

**A SURVEY OF THE INSTITUTIONS SERVING
AGRICULTURE ON THE ISLAND OF
DOMINICA, W. I.**

John D. Shillingford

DEPARTMENT OF AGRICULTURAL ECONOMICS

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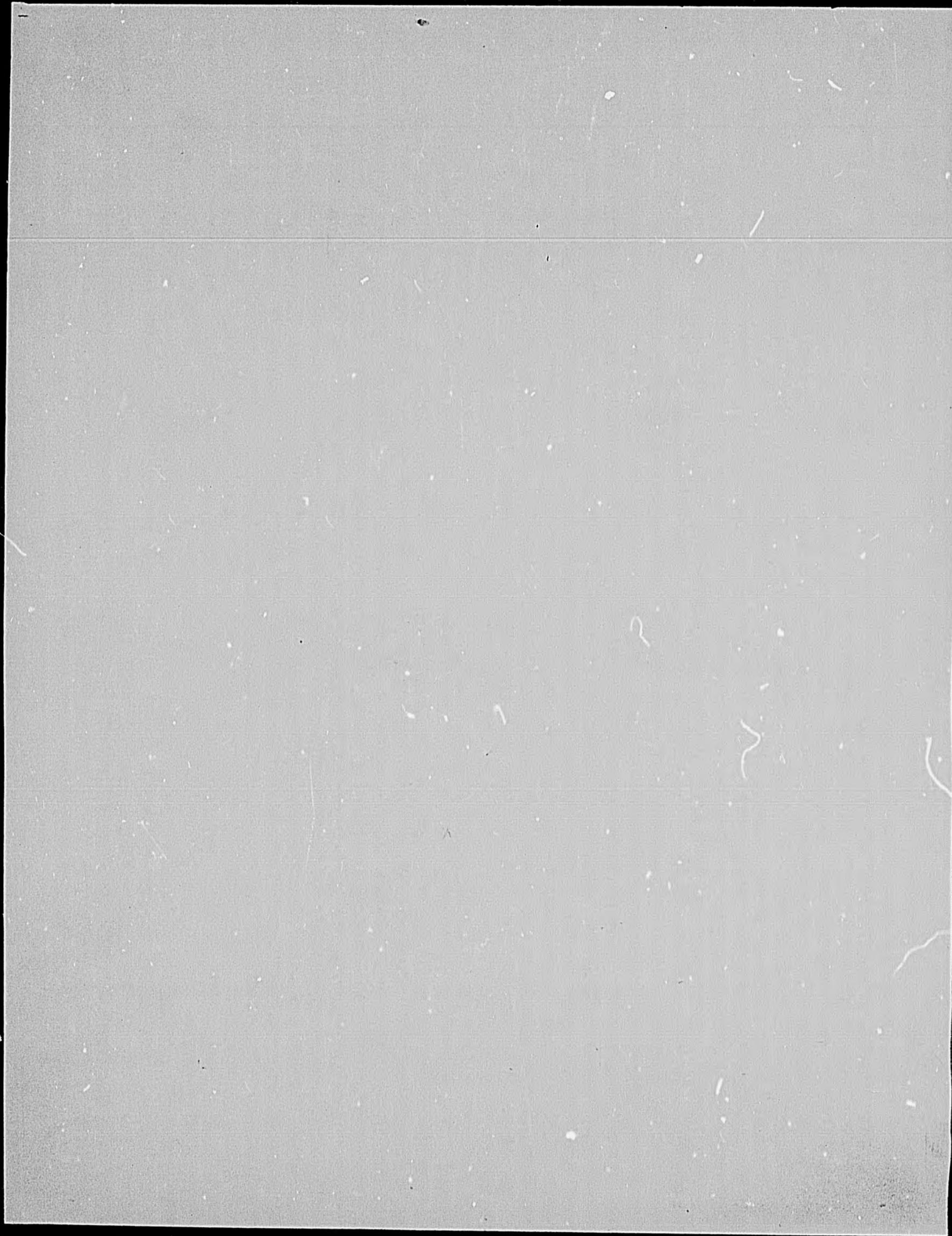


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Map 1

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A SURVEY OF THE INSTITUTIONS SERVING
AGRICULTURE ON THE ISLAND OF DOMINICA, W. I.^{1/}

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INTRODUCTION

Little meaningful agricultural research and analysis can be undertaken without an understanding of the institutional melee within which farms operate. Information on agricultural institutions in Dominica is limited and fragmentary. The intent of this paper, therefore, is to present under one cover some of the information about the institutions serving agriculture in Dominica.

Dominica is an island of 305 square miles in the Eastern Caribbean at latitude 15°15N and longitude 61°20W. In 1965, the population was over 66,000 and had a growth rate of 2.1% per annum. In 1960, the employment rate was 4.3% and 52% of the labor force was employed in agriculture (1). Per capita income in 1964 was \$407 WI (Table 1). Agriculture contributed 39% to the GDP (2), and accounted for 98% of the exports of which bananas made up 70% and citrus fruits and products 20%. The economy is export oriented, exporting the greater part of the products of its dominant agricultural sector and importing much of its food and consumer durables.

To meet increasing demands for improved welfare for its people, the island must mobilize its limited resources more efficiently. In order to do this, much more must be known about these resources and how they perform.

One of the most important factors are the human resources. These are organized into institutions which critically affect the productivity of other resources. A few institutions not locally based like CARIFTA, have a similar influence on productivity.

This survey of the institutions affecting the agriculture in Dominica is based on interviews and communication with personnel of the organizations discussed, together with information obtained from a farm management survey and from discussion with farmers (3). Six institutions were of particular importance and these are discussed in the following section.

AGRICULTURAL INSTITUTIONS

A. LAND TENURE AND THE PLANTATION SYSTEM

Table 2 illustrates the distribution of farms and land in farms (4). This shows that Dominica is not unlike many developing countries in having a

^{1/} This paper is based on data collected for a thesis presented by the author to the Graduate School of Cornell University for a degree of Master of Science.

