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# THE AGRICULTURAL SECTOR OF ST. KITTS/NEVIS<sup>1</sup>

## THE SUGAR SUB-SECTOR, ST. KITTS

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As the title indicates, this paper confines its discussion of the sugar industry to the island of St. Kitts in the three-island State of St. Kitts/Nevis/Anguilla. Sugar was grown in Nevis, in recent times, as a smallholder crop but the conditions are not good for efficient cane growing: the cane had to be transported to the sugar factory in St. Kitts by sea (at an uneconomic cost), and the potential acreage for sugar production in Nevis is too small to support its own factory. The conditions in Anguilla - poor soil and low rainfall - make an efficient sugar industry impractical.

Sugar has been the major industry in St. Kitts for hundreds of years and, indeed, until recently was almost the only industry. In 1970, sugar and molasses accounted for nearly 80 per cent of the total value of domestic exports and represented over 63 per cent in 1975, after the newly established electrical machinery industry had entered the field with 29 per cent of the total exports in a year of low sugar production. Sugar and molasses earned a total of EC\$28 million in foreign earnings in 1975 out of a total of EC\$45 million for domestic exports. One very important factor, in the conditions of a wholly locally-owned industry as in St. Kitts, is the high proportion of foreign earnings which are retained by the sugar industry, in comparison with some other industries in the Caribbean area, where a large part of annual foreign earnings has to remain abroad to provide inputs into the industry. We can cite tourism, for example, where heavy foreign spending has at present to be incurred on foodstuffs for hotels, on furniture and fittings, on sales promotion, etc., and the electrical machinery industry referred to above where the components are imported.

### Recent History of the Sugar Industry

Up to 1972, the sugar industry in St. Kitts was in private ownership, the estates being owned by St. Kitts planters with a very small number of absentee proprietors, and the only sugar factory owned jointly by a London company and the St. Kitts planters. A crisis occurred in 1972, when the commercial banks were unable to extend further credit to the cane growers. Industrial disputes, mainly over wages, low prices for sugar following the boom years of 1963/64, resulting low prices paid by the factory for cane,

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<sup>1</sup> In this paper the authors have made extensive use of the very valuable background paper by Mr. McDonald and the statistics contained in it. The authors have also drawn on statistics collected by them personally over several years and also on figures published by the former West Indies Sugar Association and its successor, the Sugar Association of the Caribbean.

a period of drought conditions combined with cane fires, ever-increasing costs of production to a point where costs exceeded receipts, all led to a disastrous fall in sugar production from a peak of over 51,000 tons in 1953 down to under 26,000 tons in 1972. (Production figures are given in detail in Appendix 1.) Exports of sugar had fallen from a high of 47,000 tons in 1953 down to under 24,000 tons in 1972. The area under cane cultivation had fallen from well over 13,000 acres in 1963 to around 10,000 acres in 1972; acreages reaped annually had shown a similar decline from around 12,000 to under 10,000 acres.

It was clear that the industry faced extinction if this trend continued. Commissions of enquiry between 1965 and 1971 had recommended centralization of control of the field side of the industry but the owners were unable to implement the recommendations. The owners offered to sell their land to Government but a price could not be agreed. The Sugar Industry Rescue Operation (S.I.R.O.) was set up by the Government to rehabilitate the sugar lands and the owners agreed to "lend" their lands to Government, the latter being responsible for the inputs and taking any profits from the operation. In 1975, the Government compulsorily acquired some 22,000 acres of estate land, of which approximately 12,000 acres were in cane, and the estates' equipment. The amount to be paid in compensation has formed the subject of prolonged negotiation and litigation and has not yet been settled. In the meantime, the Government has taken over both the field and the factory sites of the industry.

