 as well as the scope for utilizing preparation and marginal sugar lands for producing meat. The prospects for mutton, poultry, pork and beef are considered.

### Mutton

Mutton production has declined in importance in Barbados. The famous Barbados "black belly" now lives on most areas of scrub land and is kept mainly by small peasants. There is no known system of production which may be considered to be commercial. Table 1 shows that the per capita consumption of mutton is about 3 pounds per annum and that the estimated total consumption is about 750,000 pounds per annum. When considering population and income changes as well as tastes and preferences, it is not expected that mutton consumption would exceed 900,000 pounds by 1975. This figure may even be reduced if the other meat sectors produced enough to effect a reduction in their respective prices.

It would seem that in order to reduce the imports of mutton (this was 683,000 pounds in 1966), there would need to be an annual 'off-take' of 9,000 head of sheep and lamb per year in addition to the quantities slaughtered. This is approximately five times as much as the current 'off-take' and it would be necessary to consider some form of commercial operation if Barbados were to satisfy its local requirements. There is no suitable area for this purpose but some use could perhaps be made of the marginal sugar lands in the dry rainfall areas (Christ Church and St. Lucy). Not enough is known of the cost of production from these areas but indications are that they could provide

another 100,000 pounds of mutton per year. This could only be a short-run measure as the value of land in these areas would command alternative uses to mutton production.

### Poultry Meat

The imports of poultry meat constitutes about 20-25 per cent of all meat imports to Barbados. This is mainly in the form of chicken parts and birds over 4 pounds weight. The estimated present total consumption is about 3.5 million pounds with a per capita consumption of approximately 14 pounds per annum (see Table 2). The Industry has been expanding rapidly over the past ten years with production increasing by approximately 200,000 pounds per annum over the period 1957-1966.

It has been suggested that if the Industry was efficiently organised, the price of poultry meat should fall to such an extent that more of the population would be able to consume a high protein diet. A survey of the poultry industry in 1967 concluded that the producers do not employ capital and labour on any rational basis, but tend to overcapitalise and underutilize their production units. Production is not regulated to meet market fluctuations and only limited cold storage facilities are available. Furthermore, there is a lack of statistical and other data relating to the Industry and so it is extremely difficult to make forecasts and predictions.

There is a demand relationship between poultry meat, other meats and fish. When fish is plentiful or when the price of poultry meat rises relative to other meats, the demand for poultry falls. In spite of this difficulty in forecasting demand trends over a substantial period, it is expected that by 1975 the demand for poultry meat would be approximately four million pounds.

There has been some import substitution in the poultry industry but the limits have not been fully attained. What is needed is a phenomenal expansion of the broiler industry as was the case of Trinidad during the last 10 years where the initial expansion of this industry led to a reduction in the price of poultry meat and this resulted in an increase in consumption.

A striking feature of the poultry feed industry is that the locally produced feed has a negligible content of locally grown materials. This is one of the main shortcomings of local feed operations and unless import substitution can generate certain feed-backs into the economy, the effect of such substitution will be minimal. The manufacturer of poultry feed uses local to imported materials in the ratio of about

5 per cent to 95 per cent. The import content of the locally manufactured feed accounts for approximately 80 per cent of the price and when considering capital charges and remittable profits, this value may be as high as 90 per cent. Thus even where feed is manufactured locally the imported content is so high that such import substitution cannot be regarded as effective. When this analysis is applied to broiler production, it will be seen that approximately 72 per cent of the price of broilers represent the cost of imported ingredients with only 28 per cent of the price representing the cost of local ingredients.

Import substitution in the poultry industry has therefore not gone far enough and if some basic work is not carried out early, it may be a very long time before it becomes a significant factor in the poultry industry. Long run results can be forecast by studying the local content of feeds manufactured locally, and also by initiating studies on hatching eggs locally. Since the Industry is not committed to an import substitution policy there may be a lack of interest, and some form of Government intervention may be necessary if progress is to be achieved.

Progress can be made not only through expanding the production of some of the materials now used in feed manufacturing but also by adapting the available raw materials for use in animal feeds. The main ingredients used in poultry rations are grain (corn) and protein (soyabean meal and/or fishmeal). In most poultry feeds the proportion of corn ranges from about 58 to 72 per cent and soyabean meal from 20 to 36 per cent. Barbados now imports approximately 8,000 tons of corn for animal feed uses: to replace these imports 8,000 acres would be required, at the production rate of one ton per acre. At present only 2,500 acres of corn are planted annually on 'preparation land' and on peasant holdings; thus more than three times the present acreage would be needed to satisfy the local corn-feed requirements. It is estimated that 4,375 acres would be required to produce locally the amount of corn currently imported for poultry feed alone. It can be further extrapolated that approximately 7,000 acres of corn would have to be grown locally, if the corn content (70 per cent approximately) of poultry rations were to be met.