Table 1. National Income, Dominica, 1964.

Sector	'000\$	%
Export Crops	5,512	
Other Agriculture	3,089	39
Livestock & Fisheries	808	
Manufacturing & Mining	1,564	6
Construction & Engineering	2,530	11
Distribution	1,618	7
Finance & Insurance	574	2
Transport	846	4
Services & Hotels	1,235	5
Rent	2,924	12
Government	3,408	14
GDP at Factor Costs	24,108	100
Indirect Taxes (+)	2,454	
Subsidies (-)	90	
GDP at Market Prices	26,472	
Population	65,030 ^{1/}	
Per Capita GDP at Market Prices	407	

Source: U. K. Ministry of Overseas Development, Report of the Tripartite Economic Survey of the Eastern Caribbean, H.M.S.O., London, 1967, p. 262.

^{1/} Dominica Statistical Office, Annual Statistical Digest, No. 2, 1966, Table 6.

Table 2. Number and Acreage of Farms, Dominica, 1961.

FARMS	0-	1-	5-	10-	25-	50-	100-	200-	500-	TOTAL
Number	2,557 ^{1/}	4,290	1,410	546	131	78	36	37	24	9,109
% Total	28.1	47.1	15.5	6.0	1.4	.8	.4	.4	.3	100
Acreage	875	9,176	8,379	7,644	4,272	5,050	4,860	11,374	24,533	76,163
% Total	1.2	12.1	11.0	10.0	5.6	6.6	6.4	14.9	32.2	100

^{1/} Includes holdings without land.

Source: West Indies Census of Agriculture, 1961, p. 4.

large number of small farms (<25 acres - 96.8%) occupying a small proportion of the land (34.3%), and a small number of large farms (>100 acres - 1%), occupying a large proportion of the land (53.5%).

Most farms, including the small farms, are held in freehold tenure (76.3%) Among the remainder, the form of tenure varies and includes cash rent, share cropping and rent free. The extent of fragmentation is variable (Table 3). The average was 1.43 parcels per farm. In general, a greater amount of fragmentation occurs on the small farms, particularly the 10-25 acre group, than occurs on the larger farms.

Fragmentation, therefore, is not an insignificant characteristic of Dominican agriculture. This could be expected to have some negative effect on the efficiency of production. Analysis of census data, however, shows no apparent correlation between banana yields and fragmentation though output per hour of labor may be smaller on the fragmented units.

The large farms are usually in favorable locations, on good soils in valley bottoms or flat land. They are usually owned individually (86 farms) or by companies (11 farms). Very few of these large farms are rented. They are operated by the owners or by paid managers with a labor force, usually recruited from the adjacent villages. Minimum wages are set by government. Some farmers may allow their laborers to cultivate small food gardens on the estate. Many of the laborers also operate small holdings in the hinterland.

The crops grown on the estates are largely for export and include bananas, coconuts, citrus and cocoa. Production efficiency is variable, some estates being well cultivated and very productive, others almost abandoned.

The level of technology is variable. Some large farms make adequate use of fertilizer, have good internal road systems, have substantial investment in transport and other equipment, and are under excellent management. Others are run on an extensive basis, with little investment in modern inputs, and managers who have little more training than the average laborer.

The estates, in general, have relatively ready access to credit. This is probably due to good security and personal relationships between the owners and the bankers.

Then there are the peasant farms. Usually these are located further inland or on poorer soils and more rugged terrain. Ninety-eight percent of these are less than 25 acres and 75% less than 5 acres. As on the estates, the levels of technology and productivity are variable. Some small farms are as technologically advanced as some of the better estates. The proximity of the large estates and the villages and the constant flow of labor between large estate and small farm seems to facilitate the flow of some modern technology from the estates to the small farms.

A comparison of the productivity of small and large farms for major export crops, shows significantly higher yields on the large farms (Table 4). This, however, may be misleading. Most of these crops are of relatively minor importance on the small farms, and probably receive little attention, but are quite important on the large farms. Bananas on the other hand, is the only major crop on the small farms, and here, the yield is about equivalent to that

Table 3. Farm Fragmentation and Banana Yields, Dominica, 1961.

SIZE OF FARMS	0-	1-	5-	10-	25-	50-	100-	200-	500-	TOTAL
No. of Farms	2,115	4,290	1,410	546	131	78	36	37	24	8,667
No. of Parcels	2,210	6,580	2,187	1,040	199	99	48	39	31	12,433
Parcels/farm	1.04	1.53	1.55	1.90	1.52	1.27	<u>1.33</u>	<u>1.05</u>	<u>1.29</u>	1.43
Stems/acre	2,486	526	350	580	413	433		430		453

Source: West Indies Census of Agriculture, 1961, p. 4.

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Table 4. Acreage and Yields of Export Crops on Small (<25 acres) and Large (>100 acres) farms, Dominica, 1961.

Crops	Small Farms		Large Farms	
	Acreage	Yield	Acreage	Yield
Cocoa (lb)	160	281	777	350
Oranges (fruit)	104	2,757	642	9,905
Grapefruit (fruit)	22	1,378	594	8,713
Limes (tins) ^{1/}	421	151	1,593	332
Bananas (stems)	3,346	363	2,192	362
Coconuts (nuts)	541	849	3,480	1,516

^{1/} Tins juice; 1 tin = 4 gals.

Source: West Indian Census of Agriculture, 1961.

on the large farms. Value output per acre of main agricultural exports on the large farms is 1.5 times that of the small farms (Table 5). This is probably due to better land and the greater importance of tree crops, particularly citrus, on the large farms; and to the greater importance of food crop production on the small farms (Table 6). The output of main agricultural exports per acre of land in farms (approximates land owned or operated) on large farms was 74% that of the small farms. This was largely explained by the comparatively high proportion of land cultivated on small farms. Small farms produced 42% of the main agricultural exports on 34% of the farmland and large farms produced 49% of the main agricultural exports on 54% of the farmland (Table 5).

