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Small-Scale Agriculture in the United States Virgin Islands, 1930-1983

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Over the past half century, United States Virgin Islands agriculture has deteriorated because of the phase-out of commercial sugar and escalating resource competition from tourism, construction, government and export manufacturing. Increasing dualism has resulted with a few large farms dominating in cattle, dairying, and sorghum, while a very large number of small (less than 50 acres) farms have increasingly specialized in vegetables, field crops, fruits and nuts, poultry, and small livestock. Since 1960 these small-scale holdings have dominated the production of sheep, goats, hogs, poultry, eggs, avocados, bananas, coconuts, grapefruits, limes and lemons, mangoes, oranges, and papayas. In terms of gross output shares, farms of 3-9 acres have consistently been the most productive while 10-19 acre farms have been the least productive. Output per acre comparisons reveal that farm sizes of under 3 acres and 3-9 acres warrant special policy focus because of their relatively superior productivity and their extreme resource constraints.

Keywords: United States Virgin Islands, small-scale agriculture, modernization, intensive farming, relative productivity.

Agriculture in the United States Virgin Islands (USVI), like the territory's economy, is distinguished by its small scale. Yet, there is little information available quantitatively detailing the growth of small-scale farming and its contribution to total agricultural effort in the territory. In addition, although research conducted primarily by the College of the Virgin Islands Agricultural Experiment Station has emphasized the small-farm sector (College of the Virgin Islands, 1980), there is little clear evidence to determine which small farm size(s) is(are) most efficient and deserving of special policy attention.

This study is a partial response to some of these deficiencies. It has three parts. The first presents a contextual overview of USVI agriculture from 1930 to 1983. The second profiles small-scale farming in the territory and discusses respective patterns of specialization. The third examines the relative productivity of the four smallest-scale farm sizes for policy purposes. In deference to the United States Census of Agriculture data employed throughout, we have attempted to keep the conclusions fairly general because of the dangers of misreporting, the general absence of written records, and other commonly associated problems/errors. In addition, we have tried to take some account of small-number distortions in the data interpretation.

Historical Trends

Since the United States' purchase of the Danish West Indies in 1917, agriculture has steadily deteriorated as a result of the inevitable forces of economic modernization. This decline has accelerated especially since 1960 because of the territory's phase-out of commercial sugar production, intensified resource competition from tourism, construction, government, and export manufacturing, and a widespread pattern of suburbanisation to accommodate rising population densities caused by intense immigration pressures (McElroy and De Albuquerque, 1980). Similar declines in the face of industrialization have been noted elsewhere in the Caribbean (Bryden, 1974; Beckford, 1975; Daubon and Robinson, 1975; Jainrain, 1976; Bourne and Weir, 1980; Hope, 1981; McElroy and De Albuquerque, 1984).

These trends are detailed in Table 1. Since the period during which the agricultural census is taken is generally July 1 to June 30, sometimes the date of the data (1960, 1975, 1983) corresponds to the year following the date of the census (1959, 1974, 1982). The half century since 1930 has witnessed sharp reductions in total farm acreage, average farm size, harvested cropland, and agricultural employment. In addition, there have been measurable declines in agriculture as the main occupation of farmers as well as predicrable increases in the percent of farm operators engaged primarily (200+ days per year) in off-farm employment. The data also demonstrate drastic declines in the use of hired labor, partly as a result of sugar's demise, but also because of more lucrative job opportunities in tourism, construction, and so on. For example, both government and tourism employment rose from roughly 20% of the total in 1960 to 33% and above 40% respectively in 1982 (McElroy and Tinsley, 1982).

Several rural sector adjustments have taken place during this long-period encroachment. First has been the increased use of tractors and fertilizer as substitutes for labor and more traditional farming and animal husbandry practices (Table 1). A second has been the noticeable shift away from cropping toward animal husbandry/poultry—a common Caribbean index of declining effort and rural marginalization (Richardson, 1983). For example, the percentage of all farmland in pasture increased from 55% to 77% between 1930 and 1983, while the percent of all farms purchasing livestock/poultry rose from roughly 20 to 70%. Third, while the percentage of farm operators as owners and on-farm for ten years increased over the period, the proportion of new farm operators (2-4 years on farm) steadily declined, indicating agriculture's waning attractiveness. While the two increases seem to indicate a growing farming tradition, they may also reflect the difficulties of selling real estate because of conflicting multiple-family ownership claims and archaic tenure practices held over from the Danish colonial period.