#### National Agricultural Corporation

In 1975, the National Agricultural Corporation (NACO) was set up to engage in the production of sugar cane on the lands acquired by Government, to foster the development of the sugar industry, to assist cane farmers (small holders) and to encourage other industries on land unsuitable for cane. The Government's announced policy is to keep sugar as the mainstay of the economy and to produce other crops on land not in use for cane growing. The Board of NACO, under the chairmanship of the Minister of Agriculture, operates under the Chief Executive Officer, who is also Secretary to the Board but does not have a seat on it. Technical services are provided by Bookers' International Agricultural Services. There is an agricultural division consisting of an Agricultural Manager, an Agricultural Engineer and Agronomists, with junior staff. The recommendations of the commissions of 1965/71 have, therefore, been implemented and the field side of the industry is now under central control. The total staff of this division of the Corporation consists of some twenty (20) to twenty-five (25) officers, including four (4) Area Managers, each presumably responsible for a specified area of the total under the Corporation's control, similar to the duties of a sugar estate manager in other countries, with each responsible to the Agricultural Manager.

#### Sugar Manufacturing Corporation

In 1976, the Government completed the nationalization of the industry by acquiring the St. Kitts (Basseterre) Sugar Factory - the only sugar factory in the island - along with the railway which transports the cane to the factory. The manufacturing side of the industry is now managed by the St. Kitts Sugar Manufacturing Corporation, which has the normal sugar factory organization under a General Manager. Export sales

are handled under a contract by Bookers Sugar Company in London and local sales are managed by a local company, S.L. Horsford & Co., which also handles sales of sugar to neighbouring islands. The Corporation has a Board under the chairmanship of the Minister of Agriculture, with members drawn from the Ministerial and Government services, private enterprise and one factory worker. The General Manager of the factory sits on the Board.

The sugar industry is, therefore, completely nationalized and under central control. It is necessary to consider the effects and the developments since this control commenced in 1972.

### Sugar Production

As will be seen from Appendix 1, sugar production was maintained at a high level of 40,000 tons or over into the mid-1960's and began to decline towards the end of that decade. The decline continued and became progressively worse up to 1975, when came a somewhat dramatic recovery in 1976/77.

Table 1. *Sugar Production in St. Kitts for selected years.*

Year	Production (tons)	Year	Production (tons)
1950	41,204	1972	25,931
1953	51,295	1973	23,322
1960	49,717	1974	25,470
1965	38,450	1975	24,582
1969	35,352	1976	34,782
1970	26,774	1977	40,730
1971	24,991		

Source: Sugar Association of the Caribbean.

The revival in 1976/77 was a noticeable contrast to the picture in the CARICOM sugar industries as a whole (excluding Belize)

Table 2. *Sugar Production in St. Kitts and Total CARICOM Area for selected years.*

Year	CARICOM (tons)	St. Kitts (tons)
1950	813,127	41,204
1953	935,078	51,295
1960	1,173,765	49,717
1965	1,300,802	38,450
1970	1,076,684	26,774
1973	926,209	23,322
1974	1,029,576	25,470
1975	936,723	24,582
1976	1,022,595	34,782
1977	867,126	40,730

Source: Sugar Association of the Caribbean.

The peak year of production for the area as a whole was 1965, when 1,301,000 tons of sugar were produced, towards which St. Kitts contributed 38,000 tons. In 1977, the total had fallen to 867,000 tons, while St. Kitts' contribution had risen to 41,000 tons. The St. Kitts pattern is in welcome relief to that of the other CARICOM sugar industries (except Belize) in that it alone has shown a recovery of some real magnitude in the last two years. Provisional estimates for St. Kitts for 1978 show a reduction to around 36,000 tons, due to adverse weather conditions during the growing season, but this is a variation to be expected in a cane-growing area and is referred to in some detail below.

### Future Prospects

Longevity is not necessarily the governing factor in determining the continuance of an agricultural (or any other) industry - although the fact that the St. Kitts sugar industry has survived the slings and arrows of fortune over hundreds of years must be taken as evidence of its resilience - nor is it an argument for maintaining a one-crop economy and monoculture. In looking to the future, the questions to be asked might be summarised as:

1. Does the sugar industry make efficient use of the land?
2. What are its prospects in the future as an earner of foreign exchange and an employer of labour?
3. In the light of replies to these questions, should the sugar industry continue as the major industry, can it be integrated into a diversified economy, or should it be phased out entirely?

Appendix 2 gives figures from 1963 of:

1. areas under cane cultivation;
2. acreages reaped annually;
3. tons of cane per acre reaped;
4. tons cane to ton sugar ratios; and
5. tons of sugar obtained per acre reaped.