These results suggest that:

- (1) On the basis of available land, small farms in Dominica are more productive than large farms. This is largely due to the high proportion of their land resources cultivated by small farms;
- (2) On the basis of cultivated land, large farms may be more productive than small farms, (assuming export output on small farms was 75% total output). This is probably due to the use of better land, and the availability of more capital to invest in the longer gestating but more remunerative tree crop enterprises;
- (3) Absolute levels of productivity are low on both small and large farms.

It must be emphasized, however, that these results do not suggest anything about the relative efficiency of small and large farms. This would require a comparison of marginal productivities rather than average productivities as has been done here. It would also be necessary to use more homogeneous data, particularly with respect to land type.

Both these sectors, therefore, play critical roles in the total productivity of the economy. However, each of these may suffer from a number of problems which would limit its increased productivity. The peasant sector for instance, is said to have a shortage of cultivable land. The estate sector is thought to suffer from a shortage of labor.

Since we are dealing here with land tenure, let us consider the shortage of cultivable land in the peasant sector. The existence of this problem is supported by the large peasant demand for government crown lands, the labor shortage said to exist in estate agriculture, and the relatively high proportion of land cultivated on peasant farms in spite of quality and locational limitations.

The demand for crown lands and the consequent shift of labor to self employment rather than wage employment is an indication that labor can probably make a better income in self employment. Under these conditions the marginal product of labor in self employment would be greater than its marginal product in estate employment. Consequently, a shift in labor to self employment would result in an increase in total output, and not a decrease as some writers suggest (14).

To facilitate this process, efforts should be made to meet the demand for peasant land. Fortunately, ample agricultural crown lands exist to meet

Table 5. Comparative Productivity of Small and Large Farms,^{1/}
Dominica, 1961.

Productivity Indicator	Small Farms (< 25 acres)	Large Farms (> 100 acres)
Proportion of land in farms	34	54
Proportion of Main Agricultural Exports (%)	42	49
Proportion of land cultivated (%)	67	44
Main Agricultural Exports per acre land in farms (\$)	115	85
Main Agricultural Exports per acre cultivated land (\$)	173	266

^{1/} The terms "Large Farms," "Estates" and "Plantations" are considered here synonymous.

Source: Calculations based on data reported in West Indies Census of Agriculture, 1961, pp. 6-15; and 1961 Export data in Dominica Annual Statistical Digest No. 2, 1966, Table 61. "Main Agricultural Exports" include bananas, fruit juices, essential oils, copra, fresh citrus fruits, cocoa, and vanilla. This accounted for 97.5% of Total exports. Dominican food crop production, 86% of which takes place on the small farms, was not included.

Table 6. Food Crop Production on Small Farms
(< 25 acres), Dominica, 1961.

Crops	Small Farm output	Total output	%
Green Corn (ears)	25,100	32,000	78.4
Dry Corn (lb)	1,600	1,600	100.0
Green Peas (lb)	22,600	24,300	93.0
Dry Peas (lb)	4,800	5,600	85.7
Other Peas and Beans (lb)	6,600	7,700	85.7
Sweet Potatoes (lb)	227,000	251,000	90.4
Tania, Dasheen, Eddoes (lb)	6,489,000	6,991,000	92.8
Yams (lb)	611,000	672,000	90.9
Breadfruit (lb)	1,372,500	1,506,400	91.1
Mangoes (fruit)	2,005,600	2,526,800	79.4
Bananas (not export, stems)	86,741	107,030	81.0
Plantains (stems)	26,528	32,272	82.2
Average %	---	----	86.0

Source: West Indian Census of Agriculture, 1961.

this demand at least in the short run. Properly planned agricultural crown land alienation should be continued.

However, it is true that such policy will decrease the availability of estate labor and probably decrease estate production in the short run. Best (13) notes that the solution to the problem of labor shortage in estate agriculture has historically been to limit the availability of land for peasants; and the same solution has been proposed even as recently as 1969, together with a recommendation for wage control guidelines (7).

As discussed above, limiting the availability of land for peasant cultivation would be inimical to economic growth from a macro-economic viewpoint, for it would restrict the efficient allocation of the economy's labor resources. Further, any such policy and/or the institution of controls to unduly restrict wages would encourage stagnation and limit technological change in the agricultural sector. Rather than encourage growth of estate agriculture, such policies would help maintain the archaic labor intensive nature of estate agriculture and its traditional reliance on cheap labor. It would also artificially create a labor surplus situation and the seeds of chronic unemployment. An economy which is fortunate in having no major unemployment problem (and the labor shortage suggests this), should be extremely wary of such policies to increase the labor supply.

Curtailling land settlement and/or instituting wage control guidelines under present conditions would lead to sub-optimization in production, consumption and income distribution. Such a situation, together with probable unemployment, would have serious consequences for the social, economic and political stability of the island.

Any labor shortage problem in the estate sector will have to be solved on the estates. To overcome this, estate agriculture has to significantly improve labor productivity. This will allow the estates to meet demands for increased wages and compete more effectively in the labor market, thus solving their labor shortage problem.

But increases in labor productivity will only come from better management and improvements in levels of technology. Better management is a critical factor. Only few estates have trained and/or progressive managers. Government should institute policy which would facilitate and encourage the employment of trained personnel for estate management.

Thus, the traditional conflict between peasant and estate agriculture in a plantation system could be resolved in the Dominican case, and in its resolution economic development would be enhanced.

B. COMMODITY ASSOCIATIONS

1. The Banana Growers Association

Bananas are the island's main crop and consequently the Banana Growers Association is the most important commodity association. It is a statutory cooperative organization of which all banana growers are members. It provides the industry with five basic services -- (1) marketing, (2) credit, (3) pest and disease control, (4) research, and (5) insurance.

Marketing: The association represents all growers and bargains on their behalf. Together with other island associations and Geest Industries (the buyer), prices and quotas for the island are negotiated. All fruit exported is sold to the buyer through the association. The buyer pays the association which in turn pays the grower after making credit, service and management deductions. The transaction takes only a few days -- an important feature of the marketing arrangement.