The most significant alterations have occurred in farm size and acreage distributions. Table 2 sketches the broad contours of a process of growing dualism consisting of an increasing number of

TABLE 1. Selected agricultural indices, U.S. Virgin Islands: 1930, 1960, 1975, 1983.

	1930	1960	1975	1983
No. of farms	329	501	327	303
Acreage in farms	68,322	44,062	24,703	20,824
Average farm size (acres)	207.7	87.9	75.5	68.7
% Agricultural employment	33.2	7.2	0.5	0.5
Harvested cropland (acres)	6,895	4,272	751	819
Harvested cropland/Total acres	10.1	9.7	3.0	3.9
Land in pasture/Total acres	55.3[1]	48.8	62.6	76.8
% Farms with tractors	2.4	6.0	13.1	18.2
% Farms with hired labor	55.3	30.3	33.9	27.7
% Farms purch. livestock/poultry feed	19.1	24.8	67.3	70.0
% Farms using fertilizer	2.4	11.6	19.9	21.8
% Operators with agriculture as main occupation	67.0	NA	35.5	43.6
% Operators working 200+ days off farm	21.9[1]	46.5	34.3	45.5
% Operators who are farm owners	44.3	77.0	85.9	80.2
% Operators 10 years or more on farm	41.6	56.9	58.1	60.4
% Operators 2-4 years on farm	25.6[1]	20.8	17.7	15.5

SOURCES: U.S. Census of the Population for the Virgin Islands, 1930, 1960, 1970, 1980; U.S. Census of Agriculture for the Virgin Islands, 1930, 1959, 1974, 1982. Bureau of the Census, Washington.

[1]1940

very small units juxtaposed alongside a very few large-scale commercial tracts. For example, between 1930 and 1983, the percentage of smallest holdings (under three acres) rose from less than 3% of all farms to one-quarter of the total. Farms under ten acres rose from roughly one-third to two-thirds of the toral. In 1983, 84% of all farms in the territory were less rhan 50 acres in size. On the other hand, the number of large farms—175 acres or more in the small-island context—fell from one-rhird of the rotal to less than 6%. While acreage in the largest commercial operations (1000+ acres) grew from one-third to nearly half the total, the overall acreage contained in the relarively economic medium-sized farm types (175-259 acres, 260-499 acres, 500-599 acres) dropped sharply from approximately 60% of the total in 1930 to 31% in 1983.

Table 3 records the impact of these long-run changes on farm production. The trends indicate the demise of sugar previously noted and declining significance for catrle, field crops, vegetables, and some of the more land-intensive fruits/nuts like coconuts and pineapples. On the other hand, data also show increased output of bananas, avocados, citrus, small livestock, poultry, and poultry/dairy products. Much of this expansion has occurred after 1960, a recenr agricultural resurgence derailed elsewhere (De Albuquerque and McElroy, 1983). In summary, USVI agriculture adapted to a half century of land/labor encroachment by contracting farm size and effort, some substitution of capital inputs, and modifying the composition of output to suit the constraints of predominantly small-scale holdings and domestic in contrast to export demand, leaving the largesr commercial tracts to further specialize in cattle and dairy products. Similar changes have occurred throughout many other East Caribbean islands (Bourne and Weir, 1980).

TABLE 2. Distribution of farm size and acreage, U.S. Virgin Islands: 1930, 1960, 1975, 1983.

Farm Size (acres)	1930		1960		1975		1983	
	% total farms	% total acres	% total farms	% total acres	% total farms	% total acres	% total farms	% total acres
Under 3	2.4	0.1	11.1	0.2	33.3	0.5	24.8	0.6
3-9	34.6	0.8	39.7	2.5	28.7	2.1	37.6	2.9
10-19	10.3	0.7	17.4	2.7	10.7	1.8	10.7	2.0
20-49	10.5	1.5	11.4	4.2	10.1	3.8	11.2	5.0
50-99	4.6	1.4	8.4	6.6	5.8	5.7	5.9	5.7
100-174	4.3	2.8	3.6	5.5	4.0	6.4	4.0	6.9
175-259	8.9	9.6	2.0	4.7	2.1	6.2	1.6	5.4
260-499	11.6	20.2	2.6	10.9	2.4	12.2	2.0	11.0
500-999	8.5	29.3	2.0	15.8	0.9	7.9	1.3	14.7
1000 and over	4.3	33.6	1.8	46.9	1.8	53.3	0.9	45.8
Total[1]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 10	37.0	0.9	50.8	2.7	62.0	2.6	62.4	3.5
Under 50	57.8	3.1	79.6	9.6	82.8	8.2	84.3	10.5
Under 100	62.4	4.5	88.0	16.2	88.6	13.9	90.2	16.2
175-999	29.0	59.1	6.6	31.4	5.4	26.3	4.9	31.1
175 and over	33.0	92.7	8.4	78.3	7.2	79.6	5.8	76.9

SOURCES: U.S. Census of Agriculture for the Virgin Islands, 1930, 1959, 1974, 1982. Bureau of the Census, Washington.