It will be seen that the area under cane cultivation had dropped from 13,656 acres in 1963 to 9,237 acres in 1975, while the acreages reaped annually had fallen from 11,850 to 8,525. These figures reflect clearly the running-down of the field side of the industry prior to the re-organization which started in 1973 but which naturally would not show its effects for a year or so. By 1977, the area under cane cultivation had increased to 12,000 acres and the acreage reaped that year was 11,200. It will also be seen from Appendix 2 that, after a poor period in 1974/75, when the average tonnage of cane reaped was about 24.5 tons per acre, it rose to around 31 to 32 tons per acre in 1976 and 1977 and was not far behind the peak years of 1969/70. St. Kitts has a good recovery rate of tons cane per ton sugar of well under 10 (except in 1969/71) and, in recent years, fewer than 9 tons of cane have been required to make a ton of sugar. The average tonnage of sugar obtained per acre reaped - which is perhaps the most significant figure - is well above 3 tons (except during 1970/75) and in 1977 approached 4 tons per acre. It is interesting to compare these figures with those for the CARICOM sugar industries as a whole (excluding Belize) in recent years. The total CARICOM figures include those for St. Kitts and have been calculated arithmetically from recorded figures of cane

reaped and sugar made. The following are five-year averages:

Table 3. Productivity of the Sugar Industry in St. Kitts and Total CARICOM Area for Selected Years.

	1950/ 54	1955/ 59	1960/ 64	1965/ 69	1970/ 74	1971/ 75	1972/ 76	1973/ 77
<i>Tons cane per acre reaped:</i>								
CARICOM	27.72	29.76	30.08	29.56	26.98	26.19		
St. Kitts	29.46	29.11	31.45	29.23	26.77	24.98	25.74	27.42
<i>Tons cane per ton sugar:</i>								
CARICOM	9.74	9.81	10.03	10.20	10.90	10.70		
St. Kitts	8.52	8.77	8.94	9.34	9.99	9.31	8.94	8.80
<i>Tons sugar per acre reaped:</i>								
CARICOM	2.85	3.03	2.99	2.91	2.47	2.44		
St. Kitts	3.45	3.37	3.56	3.15	2.72	2.75	2.94	3.16

CARICOM figures for 1976 and 1977 are not yet available but, from figures of sugar production for those years, there is no reason to believe that in the area as a whole there has been any marked improvement in the above, such as has happened in St. Kitts. The St. Kitts figures show a performance of above the average for the area, especially for TC/TS ratios and tons sugar per acre reaped.

There is no doubt that the sugar industry of St. Kitts, given good management, reasonable weather and stable industrial relations, can make very efficient use of the 12,000 acres or more of land suitable for sugar cane cultivation. A return of 3½ tons of sugar per acre reaped bears comparison with any cane-growing area, particularly when the vagaries of the climate - which will affect almost all agricultural crops - are taken into account. It is clear, too, that the factory side of the industry is highly efficient, when one looks at the recovery of sugar from the cane milled. Indeed, the factory in St. Kitts is recognised as one of the most efficient in the CARICOM Area and has been for many years and it shows the wisdom of proper maintenance by its former owners. The transport of cane to the factory is carried out efficiently by the railway system, which connects cane sidings at each of the main delivery points from the estates and delivers the cane to the factory under an excellent system of railway sidings and a marshalling yard at the factory which allows the entry of fresh cane into the manufacturing process.

### Rainfall

In any consideration of the future of a cane sugar industry in the tropics, rainfall plays a vital part. It is no exaggeration to say that, other things such as area under cane cultivation and acreages reaped being

fairly constant and with continuing good management, rainfall - and especially the rainfall distribution - will be the determining factor in the volume of sugar produced and thus the economic viability of the industry. During the period 1950 to 1970, the average annual rainfall in St. Kitts was around 55 inches and, in the period 1974/76, it averaged only 47 inches. The range was from 78 inches in 1969 down to 43 inches in 1975. In the period 1950/70, Barbados had an annual average of 62 inches, Guyana 88 inches, Jamaica 58 inches and Trinidad 65 inches; so St. Kitts' annual rainfall is at the lower end of the scale. But annual rainfall figures can give a misleading impression, for the vitally important factor is the rainfall in the growing period for the cane - say from August to December in St. Kitts. Figures for earlier years are not immediately available but the following are those for the growing period in 1974/76:

1974	-	36.08 inches
1975	-	29.98 "
1976	-	27.38 "

No comparable figures are available for the other CARICOM sugar countries but it is generally accepted in the Caribbean that the rainfall pattern in any one year will be reflected in the sugar production figures for the following year, mainly because of the need for adequate rainfall during the growing period for the cane.