The association also provides buying points to serve the smaller producers, and transports the fruit to its central buying depot. This is a service for which a deduction is made. The bigger producers provide their own transportation to central buying depots.

At the central buying depot the fruit passes into the hands of the buyer -- Geest Industries -- who ships the fruit in company boats. The responsibility of the banana association in the marketing process stops at the central buying points.

Good market organizations, both local and overseas, and the relative stability of banana prices, would seem to be the dominant factors responsible for the growth of the banana industry.

Credit: This is generally provided in the form of inputs, and payment is deducted from banana sales. The amount of credit extended is tied to the volume of sales. Most credit is taken for fertilizers and a small amount used for pest and disease control. Recently a package deal was introduced -- The Replanting Incentive Scheme -- which is essentially a credit scheme providing credit for both fertilizer and disease control chemicals in one deal. Banana fields have to be inspected by association personnel to determine whether a farmer qualifies to participate. This is a commendable trend based on an awareness of the principle of complimentary inputs. Fertilizer can also be obtained from the association for cash with no strings attached.

Almost all of the fertilizer used in Dominica is channeled through the Banana Association. The amount allocated to each farmer is based on his volume of sales and an estimate of the fertilizer requirements per unit of production. But because of the system of mixed cropping, fertilizer allocated to bananas is used on all crops. Although this in effect may strain the capacity of the banana industry to finance its own development, it provides an indirect source of credit and finance for the development of other crops.

Pest and Disease Control: Banana leaf spot is the major disease problem of the industry. With the exception of a few large farms, where aerial spraying is done on a contractual basis, the association provides an island wide leaf spot control program. All farms are sprayed every two or three weeks depending on the level of incidence in the locality. Deductions are made from banana sales for this service.

The association also provides pest and disease control chemicals under various programs for individual farmers requesting those services.

Research: The island association itself does not carry out any research, but contributes to the Windward Islands Banana Association which researches the problems of banana production in the participating territories.

Insurance: The Association operates two Banana Insurance Schemes to compensate growers for some of the losses resulting from wind storms. The first is statutory and mandatory but covers only fields already in production. Claims are based on the proportion of the fields blown down. Up to a certain level of damage, loss is born by the farmer; the insurance scheme provides compensation only beyond that level. Up to a second level, compensation is in the form of fertilizer and beyond this compensation is in cash. Deductions from sales are made for this service.

The second form of insurance is contractual and optional, and designed to partially protect young fields not yet bearing from wind storm damage. For this service an extra premium is paid.

There has been much discussion recently about the form that insurance compensation should take. Some argue for straight cash, others for compensation in the form of inputs, more particularly fertilizer. Both of these are based on persuasive arguments. But in the final analysis, the ultimate objective of insurance -- the protection of the individual from the hardships of unforeseen circumstances -- must take priority. Consequently, cash payments must be made at some reasonable level of damage to allow the farmer to tide over the resulting hard times.

Geest Industries: This is a metropolitan firm head-officed in the U.K., specializing in the marketing of fruits, vegetables and flowers. The firm regularly contracts with the local Banana Growers Association for the purchase of all Dominica bananas produced for export. The association in turn agrees to sell only to Geest Industries. These agreements have lent considerable stability to the industry and seem to have contributed significantly to its growth. The company also makes cash "contributions" towards the support of research, credit and production schemes.

With Britain's entry into the European Common Market and the projected slow growth in demand for bananas in relation to supply (5), the outlook for the industry does not look particularly favorable. At the moment, however, due to the effects of drought in Jamaica, short supplies have kept prices relatively high.

But the drought and its consequences are essentially random phenomena. They do not change the long run outlook for the industry under present policies. They may even foster complacency.

The banana industry is at the end of an era. One in which the U.K. market could absorb rapidly expanding supplies of West Indian bananas. However, continued expansion at past rates of growth (greater than the rate of growth in demand) will lead to declining prices and lower farm incomes. Since This will also affect marketing margins, attempts will be made to control output. This may stabilize marketing incomes, but it will throw the burden of adjustment on the local banana industry. It will be necessary to lower farm prices to control expanding supplies, assuming the present structure of the industry.

Increased supplies, or the potential for increased supplies, will be the result of improvements in technology and spacial expansion, both of which are almost inevitable. Future improvements in technology have already been

largely determined by past investment. In the absence of more remunerative enterprises, these improvements will lead to greater intensity of production and spacial expansion of the industry. If we assume continuation of present policy, and the relative importance of bananas in the economy remains unchanged, then the coming era could bring a relative decline in farm incomes.

One may thus think of technological improvement as the villain in this scenario. This is far from correct. For, to maintain our competitive position and secure our share of the present market, continued technological improvement is of critical importance. But as we have seen, this may lead to surplus production.

The solution to this dilemma can lie in two directions; (1) the development of new markets, and (2) the diversification of the agricultural sector.

The general concept and techniques of large scale market development will be a new phenomenon. This was never the responsibility of colonial peoples, and they have had little experience here. The direction and nature of trade was usually given. Changing conditions, however, have made it mandatory that the Dominican people take up the responsibility of going in search of and developing new markets for their products.

In the banana industry, the importance of market development is fairly obvious. Excess supplies can be disposed of on other markets without radically affecting prices on the U. K. market, thus maintaining continued growth of the industry. However, the importance of diversification for the continued success of the banana industry is less obvious but no less critical.

Diversification has traditionally been seen in terms of optimum use of heterogeneous resources, and as a means of hedging against the risk of short term price and income fluctuation. The benefits of diversification are seen as operating through the output side of a diversification program.

But diversification has another implication, intimately related with and significant for the success of the banana industry. Diversification will compete for resources which would have gone into banana production. In so doing, diversification limits banana output without impeding technological change in the banana industry. As technological change decreases costs of banana production, successful diversification will increase the opportunity cost of resources. Thus mitigating the effect of technological change and limiting the rightward shift in the supply function. Such diversification, therefore, is intimately related to the success of the banana industry, and becomes critical in the absence of new banana markets.