It will be clearly seen that a considerable quantity of land presently under sugar would have to be utilized if this acreage were to be made available for corn production. It is, however, possible that with better agronomic techniques, a continually smaller acreage of land could be used to produce two crops of corn per year at higher levels of production.

### **Pork**

Pork is the most highly consumed meat in Barbados. Table 3 shows the imports of pork as well as an estimate of local production and consumption. The salted pork constitutes from 33 to 50 per cent of all the meats imported. Pork consumption in Barbados in 1975 is expected to be approximately 6 million pounds, of which fresh, chilled and frozen

pork would constitute approximately 1½ million pounds. Locally produced pork has had until recent years a controlled ceiling price of 60 cents per pound. This price was also applied to imported pork, and while it was possible to import pork and make a profit at the control price, the same was not true for locally produced pork as the cost of production of the local product was considerably higher than the cost of production of the imported pork. Pigs were, therefore, kept mainly to comply with the legislation of 1942 or as a form of saving, in the case of the small farmer.

Assuming a dressing out percentage of 60 per cent, 6 million pounds of finished products represent at least 9 million pounds of live pigs. If the average weight of a pig is assumed to be 180 pounds, this would represent 50,000 carcasses. Therefore if Barbados is to become self-supporting in pork and pork products, a minimum of 50,000 pigs a year must be slaughtered. If cheap pork by-products are made available, the increased demand would probably necessitate the raising of 75-80,000 pigs per year.

The amount of feed needed for the local production of pigs can be estimated (using the conservative figure of 50,000 pigs and a minimum concentrate level of feed of 3 pounds per pig per day), as 75 short tons of pig feed per day (or 54,750,000 pounds per annum). Concentrate feeds are expensive as they are imported and the same is true of the ingredients for the locally mixed feeds. If it were possible to obtain local materials for use in feed processing, it is likely that the cost of feed would be reduced. At present, the only available feed ingredients are blood meal, fish meal, meat and bone meal, poultry offals, coconut meal and root crops; and the quantities are minimal. Corn is not available in any large quantities but research results suggest that production can be greatly increased. It would seem that there would be competition among the cattle and pig industries, as well as with the human population, for corn, which was locally produced. However, there are economic advantages to be gained by using wheat offals and coconut meal as partial replacements for corn in grower-finisher rations for pigs, and this can be imported from within the Region.

### **Beef**

The production of beef has never been a specialized enterprise in Barbados, largely because it could not compete for the available land, and also because of the high cost of imported feed. The Control Order of 1942 stipulated that one ox, bull, cow or heifer had to be kept for every 20 acres of plantation land, and with the exception of cattle used or intended for breeding purposes, the age of the animal was not to exceed two years. The plantations allowed the peasants to keep cows on their holdings and these animals were kept mainly for milk until it was time to slaughter them for beef. As a result of the low level of production of beef, Barbados now spends over \$2 million annually in imported beef. Statistics on slaughtering indicate that some 1,500 to 2,000 head of cattle are slaughtered annually.

Table 4 presents the relevant data on beef in an attempt to arrive at an estimate of consumption. The data cover 1957 to 1966 and show that over the period, the estimated per capita consumption of beef in Barbados increased from 11 to 21 pounds and total consumption from 2.6 to 5.1 million pounds. Fresh, chilled and frozen beef was approximately 13 per cent by weight and 10 per cent by value. On the basis of population and income projections it is estimated that the consumption of beef in Barbados would be 5.25 million pounds in 1975. In view of the proposed expansion of the dairy industry it is expected that there will be an annual beef take-off, and this would depend on the rate of expansion of dairying. If it is assumed that one-half of the local milk requirements would be met by 1975, the production of beef would not be expected to exceed  $\frac{3}{4}$  million pounds. This would leave  $4\frac{1}{2}$  million pounds still to be provided. If the dressing weight per animal is taken as 400 pounds, this would mean that more than 1,000 head of cattle would be required as an annual take-off. If we consider the use of planted pastures this would mean that more than 22,000 acres of land would be required to fully replace the imports of beef. If we assume a beef animal weighing 800 pounds (dressing weight of 400 pounds) to be sold at 40 cents per pound, then the gross return per acre would be \$160 per year, and this return is small when compared with the return from sugar production. If we consider the production cost from both enterprises, sugar would indicate higher net returns.