For St. Kitts, however, no very clear correlation exists between these figures, as the following examples show:

Table 4. *The Relationship between Annual Rainfall and Sugar Production in St. Kitts for selected years.*

Year	Annual rainfall (inches)	Sugar production following year (tons)
1952	64.80	51,295
1953	45.76	49,483
1974	49.53	24,582
1975	43.00	34,782
1976	48.44	40,730

Low rainfall in one year has not necessarily resulted in low sugar production in the following year (falling acreages reaped had their effect in the early 1970's) and the rainfall in the growing period will have a very important effect. Appendix 3 contains figures of acreages reaped, tons cane per acre reaped and the annual rainfall in the preceding year (see above). It will be seen that, generally speaking, rainfall in excess of 50 inches in any one year will result in figures of cane per acre reaped in the following year in excess of 30 tons. The period of decline in sugar production (1970/75) coincided with a dry spell, with annual rainfall averaging well under 50 inches from 1971 onwards. During this period, the acreages of cane reaped fell considerably. One thing that does emerge is that St. Kitts has been going through a dry period - in common with other CARICOM countries - and there is no doubt that these dry periods will occur. But St. Kitts is

not alone in this and, indeed, has shown that in the recent dry period it has been able to increase sugar production. This is not to say, however, that the industry would not benefit from studies of rainfall patterns and distribution and their effects on production (such as have been carried out, for example, in Barbados) in its planning for the future. Distribution of rainfall in the cane-growing area of St. Kitts is also of importance in determining future use of the land.

### Water Conservation

There are some areas cane cultivation in St. Kitts which would obviously benefit from irrigation, if water could be made available for this purpose. The dry Basseterre Valley is an example and in the past there have been some attempts at irrigation at Ponds/Needs Must. With an annual rainfall averaging around 50 inches annually, it is clear that every effort must be made to ensure the maximum use of every inch of rain that falls. Greater conservation of the rain that runs into the sea from the many 'guts' around the island seems an obvious area to investigate, and so is the possibility of water being made available for irrigation of cane. The value of the irrigation system in the Burdekin area of Queensland is a good example of how production can be greatly increased by irrigation. Funds for such investigations should be available from international and Commonwealth agencies.

### Employment

The sugar industry of St. Kitts employs some 4,000 people in-crop and some 3,000 people out-of-crop in the field. In the out-of-crop season a minimum of three days' work a week is guaranteed. The sugar factory employs 776 people in-crop and 516 out-of-crop. Total direct employment is just under 5,000 in the peak period of the crop and 3,500 out-of-crop. In addition, there are some 139 small farmers who in 1977 sold 4,900 tons of cane from 250 acres. The total labour force of St. Kitts is put at 22,000 in 1975 with a projected increase to 25,000 in 1980. So far as the sugar industry is concerned, regard has to be had to the ancillary industries which benefit and the total number of people who derive a living from sugar is far higher than the figures of direct employment. It is unlikely that the sugar industry can increase its proportion of the total employment and whether it can maintain the present level depends to a degree on the Government's policy in regard to mechanisation in the field, particularly in regard to mechanical cane harvesting. Experience in this field in some other Caribbean countries has not been noticeably happy and doubtless experience elsewhere will be considered in connection with any proposals for St. Kitts. However, at present figures, direct employment of some 25 per cent of the total labour force is a considerable contribution to the economy and one which cannot be lightly disregarded. Total wages paid in 1977 exceeded EC\$10 million.

The picture thus presents itself of an efficient industry which is making good use of the land, contributing considerably to the foreign earnings of the country and creating employment. One other factor in considering its future is the continuance of satisfactory and lucrative markets for raw sugar.