Although diversification programs will continue to be the responsibility of the central government, their implications for a successful banana industry will demand increased concern for diversification by the Banana Association. This will affect Association policy in the future.

In the coming era, therefore, changing conditions in the banana industry will demand new approaches for continued development. These will include, among others, emphasis on the development of new banana markets and much greater concern for the success of diversification programs.

The discussion has not touched on the potential impact on the Dominica banana industry of U.K. entry into the EEC and the host of other issues of importance to the Banana Association. But these issues, together with those discussed above, all point to the need for the Dominica Banana Growers' Association to formulate new policy which will guide the development of the banana industry into the new directions it will have to take in the coming era.

2. The Citrus Growers Association

This is a cooperative organization predominantly concerned with the marketing of grapefruits. Oranges also fall within the association's portfolio but get little attention at present, due, it is said, to poor market conditions. Lime producers are organized in a separate cooperative.

Fruit for the fresh fruit market is processed for export in a government owned plant under the supervision of the Association. It is shipped on a commission basis through Geest Industries' banana boats. Most of the production goes to the U.K.

Market outlook at the moment seems quite favorable for the fresh grapefruit trade. Dominica is able to put its fruit on the market in the fall when little fruit is available and demand is high. Consequent favorable prices have significantly encouraged the expansion of the industry. It seems that the situation will probably remain like this for some time. To change these conditions other producing countries will have to develop technology which will allow them to market fruit during the critical period, or orchards will have to be developed in localities where fruit ripens in a favorable market period. To date, the former has proven extremely difficult and the latter will take much time.

The situation is not as favorable for the fresh orange trade (15). Some farmers think, however, that although prices may not be as attractive as grapefruit prices, orange prices may be good enough to support an economically viable orange trade. The fact that Trinidad and Jamaica do export substantial quantities of oranges, and the findings of a recent report (15), does lend support to this argument.

The report indicates that potentials exist for developing orange markets in the Caribbean area and in the U.K. and Canada. The main problems, however, are quality control and shipping limitations. One suspects also, that organization to overcome those problems may also be limiting.

Attempts to develop orange markets in the Caribbean and in metropolitan countries should not be considered separate objectives but should compliment each other. Accordingly, the development of a Caribbean market should have two functions. First, it should be a market in its own right, and second, it should be a base for developing quality, orange marketing know-how, and the capital necessary for a jump off into the metropolitan markets. A program could be developed to span a number of years. The first part would emphasize the development of the Caribbean market, with a number of yearly test shipments to the largest metropolitan markets. The second period would be directed at the development of the metropolitan markets where test shipments have been successful. Such market development should be a continuing process.

Another subsidiary service of the Association is the bulk purchase of a limited amount of equipment on behalf of the farmers. The association also contributes towards the support of a West Indies Citrus Research Scheme administered by the University of the West Indies.

In spite of the recent growth of the grapefruit industry, little change has taken place in Association Services for some time now. There seems to be ample scope for providing more services to citrus growers and more dynamism to the citrus industry.

Briefly, a greater contribution to the growth and development of the industry and the welfare of citrus growers could be made on at least five fronts. Some of these suggestions come from farmers interviewed.

- (a) The purchase and distribution of citrus fertilizers, as is done for instance in the banana industry. Because of this omission the level of fertilizer available for citrus orchards is low, since for most farmers this has to come from banana allocations. This reduces the amount available for bananas and generally does not adequately provide for the citrus orchards. This problem is faced by small and large citrus growers alike. Further, it would be more desirable to use fertilizer formulations specifically suited to citrus orchards rather than the banana fertilizer.
- (b) Many farmers would welcome a pest and disease control program. This was demonstrated by the pilot project organized by the Department of Agriculture. Such a project could either be instituted by the Association, or the Association could be instrumental in having private enterprise develop it.
- (c) The Association should be spearheading the development of canning based on the citrus industry, but including the processing and canning of other fruits and vegetables whenever possible.^{1/}

^{1/} A report on canning in Dominica (6) concluded that, "While it would not be advisable to establish a commercial cannery at present, the establishment of a small compact cannery, as a supplement to agricultural development is strongly recommended." This conclusion was based on the fact that the bulk of the grapefruit crop is exported and only a small proportion (20%) would be available for canning. The study also assumed that the situation in the orange industry was parallel to that in the grapefruit industry and that the quantity of fruit available for canning from each of these would be the same. Further information has indicated that although the situation described for the grapefruit industry is correct, the same does not hold true for the orange industry. On the contrary, only a small proportion of the orange crop is exported, 6,870 boxes in 1961 (15), and so the greater part of the crop would be available for canning. In 1961, harvested grapefruit production was about 72,000 boxes and harvested orange production was about 78,000 boxes (4). One suspects that due to the ostensibly poor fresh orange market, a significant proportion of the orange crop would not have been harvested; also, poor markets would foster low levels of husbandry and poor yields. Potential orange production may, therefore, be much more than the above figures suggest.

- (d) Greater effort should be directed at the development of new markets for citrus fruits, particularly the development of markets for oranges. There is available a fairly sizable orange crop which is not marketed. Some farmers argue, and justifiably so, that although oranges may not bring as attractive a price as do grapefruits, the orange price may be good enough to support an economically viable trade. This argument seems particularly reasonable in view of the fact that a large acreage of mature orange orchards exists, and better husbandry and modern cultural methods might advance the time of harvest to a period of good market prices.
- (e) The Citrus Association should also include lime producers. The amalgamation of the present Citrus Growers Association, and the lime growers cooperatives would benefit members of both groups. It would be more economical to organize the services suggested for the combined organization with a larger membership than for individual organizations. And this in itself would give further impetus to both industries. The Citrus Growers Association is the more dominant organization, and so it may be more practical for it to take the initiative in this reorganization. However, the problem of sectional interests obscuring the greater benefits to be obtained from united effort may militate against this proposal. Under these circumstances it would seem that government initiation and constant encouragement would be appropriate.