There are at least three possibilities for consideration :—

- (1) **The use of sourgrass pasture land.** Sourgrass occupies approximately 2,600 acres in Barbados and is found mainly in the rocky and low rainfall areas. It does not seem possible that pangola grass could be substituted in these areas, and any grazing of sourgrass would require some form of supplemental feeding. This supplement could be obtained from sugar cane by-products.

The by-products of sugar cane cultivation and manufacture — sugar cane tops, bagasse, molasses, filter press mud and rum vat yeast — are a source of animal feed ingredients. Sugar cane tops can be used as the main source of roughage for cattle, especially in the dry season, but the feeding value can be enhanced by the addition of some source of protein. Beef steers have shown superior performance when fed on cane tops and a urea/molasses/vitamin mixture than when fed on cane tops alone. There is thus some scope for complementarity in the sugar and beef industries when it is realized that in fattening cattle, up to 45 per cent of the grain mixture can be replaced by molasses.

Much attention must be paid to the question of utilizing high levels of molasses

in animal rations for beef, and emphasis must be placed on investigations to increase the efficiency of utilization of molasses as a source in livestock feeds so that the proportion of imported cereal grains may be reduced. Urea molasses, in association with vitamins and minerals, is now an effective means of utilizing coarse forages and fibrous waste and there is the urgent need for investigations to raise the efficiency of molasses in these feeding systems. The price of molasses will be the important factor in determining its use in beef production. If prices are reasonable, the production of beef should be encouraged. Enough data is not available in order to determine the costs and returns to molasses utilization in feeds; however, it is to be expected that in another few years the animal industry will derive substantial benefits from this method of feeding.

- (2) **The use of dry lot feeding.** This assumes that the majority of feeder cattle will be located on the Island, and that a potential may exist for the production of grain corn. As both of these assumptions are not likely to be met, the prospects are not encouraging for this type of operation in Barbados.
- (3) **The use of the Scotland Area.** A third possibility exists in the Scotland Area where it is possible that a range of crops, including coconuts, may be established. In many parts of the tropics, beef is produced on grass planted under coconuts. Should it be recommended that coconuts be grown, it is feasible that 10,000 acres could carry 7,500 head of beef. With an annual take-off of 1,800 head at 350 pounds carcass weight each, this could result in the reduction of imports by 675,000 pounds of meat, or by about 50 per cent of the fresh, chilled and frozen beef demand by 1975.

#### SUMMARY AND DISCUSSION

Meat production in Barbados has been commercial only with respect to pigs and poultry. Beef has been produced as a by-product from the dairy industry, and cannot be considered an industry in itself. Mutton production has come mainly from small producers without any organised system of production and the long run prospects are not encouraging. The poultry industry needs to be structured along lines which will enable expansion, and the pork industry needs the benefits of proper marketing and processing facilities. It is possible that both these industries can produce the local requirements. It does not seem likely that the total requirements of beef and mutton will be met locally.

Feed is the major item of cost in all forms of production and the success of diversification and import substitution in terms of meat production will de-

pend on how cheaply this can be produced locally. Corn is the crop of major concern since it is a high proportion of most feeds, and efforts will have to be made to increase yields. Such increased yields will be necessary, not only to produce the ingredients necessary for feed but also that corn as a crop might be competitive with sugar for land. It is suggested that the yields of corn would have to be increased considerably in order for it to be competitive with sugar cane. Sugar gives an average gross return of \$600 per acre whereas the return is approximately \$150 per acre for corn. At least two crops per year would be necessary in order to equate the gross returns with that of sugar.

Sugar cane makes intensive use of land and this is of considerable importance in Barbados where land is limited. It is to be expected, therefore, that any feed crop (corn, sorghum, or grasses) must also be intensive, since land resources are limited and it is not to be expected that any system of livestock production would involve vast areas for grazing. Not only is the land unavailable but returns are not competitive with sugar.

Expanding meat production would involve some risk and considerable research on adaptable breeds, disease control and seasonal characteristics. The current research, which is mainly on nutritional aspects, is extremely important. Because of the long association with sugar, it may take some time before the farming community adjusts to the decision-making problems associated with livestock production. The knowledge, skill and management required for meat production are different than for sugar production and there is likely to be a shortage of these skilled people in the Island.