### Markets

In St. Kitts conditions, sugar is an export crop, since only



2-3,000 tons are needed annually for local consumption and exports to neighbouring islands, and its economic viability depends, therefore, on the achievement of adequate returns from external sales, to cover production costs and provide a margin. The world sugar market is notoriously volatile, with so-called world prices showing wild and violent swings. The London Daily Price (the "world market price") stood at over £600 sterling a ton in 1974/75 and at present is around £100 per ton.

For a large part of its exports, however, St. Kitts has for many years not had to rely on world prices for sugar. It had the defence of the Commonwealth Sugar Agreement and now has the benefit of special arrangements under the Lomé Convention, which it is reasonable to assume will continue after 1982, the present expiry date for sugar quotas into the EEC. Under the Lomé Convention, St. Kitts has an annual quota of around 15,000 tons into the EEC, with a total price at present in the neighbourhood of £200 per ton. In the past, St. Kitts also had the benefit of quotas into the U.S.A., with preferential prices and, although these quota arrangements have ceased, it is to be hoped that some preferential arrangements can be resumed. In recent years, exports have gone to Europe and the U.S.A.

Table 5. *Sugar Exports to Main Markets.*

	1970	1971	1972	1973	1974	1975	1976	1977
EEC (U.K.)	24,449	23,537	23,963	21,134	16,884	16,117	16,371	15,000
U.S.A.	-	-	-	-	-	5,500	15,246	22,500
Total	24,449	23,537	23,963	21,134	16,884	21,617	31,617	37,500

Up to 1974, St. Kitts had a much larger quota under the Commonwealth Sugar Agreement than she has under the Lomé Convention and had no sugar available for export elsewhere. Since 1975, increasing sales have been made to the U.S.A., after meeting the EEC quotas. The Canadian market is also available to St. Kitts, if sugar is available and the market conditions are favourable. St. Kitts is, therefore, no worse off in competing in the export market than most other cane producing countries and is in a better position than many others with a guaranteed market for something approaching half of its export availability at prices well above ruling world prices.

Of course, variations in the size of the annual crop will occur depending on weather conditions and industrial stability, but there is no reason why one should not look to an average sugar production of around 40,000 tons annually. Over 50,000 tons have been attained in the past and up to 1959/63, the five-year moving averages were in excess of 45,000. It is true that the five-year moving averages dropped to below 30,000 tons in the period 1968/72 to 1972/76 but there are good grounds for believing that this will not recur. Production at this level would give an export availability of some 37,000 tons annually on average and a continued resurgence of the years 1976/77 affords grounds for an approach

to the EEC for an increased quota into Europe (which is well below the quota under the previous Commonwealth Sugar Agreement) and would make sugar available to take advantage of other markets when conditions are favourable.

### Sugar Earnings

As regards earnings from the land under cane cultivation, it will be seen from an earlier paragraph that since 1972/76 an average of some 3½ tons of sugar is produced from each acre reaped and there is no reason to suppose that this cannot be maintained. At the present low level of world market prices (£100 sterling or approximately EC\$500 per ton) this represents some EC\$1,750 per acre reaped (at \$5 = £1). But St. Kitts receives more than this for its sugar exports. The total EEC price is around £200 sterling per ton (EC\$1,000) and St. Kitts has an annual quota of some 15,000 tons. The EEC price is not likely to go below this level even if the price does not rise noticeably. In 1977, some 15,000 tons were sold to the EEC, and 22,500 tons to the U.S.A. Taking the latter at the present world price (although St. Kitts received a higher price for its U.S. sales in 1977), the average price per ton of sugar would have been (15,000 tons x \$1,000 = \$15 million plus 22,500 tons x \$500 = \$11,250,000) =  $\frac{\$25,250,000}{37,500 \text{ tons}}$  = EC\$700 per ton. The average yield per acre was therefore some EC\$2,450 (\$700 x 3½ tons), even at the present depressed world prices for sugar. The actual yield in 1977 was higher than this. A yield from the land of this size is not lightly to be disregarded.

### Costs

As in all CARICOM industries, rigid control of production costs will be needed to ensure that costs do not escalate above receipts, and wage demands must be reasonable. Here, the relationship of the trade union with the ruling political party is important and strikes in the sugar industry have been rare in recent years.