3. Miscellaneous Associations

Few other commodity associations exist. Of these lime and oil cooperatives are the most visible. These, however, are essentially marketing organizations, and, as in the case of the Citrus Growers Association, they have not developed beyond a rudimentary stage, in spite of the successful example of the Banana Growers Association.

C. MARKETING

The marketing of two of the major export crops has been discussed above. Limes, another important export crop will be discussed here.

The bulk of the lime crop is marketed as raw lime juice on the U.K. market. One company, L. Rose & Co., dominates the industry. It owns lime plantations and juicing factories and buys limes from individual growers and cooperatives.

An interesting aspect of the industry is the vertical integration of the dominant firm. It has its own lime plantations and factories, and exports its lime products to the parent firm, a large consumer of lime juice, in the U.K. One disadvantage of this relationship is that the local subsidiary can sell juice at a low price to its parent company, thus maximizing the profits of the metropolitan parent company, minimizing the profits of the local Dominican subsidiary, and consequently evading local income tax.

One advantage of this form of international integration is the market security that it creates. Without such a relationship the lime industry would have more intense competition. The existence of such integration may partially explain the long history of a relatively stable lime trade. But the development of the industry locally has been relatively static for some time, and

much more forward integration is possible locally. This could begin with the domestic production of finished processed lime products for the Caribbean market.

A small but growing volume of inter Caribbean trade in citrus and other fruits, root crops and vegetables exists. Organization here is still rudimentary. It is carried on by one-man outfits (hucksters) who buy the products from producers, package them, and sell them in neighboring islands. Often these hucksters accompany the produce to do their own retailing.

The local marketing of fruits, vegetables, and root crops is also organized on a rudimentary basis. Farmers and farmers' wives take their crops to the towns and larger villages for sale, usually in a central market. The recent growth of super markets and refrigeration will doubtlessly affect such market organization. Up to now, however, this development is only in its infancy and does not involve more than a small proportion of the fruits, vegetables and root crops traded.

The Dominica Agricultural Marketing Board, a statutory body, has recently been giving increasing attention to the marketing of fruits, vegetables, and root crops on both local and export markets. It maintains a number of depots in different towns and purchases farm products at guaranteed prices. Apart from relieving the farmer of the necessity for spending extra time selling his produce and providing the consumer with a daily source of these commodities, it is in a position to explore and develop export markets for these crops. The efforts of such an organization, coordinated with those of the Department of Agriculture could make a considerable impact on agricultural development. This could facilitate self-sufficiency in the production of vegetables and food crops and could probably lead to an export trade in these commodities. Unfortunately the Board has no refrigeration facilities, almost indispensable in this field. This will severely restrict the capacity of the Board to take advantage of existing possibilities to develop markets for Dominican agricultural products in other Caribbean islands, North America, and the U.K.

The marketing of livestock products presents a slightly different picture. With the exception of beef and veal and poultry products, most meat consumed is imported by groceries and supermarkets (Table 7). A significant amount of the beef and veal and poultry meat consumed is produced locally, 148,800 lb. (47%) and 230,000 lb. (23%) respectively (12). Most of the local beef and veal is produced by small farms on a subsistence basis; marketing takes place through traditional channels. An increasing proportion of local poultry production is carried on by modern poultry outfits that either have their own outlets or supply groceries and super markets. Livestock marketing is still highly atomistic and rudimentary; no organization exists through which these products can be channeled to maximize distribution.

D. AGRICULTURAL CREDIT

In Dominica, credit for the agricultural sector comes from about five sources -- money lenders, credit unions, commercial banks, agricultural supply firms and commodity associations.

A study (7) of a randomly selected group of farmers found of those using credit 12.1% obtained credit from commercial banks, 15.5% from credit unions, 70.6% from commodity associations, and 1.8% from other sources.

Table 7. Meat and Consumption and Imports, Dominica, 1967.

Type	Total Consumption lb.	Imports lb.	%
Beef and Veal	316,307	167,507	53.0
Pork and Pork Products	391,197	359,447	91.9
Mutton and Lamb	41,443	39,668	95.7
Poultry	984,358	754,358	76.6
Other	356,509	323,355	90.7
Total	2,089,814	1,644,335	78.7

Source: J. M. Mayers, Meat Production and Consumption Statistics of the Commonwealth Caribbean, U. W. I., Trinidad, 1970.

By far the most important sources of credit are the commodity associations, especially the Banana Growers Associations. The Citrus Growers Association and the Lime Cooperatives provide little or no credit.

The Banana Growers Association provides credit in the form of agricultural inputs such as fertilizer and disease control chemicals. This is repaid by deductions from banana sales. In general, this credit program has been successful. Numerous problems have arisen, but the Association seems to have addressed itself to the solution of these problems.

Inherent in the concept of commodity credit, is the limitation of its availability to the farmers involved in the production of the given commodity. Farmers in Dominica who do not or cannot produce bananas cannot make use of this credit source. This is not an argument against commodity credit, but means that other types of credit sources usually are needed.

Money lender credit is not very popular in Dominica. It suffers typically from excessive interest rates, and critical credit needs are more easily met by credit from The Banana Association.

Agricultural supply firms provide some credit in the form of supplies sold to farmers on credit. At present this source of credit is limited. It is hampered by the fact that the farmers who need credit are rural folk little known to the firms who have to grant that credit. Credit worthiness cannot easily be determined and many farmers who could effectively use credit are left without. The majority of farmers intuitively understand this, and will make little effort to approach the agricultural firms. This gives the superficial impression of a low demand for such credit. (The same is true of the commercial banks). It seems necessary, therefore, that agricultural supply firms give serious attention to increasing their expertise in their credit departments. This would involve either the employment of trained personnel or the training of existing personnel to perform those duties. Such organization would provide a more accurate estimate of the credit worthiness of farmers and thus decrease the element of risk and its cost; and it would allow increased investment in agriculture whose development is essential for the welfare of the economy and the welfare of the agricultural supply firms in particular.