[1]May not sum exactly because of rounding error.

TABLE 3. Selected acreage and crop production, U.S. Virgin Islands, 1930, 1960, 1975, 1983.

	1930	1960	1975	1983
Sugar cane (acres)	5,823	3,676	4	3
Sorghum (acres)	--	--	3,531	403
Selected field crops (acres)[1]	68	98	29	46
Selected vegetables (acres)[2]	48	32	36	43
Selected fruits/nuts harvested:				
Avocados	14,700	37,945	16,561	31,874
Coconuts	27,008	26,107	46,376	18,066
Bananas (bunches)	6,790	20,539	4,785	11,532
Grapefruits (lbs.)	1,280	1,375	9,750	4,615
Limes/Lemons (lbs.)	11,640	29,860	35,009	12,472
Oranges (lbs.)	3,840	3,758	21,055	6,246
Plantains (bunches)	823	401	284	950
Pineapples (boxes)	2,404	1,407	596	74
Mangoes	407,683	173,457	217,807	209,845
Selected Livestock/Poultry				
Sheep	1,533	2,152	3,122	2,882
Goats	1,476	2,334	4,162	4,035
Hogs	860	1,297	1,454	2,404
Cattle	12,252	8,383	6,106	5,672
Chickens sold	2,817	3,860	8,669	20,071
Eggs sold (doz.)	4,353	92,050	315,023	284,107
Milk sold (qts.)	494,492	565,781	3,126,063	1,858,145

SOURCE: See Table 2

[1]Corn, dry beans, cassava, sweet potatoes, taniers, yams

[2]Carrots, okra, onions, peppers, egg plant, squash, tomatoes,green beans, celery

Small-Scale Agriculture

Table 4 provides a review of the impact of this shift from more extensive to more intensive cultivation patterns on the four smallest-scale farm sizes reported in the Census of Agriculture: under 3 acres, 3-9 acres, 10-19 acres, and 20-49 acres. These data indicate that the percentage of total acreage in harvested cropland contained in these small farms increased from 17% of the total in 1960 to over 60% by 1983. As a consequence, in terms of the percentage of commercial farms (sales of $2,500), these four small-holding types dominated the field crops, vegetable, fruit/nut, and poultry sectors. Between 1960 and 1983—even given the normal caveats associated with interpreting percentages from very small numbers—under the pressures of encroachment and rising inflation, these trends generally intensified with some noticeable differences in sub-specializations. For example, in 1983 over half of all commercial field crop farmlands were under 3 acres as were over one-third of all vegetable farms. In 1983 in addition, 50% of all commercial fruit/nut farms were 3-9 acres in size as were about 80% of all poultry farms. The other major shift was the dramatic increase in the proportion of small-scale farm types which together rose from 40% in 1960 to nearly 75% in 1983.

The above information is helpful in interpreting the differing small-farm profiles and their respective patterns of resource utilization assembled in Table 5. First, in contrast to the average-sized farm of 70-90 acres, these smaller holdings maintained considerably higher acreage shares in cropland and predictably lower acreage shares in pastures. Their consistently high levels of woodland/other (roads, buildings, unused lots) is largely due to the diseconomies of scale associated with their relatively small sizes. Second, because of their small scale, proportionately fewer of these small units used tractors and hired labor. These differences, however, became less clear in 1983, perhaps partly as the result of increasing sophistication and modernization as well as more intensive cultivation of the small-scale specializations in field crops, vegetables, fruits/nuts and so on.

Third, within the four small-farm classes, increasing scale tends to be associated as expected with increasing use of tractors, hired machines, hired labor, rising levels of commercial sales, and falling levels of part-time (200+ days work off-farm) effort. These trends reflect not only economies of scale in input utilization, gradations in farming effort, and perhaps a changing pattern of

TABLE 4. Distribution of harvested acreage and commercial[1] farms by crop and farm size, U.S. Virgin Islands: 1960, 1975, 1983.