One of the key factors which could retard the extent of diversification in meat production is the nature of the farm size structure. Many of the farms in Barbados are less than five acres and the large farms can vary from 100 to 400 acres. There are few farms in between these gaps. On the small farms, a few head of livestock and poultry have been kept mainly as a means of peasant savings. The pig kept mainly on swill, the cow kept on cane tops and roadside grazing, and the common backyard fowl have been the main feature of small farming livestock production. The large estate, on the other hand, kept the mandatory requirements but was not particularly in-

terested in livestock. It seems unlikely that against this background, a viable and dynamic meat economy could develop. Certainly the peasant farms do not appear to possess the scope for commercial development, especially as most of the small producers may be part-time farmers. Any substantial development along commercial lines must come from the cane producers who possess generally better soils in higher rainfall areas. Furthermore, the problems of fragmentation and praedial larceny would be associated more with peasant operations than with large estates.

It is expected that competition for underground water would be a problem as shortages in some areas restrict the irrigation practices for food crop and dairying.

Barbados is atypical in that it has no areas of natural grasslands as do some of the other Caribbean territories, and any development of a beef industry must come from cheap by-products of sugar. There are no by-products available from other crops, for example citrus meal. A further hindrance to livestock development in Barbados is the unique legislation which prevents livestock from being kept in certain parts of the Island.

The meat industry in Barbados must take cognisance of the tourist industry. As tourism expands, more meat will be required out of proportion with the needs of the resident population. The tourist industry may also demand special types and cuts of meat which should be produced locally. It does not seem, however, that these requirements will be met.

Meat production as an alternative or supplement to sugar cane production must be competitive. It should improve the balance of trade position by reducing imports, as well as improving the overall balance of payments. There seems to be some scope in Barbados for meeting a greater proportion of the local meat requirements, particularly poultry and pork. However, sugar is still in a better position, as crops needed for livestock feeds do not appear to be able to compete with sugar for available land. As far as beef is concerned, it is worthwhile for Barbados to consider imports from within the Caribbean Commonwealth area where the potential exists in Jamaica, British Honduras and Guyana.

**Table 1** *Estimated Consumption and Mutton Imports: Barbados, 1957-1966*

Year	Mutton Imports				Estimated Local Production (pounds)	Estimated Total Consumption (pounds)	Estimated Per Capita Consumption (pounds)
	Quantity	Value (c.i.f.)	As a % of all meat imports				
	(pounds)	(dollars)	Quantity (per cent)	Value (per cent)			
1957	156,886	74,796	2.06	3.23	217,000	373,886	1.21
1958	177,458	80,839	3.61	2.87	212,700	390,158	1.70
1959	89,698	44,968	0.68	2.16	220,500	310,198	1.33
1960	110,905	59,280	1.62	2.48	233,400	344,305	1.48
1961	191,137	102,077	2.43	3.42	221,200	412,337	1.77
1962	197,435	96,455	2.36	3.61	148,200	345,635	1.47
1963	217,082	105,314	2.42	3.24	196,400	413,482	1.73
1964	278,837	132,331	3.01	4.05	211,600	490,437	2.02
1965	607,476	309,394	5.32	6.25	232,100	839,526	3.43
1966	462,838	232,020	4.57	4.68	221,100	683,938	2.76

Source : Overseas Trade Reports, 1957 to 1966

Abstract of Statistics, 1965 (local production estimated from statistics on Number of Animals Slaughtered)

**Table 2** *Estimated Consumption and Poultry Meat Imports: Barbados, 1957-1966*

Year	Poultry Imports				Estimated Local Production (pounds)	Estimated Total Consumption (pounds)	Estimated Per Capita Consumption (pounds)
	Quantity	Value (c.i.f.)	As a % of all meat imports				
	(pounds)	(dollars)	Quantity (per cent)	Value (per cent)			
1957	179,541	108,829	2.34	4.70	412,300	591,841	2.66
1958	655,908	250,023	13.35	8.87	406,200	1,062,108	4.62
1959	534,167	237,680	8.12	11.40	467,300	1,001,467	4.30
1960	617,372	306,622	9.04	12.85	481,800	1,099,172	4.76
1961	927,022	425,747	11.79	14.24	507,400	1,434,422	6.17
1962	1,183,500	517,695	14.14	19.38	582,300	1,765,800	7.49
1963	958,012	406,326	10.67	12.48	726,600	1,684,612	7.05
1964	1,433,187	512,556	15.46	15.68	640,964	2,074,151	8.55
1965	2,217,024	956,688	19.39	19.31	524,300	2,741,324	11.19
1966	2,817,504	962,394	27.80	19.40	573,100	3,390,604	13.66