### Capital Expenditure

Continued efficiency, however, will depend not only on good management and rigid cost control but also on adequate maintenance and renewals of equipment in the field, on the railway and in the factory. Earnings might not, under the present state of the sugar export market, generate sufficient capital for this. There are, however, regional and international sources for grants and loans at low interest rates for development purposes are available from the Caribbean Development Bank, the EEC Aid Programme and the British Development Division. The encouraging pattern of recent years might persuade the commercial banks to overlook conditions of 1970/72 in regard to loans. Irrigation, particularly in the dry Basseterre Valley, the efficient use of available water, and the conservation of rain water flowing off in the "guts" all need examination. Furthermore, outside aid should be available for studies and investigations.

The picture thus presented is of a re-organized and efficient field side of the industry, making good use of the 12,000 acres under

cane, an efficient transport system for getting the canes to the factory and a sugar factory amongst the most efficient in the Caribbean. At a production of 3½ tons of sugar per acre reaped, a wages bill in excess of EC\$10 million, a contribution of over 60 per cent to the total domestic exports, and foreign exchange earnings which amounted to EC\$28 million in 1975 - and probably the same or higher in 1977 - the sugar industry can justly claim that it makes good use of the land devoted to sugar.

The question arises of what proportion of foreign earnings are retained in the country. Precise details of the breakdown of costs on the field side of the industry in St. Kitts are not available to us but figures from Barbados for estates operated in a similar manner (including mechanical loading but not harvesting, just as practised in St. Kitts) show the foreign exchange outflow to be approximately 24 per cent of the costs of production. On the factory side, figures for 1977 from St. Kitts show an import component of 27 per cent of costs. However, in St. Kitts wage rates are somewhat lower than in Barbados, so the proportion of retained earnings could be slightly less than in Barbados; but it seems certain that this could not exceed 30 per cent of the costs. It must be noted also that any profits made by the industry are retained in the country (by Government) so there is no leakage of foreign exchange here. So, even if we use the undoubtedly too high figure of 30 per cent of earnings as the foreign exchange "leakage" of the industry as a whole, with a \$30 million income some \$21 million remains in the country. The food import bill is approximately \$10 million, so this means that the sale of sugar purchases all the imported food the island uses and there is \$11 million left over for other foreign purchases. Also, to look at the matter in another way, every foreign exchange dollar earned by the sugar industry has a multiplier effect - though economists disagree as to the extent of this effect in a small island economy such as that of St. Kitts - and it is variously stated to range from 3 to zero. Again, being very conservative and using the small and probably too low figure of 1.5, we can say that the \$21 million net inflow of foreign exchange is worth \$31.5 million. There are approximately 10,000 families in St. Kitts. On this basis, the sugar industry is worth \$3,150 per year to each family in the island.

The answer to any question of the continuance of the sugar industry must be a strong affirmative and there can be no criticism of the Government's policy that sugar is to be kept as the mainstay of the economy.

### Diversification and Other Crops

The third question posed above contemplates diversification of the agriculture in St. Kitts. There can be no question of diversification out of sugar and the question really revolves around diversification using sugar as a nucleus. This can only be agricultural diversification, since the land available outside cane cultivation is far too large for any area likely to be needed for industrialization or tourism and the land on the lower slopes of the mountains is not anyway suitable for hotel development to any large degree. There is ample land available for these developments.

Diversification, in this context, falls into the consideration of agricultural export crops on the one hand and growing food crops for import substitution on the other. Apart from cotton and, in recent years, peanuts on a small scale, there have been no developments in regard to export crops.

In both directions, it would seem that the first step should be a determination of the total area available which is suitable for this form of agriculture, and then a long-term programme of examination into the crops which can be grown efficiently in St. Kitts/Nevis conditions, such as was carried out in Barbados some years ago. The latter would involve some years of testing and trials of all likely crops, with a view to determining what can be grown. Research has already commenced and is referred to below.

### Export Crops

Equally important are market surveys to determine the prospects for export crops and the likely receipts in the shape of foreign exchange earnings. In this connection, it has to be remembered that the average export earnings from sugar are, at present, around EC\$2,500 per acre and consideration of any other export crop should bear this in mind, in addition to labour intensity and the effect on the soil of the crops grown. In present world conditions, it seems unlikely that other export crops would be in a position to replace sugar and any diversification would seem to be on the lands not used for cane growing and on lands in Nevis. This is not to say that diversification into other crops would not have a place in the economy.