		Under 3 ac.	3-9 acres	10-19 acres	20-49 acres	TOTAL 0-49 acres	TOTAL All Farms	0-49 as % of All Farms
Harvested cropland (acres)								
	1960	30	310	222	179	741	4,272	17.3
	1975	27	113	61	79	280	751	37.3
	1983	53	200	82	174	509	819	62.1
% of total commercial farms:								
Crops	1960	6.7(4)[2]	33.3(20)	21.7(13)	10.0(6)	43	60	64.2
	1975	--	--	--	--	--	--	--
	1983	57.1(4)	42.9(3)	--	--	7	7	100.0
Veg.	1960	16.7(1)	50.0(3)	33.3(2)	--	6	6	100.0
	1975	22.2(2)	33.3(3)	22.2(2)	11.1(1)	8	9	88.9
	1983	35.7(5)	21.4(3)	21.4(3)	14.3(2)	13	14	92.9
Fruits & Nuts	1960	15.6(5)	34.4(11)	18.7(6)	25.0(8)	30	32	93.8
	1975	29.0(9)	25.8(8)	9.7(3)	9.7(3)	23	31	74.2
	1983	25.4(15)	50.8(30)	8.5(5)	6.8(4)	54	59	91.5
Poul.	1960	21.4(3)	21.4(3)	28.6(4)	14.3(2)	12	14	85.7
	1975	33.3(6)	11.1(2)	22.2(4)	16.7(3)	15	18	83.3
	1983	20.0(1)	80.0(4)	--	--	5	5	100.0
Live-stock	1960	8.3(4)	10.4(5)	12.5(6)	8.3(4)	19	48	39.6
	1975	15.4(16)	17.3(18)	12.5(13)	14.4(15)	62	104	59.6
	1983	17.9(20)	28.3(32)	11.6(13)	15.2(17)	82	112	73.2

SOURCE: See Table 2.

[1]Commercial farms indicate sales of $2,500 per year.

[2]Absolute number of farms in parentheses

TABLE 5. Selected characteristics of small farms, U.S. Virgin Islands: 1960, 1975, 1983.

	Under 3 ac.	3-9 ac.	10-19 ac.	20-49 ac.	All Farms
Ave. size farm (ac.)					
1983	1.6	5.2	13.1	30.3	68.7
1975	1.1	5.5	12.8	28.6	75.5
1960	1.4	5.4	13.6	32.4	87.9
% Acreage in cropland					
1983	50.4	41.1	28.0	32.9	8.8
1975	30.6	34.6	22.0	27.6	10.0
1960	39.5	44.2	42.1	30.8	25.7
% Acreage in pasture					
1983	18.8	36.5	43.5	49.1	76.6
1975	21.0	35.6	44.0	41.0	62.6
1960	8.6	22.0	32.6	38.7	48.8
% Acreage in woodlands, etc.					
1983	30.8	22.4	28.5	18.0	14.6
1975	48.4	29.8	34.0	31.4	27.4
1960	51.9	33.8	25.3	30.4	25.6
% Operators on farm (2-4 years)					
1983	24.0	11.4	12.5	20.6	15.5
1975	24.8	10.6	25.7	15.2	17.7
1960	35.7	17.6	19.5	17.5	20.8
% Operators born in USVI					
1983	57.3	64.9	71.9	67.6	66.3
1975	67.9	76.6	60.0	60.6	69.1
1960	69.6	55.3	55.2	49.1	57.5
% Operators working 200 or more days off farm					
1983	53.3	53.5	37.5	35.3	45.5
1975	36.7	31.9	54.3	30.3	34.3
1960	50.0	51.3	35.6	42.1	46.5
% Farms using tractors					
1983	5.3	8.8	25.0	29.4	18.2
1975	2.8	5.3	14.3	30.3	13.1
1960	0.0	1.0	1.1	3.5	6.0
% Farms using machines					
1983	22.7	37.7	43.8	55.9	39.6
1975	13.8	16.0	11.4	27.3	23.2
1960	12.5	19.6	23.0	24.6	19.4
% Farms hiring labor					
1983	12.0	21.1	25.0	44.1	27.7
1975	17.4	29.8	22.9	48.5	33.9
1960	12.5	32.6	29.9	26.3	30.3
% Farms purchasing feed					
1983	64.0	66.7	59.4	58.8	70.0
1975	77.1	57.4	51.4	63.6	67.3
1960	25.0	22.1	28.7	22.8	24.8
% Farms purchasing fertilizer					
1983	25.3	22.8	18.8	20.6	21.8
1975	11.9	23.4	28.6	24.2	19.9
1960	5.4	8.5	13.8	14.0	11.6
% Commercial farms[1]					
1983	65.3	68.4	71.9	76.5	71.6
1975	34.9	59.6	54.3	63.6	54.1
1960	30.4	22.6	37.9	38.6	36.3

SOURCE. See Table 2.