Source : Overseas Trade Reports, 1957 to 1966

Abstract of Statistics, 1965

Table 3

## Estimated Consumption and Imports of Pork : Barbados, 1957—1966

Year	Pork (fresh, chilled, frozen)				Pork (salted)				Estimated Local Production	Estimated Total Consumption	Estimated Per Capita Consumption
	Quantity	Value (c.i.f.)	As a % of all meat imports		Quantity	Value (c.i.f.)	As a % of all meat imports				
			Quantity	Value			Quantity	Value			
(pounds)	(dollars)	(per cent)	(per cent)	(pounds)	(dollars)	(per cent)	(per cent)	(pounds)	(pounds)	(pounds)	
1957	22,961	20,360	0.30	0.88	4,009,911	1,079,861	52.70	46.62	1,018,776	5,041,648	22.28
1958	19,033	8,669	0.38	3.08	1,213,557	1,255,494	24.70	44.55	1,050,192	2,282,782	9.94
1959	16,496	10,054	0.25	0.48	4,254,989	1,085,177	64.65	52.01	1,140,348	5,411,833	23.22
1960	9,991	7,507	0.15	0.31	4,283,894	1,164,411	62.72	48.80	1,184,832	5,479,717	23.51
1961	67,120	32,152	0.72	1.08	4,221,241	1,303,654	53.69	43.62	1,018,908	5,308,269	22.84
1962	222,303	102,317	0.26	3.83	4,142,181	1,196,285	49.50	44.79	808,104	5,172,588	21.93
1963	169,422	74,164	1.88	2.28	4,639,519	1,376,799	51.66	42.30	869,616	5,678,557	23.78
1964	29,602	10,134	0.32	0.31	4,213,868	1,095,238	45.45	33.50	1,511,004	5,754,474	23.71
1965	290,225	144,420	2.54	2.92	4,128,842	1,304,905	36.13	26.34	1,001,352	5,420,419	22.13
1966	113,097	45,081	1.12	0.91	3,672,165	1,550,133	36.23	31.24	1,584,000	5,369,262	21.63

Source : Overseas Trade Reports, 1957-1966

Abstract of Statistics, 1965

Table 4

## Estimated Consumption and Imports of Beef : Barbados 1957—1966

Year	Beef (fresh, chilled, frozen)				Beef (salted)				Estimated Local Production	Estimated Total Consumption	Estimated Per Capita Consumption
	Quantity	Value (c.i.f.)	As a % of all meat imports		Quantity	Value (c.i.f.)	As a % of all meat imports				
			Quantity	Value			Quantity	Value			
(pounds)	(dollars)	(per cent)	(per cent)	(pounds)	(dollars)	(per cent)	(per cent)	(pounds)	(pounds)	(pounds)	
1957	2,206,564	697,153	29.00	30.10	1,055,680	355,450	13.87	15.35	824,925	4,086,169	18.06
1958	2,269,804	924,094	46.21	32.79	695,473	307,550	14.16	10.91	868,350	3,833,627	16.69
1959	1,243,385	561,697	18.90	26.92	467,434	117,054	7.10	22.40	912,375	2,623,194	11.25
1960	1,258,714	658,027	18.43	27.58	558,966	197,506	8.18	8.36	877,400	2,695,080	11.56
1961	1,627,301	813,125	20.71	27.21	895,803	344,234	11.39	11.52	965,125	3,488,229	15.00
1962	2,119,317	987,137	25.33	36.96	725,733	273,089	8.67	10.23	690,850	3,535,900	14.99
1963	2,066,098	1,022,252	23.00	31.41	1,100,759	344,336	12.26	10.58	800,125	3,966,982	16.61
1964	2,083,889	1,180,605	22.47	36.11	1,232,782	338,228	13.30	10.35	903,475	4,220,146	17.40
1965	2,907,517	1,835,418	25.44	37.05	1,567,997	547,593	13.72	11.05	711,150	5,186,664	21.08
1966	1,932,166	1,424,856	19.06	28.71	1,251,358	561,861	12.25	11.32	824,250	4,007,804	16.15

Source : Overseas Trade Reports, 1957-1966

Abstract of Statistics, 1965

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