### Import Substitution

The Agricultural Land Development Authority (A.L.D.A.) was set up in 1974 to encourage the development and more economic use of agricultural lands and to encourage good husbandry practices amongst farmers. With the establishment of NACO, the work of A.L.D.A. has been confined to Nevis and its functions have been absorbed by the Agriculture Department. It is thus to the operations of NACO that one must look for diversification, particularly if export crops are contemplated. In conjunction with the Caribbean Agricultural Research Development Institute (CARDI) and the Ministry of Agriculture, NACO is conducting applied research on vegetables and other crops. The results of this research are an essential pre-requisite to the utilization of land for these crops. NACO took over responsibility for some 22,000 acres of land, of which 12,000 acres are in sugar. This does not mean, however, that some 10,000 acres are available for other crops. Much of this land will be on the higher slopes of the mountains and consideration of terrain, soil, accessibility, rainfall, soil erosion and the maintenance of forest for water conservation have all to be taken into account. A vital first step is a survey to determine what of the available area is suitable for agricultural purposes and what could be economically devoted to tree crops and fruit trees and what should be maintained in forest for conservation purposes.

### Central Marketing Corporation

In 1974 the Central Marketing Corporation was established to stimulate, facilitate and improve production, marketing and processing of produce, to develop and secure most favourable arrangements for the purchase, handling, distribution, transportation, storage, processing, exportation, shipping, marketing and sale of produce both in and outside the State. This is a most comprehensive list of duties and responsibilities. The Corporation operates a supermarket but has limited storage facilities and is able to take off only 25 per cent of the produce of NACO.

Food crops are grown by NACO on lands not suitable for cane growing, on marginal cane lands and by intercropping with cane. In order to keep agricultural labour, about half an acre of land is allocated to each worker for food crop cultivation and this could take up some 1,500 to 2,000 acres of land. In the period September 1976 to July 1977, some thirty-three (33) different varieties of food crops were produced by NACO, the major items being peanuts with over 150,000 pounds, and white ("Irish") potatoes at over 157,000 pounds. Unfortunately, the financial results were far from encouraging. Only five crops out of a total of thirty (30) showed a profit over the cost of production (peanuts losing over \$97,000, white potatoes over \$117,000 and yams over \$74,000) and the total loss on the operation approached \$500,000.

Little co-ordination appears to exist between the field activities of NACO and the Central Marketing Corporation. The vegetable growing project seems to run more as a social service than as an economic operation and the main object seems to have been to implement the Government's decision to provide three days' work a week for agricultural workers in the sugar industry. It is clear that attention is needed to the marketing side.

In 1975, the value of food imports was well over EC\$10 million of which meat and meat preparations accounted for nearly \$2 million, dairy products and eggs \$1.4 million, cereals for over \$3 million and fruit and vegetables for over \$1 million. In consideration of import substitution, to prevent this drain on foreign reserves, it is important to have careful regard to the return which would result per acre of arable land. It would, for example, be of little use surrendering sugar land, which gives a return in foreign earnings of \$2,500 per acre for an industry which gives a return of only \$1,000 per acre. This would particularly apply to cattle rearing, and the economics would need careful study in addition to an examination of whether the land available outside sugar would be suitable for the crop contemplated.

### Training

The St. Kitts agricultural worker has a long tradition of sugar cane cultivation and would need training in the production of other crops, particularly vegetables where success would depend on practices of a very different nature from those of cane growing (weed control, rotation of crops, etc.) as has been demonstrated, for example, in Barbados.

### Marketing

It is clear that the marketing of the vegetables produced by NACO needs very careful examination. An annual loss of \$500,000 is hardly the most economic use of the land. Clearly, greater attention is needed to retail outlets or a better method of distribution to supermarkets. Thirty-three (33) items seems a large number - although it is appreciated that the programme is still in an experimental stage - and some of the more exotic, and less profitable, items could perhaps well be left to kitchen gardens. If some items of vegetables are proved to be economic, then marketing to neighbouring islands should be a possibility. This would, however, call for careful grading, transport and marketing - areas where the other CARICOM countries have not been noticeably successful. Except for inter-row planting with cane and possibly the rotation of pure stands

of vegetables with cane, the land available for vegetables will be on the higher slopes where rainfall is generally higher and there are cooler nights which are conducive to successful vegetable growing.