All this is intimately related to the merchandizing capability of these firms. Too often they play an essentially passive role, expecting farmers to come to them. Rarely do they go out into the field to demonstrate or explain to the farmer the goods and services they have to offer. This seems essential in a situation where these services are new to the farmers. There is, thus, a great need for more dynamic merchandizing on the part of these firms, in cooperation, if necessary, with the Department of Agriculture.

The credit unions provide a small amount of credit to the agricultural sector. In 1966 only 2.4% of credit union loans was slated for agricultural production (7). This is partially explained by the predominantly urban character of union membership and a lending policy which, because of collateral requirements, tacitly favors consumption loans.

The commercial banks are the major banking institutions in Dominica. No data was available on the banking characteristics of the economy. Indications are, however, that banking characteristics and policy in Dominica are not significantly different from those of the average "dependent monetary

economy" (8). These include the transfer of a significantly large proportion of local savings (deposits) into foreign assets, the relatively small volume of local loans made, and of this, the significantly small volume of credit going to agriculture.

But the critical importance of mobilizing local saving for investment in the economy particularly in agriculture, makes the continuation of this situation unacceptable. And this is so irrespective of the factors which have created it.

These features have been the result of institutional arrangements dictated by traditional colonial banking policies. They may probably have been inevitable. Even with more progressive policies, some transfer of local savings into foreign assets would still be necessary. But it is essential that a greater proportion of bank deposits be channeled into local investment, and particular attention be paid to investment in the agricultural sector.

This will mean institutional and policy changes and probably the creation of new institutions within and outside of the commercial banking sector to effect the new objectives. There will have to be a change in banking policy to one in which the economic development and welfare of the Dominican economy takes priority rather than the development and welfare of the multinational parent organization. It will mean a shift from the narrow identification of commercial bank servicing with the commercial sector (in spite of the fact that the economy is predominantly agricultural) to a commercial bank organized to service an agricultural economy. It seems inconceivable that the credit worthiness of an applicant for an agricultural loan can be realistically determined by personnel whose experience and training is largely confined to servicing the commercial sector. The principle that banks must invest close to home cannot be compromised. In fact, new guidelines for relevant and responsible commercial banking policy have long been overdue. A critical institution like the commercial banking system cannot remain unconcerned about its changing social and economic responsibilities to the community and the country.

Arising out of the necessity for new institutions to facilitate and encourage more rapid agricultural growth is the need for a government agricultural development bank. One of the functions of such an institution would be to act as a financial intermediary for mobilizing local savings from the commercial banks and insurance companies and channeling funds from international sources for agricultural development. Another important function would be provision of medium and long term risk capital, not normally provided by the commercial banks, for domestic agriculture. (This would not absolve the commercial banks of their responsibility for changing policy and reorganizing to become more dynamic, more functional, and more relevant to an agricultural economy). A third function of the agricultural development bank would be to help farmers present project applications effectively, and, associated with this, to identify and encourage potentially successful enterprises. The problems of setting up such an institution will be numerous. But these must be seen only in terms of their ultimate solution.

E. EXTENSION AND RESEARCH

In the Dominica Department of Agriculture, agricultural extension is supervised by the Extension Coordinator. He reports directly to the Chief Agricultural Officer. The Coordinator supervises the work carried out in the

four agricultural districts, each district being the responsibility of an agricultural assistant. The districts are subdivided and each division is the responsibility of an instructor, comparable to the village level extension agent of many countries. Such an instructor is responsible for both crop and livestock work.

Each district has at least one agricultural station, whose management is the responsibility of the district agricultural assistant. With two exceptions, the Plant Propagation Centre and the Livestock farm, all stations carry out research, demonstrations, and plant and animal propagation.

Animal husbandry and production is the responsibility of a livestock officer, and animal health the separate responsibility of the veterinary officer.

Research in the different fields of agriculture is carried out by agricultural officers each responsible to the Chief Agricultural Officer for work in his particular field. Most of the research work is carried out with the help of the extension agents.

The basic organization of these services seems generally satisfactory and the recent trend towards specialization and centralization must be commended. Some limitations, however, are worth mentioning. The level of training of extension personnel is generally inadequate. The agricultural assistants in charge of each of the four districts and responsible for agricultural development in these districts are only trained to the two year diploma level. Most of the village level agents have little formal training in agriculture. One fears that this lack of training may result in a lack of a dynamic problem solving approach so essential for dealing with the constant challenges encountered in the business of bringing change and development to agriculture. It would seem desirable to have the four district extension agents trained to the university level, and many of the village level agents trained to the diploma level. Many of the extension personnel are quite capable, but most of these agents would benefit considerably from further training.

The fact that most of the agricultural stations serve three basic functions -- research, demonstrations and propagation -- is the result of the conditions and the philosophy prevailing at the time the stations were created. This combination has been very useful, but today there is need for drawing sharper lines among them and possibly some need for physically separating these functions.

There is today on these stations much confusion as to what is research and what is demonstration. This has a decidedly negative effect on efficiency and gives rise to conflicts in managerial objectives.

Further, some attempts have been made to make the agricultural stations economically viable. Although this does not necessarily conflict with the extension objective of demonstrating viable improved methods and materials, it often comes into conflict with research methods and goals, for returns from research cannot be easily monetized or even quantified, particularly in the short run.

The recent trend towards increased specialization and centralization in the operation and management of the stations seems to be an attempt to reorganize agricultural services in keeping with recent changes in communication and development philosophy. There are now separate agricultural officers responsible for

research, livestock services, and plant propagation. But these functions are still intermingled on stations that are the responsibility of the district agricultural assistants. It would seem advisable to take the process further and to provide that some stations specialize in research while others specialize in the other functions. Simply reorganizing personnel and infrastructure along these lines would probably result in much more efficient allocation of resources.