These later paragraphs stray somewhat from a discussion of the St. Kitts sugar industry and are perhaps more relevant in the context of Nevis, where there is no cane industry. But, if the sugar industry is to be put into its proper perspective, it is essential to examine other crops. It would seem that there is ample opportunity for diversification, with careful research and planning, to add to the benefits which the sugar industry undoubtedly brings to the economy.

Appendix 1. *St. Kitts Sugar Production, 1950 to 1977.*

(long tons *tel quel*.)

Year	Annually	Five-year moving averages	
1950	41,204		
1951	44,034		
1952	50,276		
1953	51,295		
1954	49,483	1950/54	47,258
1955	48,889	1951/55	48,795
1956	49,850	1952/56	49,959
1957	44,377	1953/57	48,779
1958	42,170	1954/58	46,954
1959	46,441	1955/59	46,345
1960	49,717	1956/60	46,511
1961	46,622	1957/61	45,865
1962	42,883	1958/62	45,567
1963	39,566	1959/63	45,046
1964	43,135	1960/64	44,385
1965	38,450	1961/65	42,131
1966	37,753	1962/66	40,357
1967	38,526	1963/67	39,486
1968	34,832	1964/68	38,539
1969	35,352	1965/69	36,983
1970	26,774	1966/70	34,647
1971	24,991	1967/71	32,095
1972	25,931	1968/72	29,576
1973	23,322	1969/73	27,274
1974	25,470	1970/74	25,298
1975	24,582	1971/75	24,859
1976	34,782	1972/76	26,817
1977	40,730	1973/77	29,777

Source: Sugar Association of the Caribbean.

Appendix 2. Tons Cane and Tons Sugar Per Acre Reaped, St. Kitts.

Year	Area under cane	Acreage reaped	Tons cane per acre reaped	TC/TS	Tons sugar per acre reaped
1963	13,656	12,026	29.19	8.87	3.29
1964	13,047	12,618	29.88	8.74	3.42
1965	12,739	11,417	29.96	8.89	3.37
1966	12,825	12,571	27.68	9.22	3.00
1967	12,528	12,272	26.73	8.51	3.14
1968	12,570	12,177	26.36	9.22	2.86
1969	12,624	10,571	36.33	10.86	3.34
1970	12,487	9,704	33.59	12.18	2.76
1971	11,818	9,763	27.86	10.88	2.56
1972	10,809	10,539	23.06	9.37	2.46
1973	9,693	8,606	24.40	9.00	2.71
1974	9,241	8,829	24.58	8.52	2.88
1975	9,895	8,698	24.83	8.60	2.83
1976	10,755	9,800	32.70	9.02	3.55
1977	12,000	11,200	31.48	8.60	3.64

Source: Sugar Association of the Caribbean.

Appendix 3. Effect of Rainfall on Sugar Production, St. Kitts.

Year	Acres reaped	Tons cane per acre reaped	Annual rainfall in previous year (inches)	Tons sugar per acre
1960	13,830	31.3	55.38	3.59
1961	12,310	31.9	56.45	3.77
1962	12,010	34.4	53.88	3.57
1963	12,026	29.19	38.52	3.29
1964	12,618	29.88	37.83	3.42
1965	11,417	29.96	53.17	3.37
1966	12,571	27.68	39.98	3.00
1967	12,272	26.73	53.17	3.14
1968	12,177	26.36	41.62	2.86
1969	10,571	36.33	64.16	3.34
1970	9,704	33.59	78.14	2.76
1971	9,763	27.86	44.05	2.56
1972	10,539	23.06	34.85	2.46
1973	8,606	24.40	36.55	2.71
1974	8,829	24.58	40.75	2.88
1975	8,698	24.83	48.18	2.83
1976	9,800	32.70	43.00	3.55
1977	11,200	31.48	48.44	3.64

Source: Sugar Association of the Caribbean and Rainfall Records in St. Kitts.