The time has come when research and extension must be directed at specific land types. In colonial times the word would go out that Britain needed more cocoa, for instance, and all resources would mobilize for the production of cocoa. Research and extension were directed at cocoa production to the exclusion of all other crops and cocoa was pushed onto all but the most inhospitable land types. This obviously resulted in very inefficient resource allocation, with consequent ill effects on farm incomes and economic growth. The present dominance and spacial distribution of banana production is mute testimony of the continued influence of past colonial policy. Bananas is not the only crop which can be grown efficiently in Dominica, nor is it the only crop which can be grown on all land types.

Research and extension must be directed at determining the various crops which can be grown economically on each land type, and the levels of fertilizer and other inputs appropriate for optimum production of each crop. Recommending one ton of fertilizer per acre per year for bananas without further qualifications implies that wherever bananas are grown, one ton per acre per year is also the appropriate level. This probably correct for some of the Red (Kandoid) Latosolics (at present prices) but this is not so for the Bleached Allophanoid Podzolics of the Gleau Gomier area.

Obviously available resources will preclude the determination of crop and input packages for each land type, but these must be developed for the main crops on the major land types. Ideally, the development of such packages must be based on on-the-spot analysis, but at the initial stages much use can be made of the work done for similar land types in other islands.

Finally, the Department of Agriculture should maintain continuous evaluation of the effectiveness of its programs and of its total impact on the growth and development of the agricultural sector. Only in this way will it be in a position to determine which programs should be terminated or accelerated or when new programs and new directions are needed. The continued dominance of the banana industry and its increasing problems, inspite of numerous diversification and other programs, is mute testimony of the need for more rigorous evaluation. However, we should be careful about the criteria used for evaluation and their interpretation. As far as possible, emphasis should be placed on criteria related to human development.

F. CARIFTA

A recent development in the Caribbean which could have a significant impact on Dominican agriculture is the Caribbean Free Trade Association formed by an agreement signed by the Commonwealth Caribbean countries. The objective of the Association, laid down in article 2 of the Agreement (9) are:

- "(a) To promote the expansion and diversification of trade in the area of the Associations;
- (b) To secure that trade between member territories takes place in conditions of fair competition;
- (c) To encourage the balanced and progressive development of the area...;

- (d) To fast the harmonious development of Caribbean trade and its liberalization by the removal of barriers to it;
- (e) To ensure that the benefits of free trade are equitably distributed among member territories."

CARIFTA thus presents the opportunity for increasing agricultural exports to other Caribbean territories (10, 11). With the agricultural resources that she has, Dominica is in a favorable position to utilize the opportunities that CARIFTA presents. But to do this it would be essential to embark on aggressive and dynamic programs of production and marketing. And of critical importance is the need to initiate these programs as early as possible. Rapid competition from other territories could quickly eliminate trading opportunities, and Dominica could be the victim rather than a beneficiary of such an association.

SUMMARY

The institutions serving agriculture are a critical factor in the productivity of this sector. Six of these institutions are particularly important. They are (1) Land Tenure and the Plantation System, (2) Commodity Associations, (3) Marketing, (4) Agricultural Credit, (5) Research and Extension and (6) The Caribbean Free Trade Association.

The tenure system is dominantly freehold. There are large estates and many intermingled small farms typical of a plantation system. The estates produce primarily export crops and the small farms produce for both local consumption and export.

On the basis of available land, small farms in Dominica are more productive than large farms. This is largely due to the high proportion of their land cultivated by small farms. On the basis of cultivated land, large farms may be more productive than small farms. This is probably due to the use of better land, and the availability of more capital to invest in the longer gestating but more remunerative tree crop enterprises. Absolute levels of productivity are low on both small and large farms. The system of production is still labor intensive. More attention needs to be given to the problem of developing an agricultural technology of high productivity suited to the nature of the island's resources, particularly its rugged terrain and potentially limited labor supplies in the agricultural sector.

A number of commodity associations operate in the island and two are particularly important, the Banana Growers Association and the Citrus Growers Association. The former is well organized and seems relatively responsive to farm requirements. But the changing market conditions and continuous improvements in technology are creating new problems in the industry. This will demand a reorientation of Association priorities. In the past banana industry policy has been largely inward looking, directed at yields, fertilizer, disease. In the future it will have to be equally outward looking. This will involve, among other things, greater emphasis on the development of new markets and some consideration for the success of national diversification programs. Such a reordering of priorities, and the development of complimentary policy, are paramount if the coming era is not to bring a relative decline in the banana incomes.

The Citrus Growers Association seems to have much room for playing a more dynamic role in the development of the citrus industry. It could start by providing the type of services that the Banana Association provides and extending those services to lime producers. The Citrus Growers Association is in a particularly favorable position to pioneer a canning industry.

With the exception of banana marketing, the organization of marketing in the island is still rather rudimentary. The Marketing Board has recently begun programs for the organized marketing of a number of crops. The effort, however, may be hampered by the lack of storage and processing facilities and by limited farm level organization. Some of these problems can only be solved by greater coordination with the Department of Agriculture.

The agricultural credit needs of farmers seems to be met primarily by commodity credit, particularly through the Banana Association for banana

production. More funds could be channeled into agriculture if the Citrus Association provided a similar service. One of the major avenues for funding different sectors of an economy is through the commercial banks. These institutions, however, have not been able to modify their organization and lending policy to meet the new social and economic responsibilities of the community, a community which is predominately agricultural.

The Agriculture Department is responsible for research and extension. There has been a recent trend towards a greater degree of specialization and centralization. This could probably be taken further; it would seem desirable to separate research stations from demonstration (commercial farm) stations. There seems to be a need for more coordination with the Marketing Board, more trained personnel in the Department, and far more empirical research into the problems of the island's agriculture.

Research and extension must also be directed at determining the various crops which can be grown economically on each land type, and the levels of fertilizer and other inputs appropriate for optimum production of each crop.

The Caribbean Free Trade Association, although not a local institution, could have an important impact on the island's agriculture and its economy. There does not seem to be much scope for immediate gains from this source because of the island's limited trade with the rest of the area. Some potential does exist for future gains, but this will depend on the rate and extent to which the island can mobilize its resources to exploit the opportunities created. Failing this, CARIFTA may be more a drain than a benefit.

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