[1]Commercial farms indicate sales of $2,500 per year.

TABLE 6. Distribution of total livestock and poultry production by small farm size. U.S. Virgin Islands, 1960 and 1983[1].

	Under 3 acres	3-9 acres	10-19 acres	20-49 acres	Total under 50 acres
% of total cattle					
1983	1.5	2.6	1.6	5.6	11.3
1960	0.1	1.0	1.1	2.3	4.5
% of total hogs					
1983	22.6	38.4	5.8	9.9	76.7
1960	17.2	25.1	10.8	10.6	46.5
% of total sheep					
1983	13.5	15.2	5.3	24.9	58.9
1960	1.1	19.1	6.3	7.3	33.8
% of total goats					
1983	13.5	30.2	14.1	17.8	75.7
1960	11.1	20.4	15.8	17.1	64.4
% of total chickens 4 months and over					
1983	5.8	88.2	1.5	2.9	98.4
1960	5.3	44.3	11.1	3.8	67.1
% total turkeys and other poultry					
1983	42.6	39.5	--	7.2	89.3
1960	18.6	32.5	27.4	1.0	79.7
% total eggs sold (doz.)					
1983	0.7	99.0	(D)[2]	(D)[2]	99.7
1960	1.1	39.7	11.5	0.9	53.0

SOURCE: See Table 2

[1]All figures are percentages of total territorial production.

[2]Data not reported because disclosure would result in individual farm identification.

specialization toward small livestock, but also some institutional distortions. For example, the extent of commercial farming (sales of $2,500) has certainly been affected by inflation. In addition, the increasing usage of hired machines/custom work may partly be influenced by the increased availability of subsidized clearing/spraying, etc., services provided by the USVI Department of Agriculture. Moreover, the comparatively high pasture acreage share of the two larger small-farm types (10-19 acres and 20-49 acres) may partly reflect merely "running a few goals" to avoid taxation and reduce the cost of holding land for speculative purposes. Land in the USVI certified as agricultural is eligible for a 95% property tax exemption and a 90% farm income tax refund. These measures were implemented to retain land in agriculture but do not prevent realty speculation since on small farms with limited farm effort and income "the capital gain that can be realized is so much larger than the value of the tax break. . . ." (D. Padda, et al. 1978).

Finally, it is noteworthy that the smallest holdings of under 3 acres over the entire period were operated by the highest percentage of young farmers (2-4 years on farm). This can be primarily explained by the very minimal entry barriers assumed for such small farms in terms of relatively low startup costs, capital requirements, and labor effort. However, in conjunction with a sharp decline in the proportion of operators born in the Virgin Islands recorded only for farms under 3 acres between 1960 and 1983 (Table 5), this uncharacteristically large percentage of young small farmers may partly reflect the impact of massive West Indian migration to the territory during the 1960's tourism and construction boom (De Albuquerque and McElroy, 1982). The sharply falling levels of new farmers for most all farm classes between 1960 and 1983 indicate not only the increasing attractiveness of nonfarm alternatives, but also the consequences of rising population densities and an accomodative pattern of suburban sprawl on realty values and hence rising entry barriers.

Relative Productivity

Tables 6 and 7 present data on the relative importance of the small-farm sector in the territory's agricultural economy, and on the differing productivity of the four small-farm classes. Although these small-scale holdings contained approximately only 10% of the total agricultural land, by 1983 they accounted for the bulk of production in hogs, goats, sheep, chickens, other poultry, and eggs. In every case, their share of production increased over the 22-year period with the largest gains in hogs, sheep, and poultry products. By 1983 small farms produced three-fourths of all hogs and goats in the USVI and over 90% of poultry products. Regarding fruits/nuts, the data available (1983 only) show that the small-farm sector accounted for 90-95% of all limes/lemons and papayas, 80-90% of avocados and oranges, and 70-75% of all bananas, coconuts and grapefruits.

Within the four small-farm classes, 3-9 acre plots demonstrated highest shares of total output in hogs, goats, chickens, and eggs while—again in terms of gross output shares—20-49 acre units dominated cattle and sheep raising, and under 3 acre units dominated other poultry (Table 6). The numerous 3-9 acre holdings, containing over one-third of total farms in 1983, also dominated the production of fruits/nuts: specifically avocados, bananas, coconuts, mangoes, and oranges (Table 7). The 20-49 acre holdings dominated grapefruits and limes/lemons while plots under 3 acres accounted for the highest production of papayas. In summary, these data identify the 3-9 acre holdings as the most productive in terms of the gross output contribution to the insular economy for the limited livestock/products examined. This is not surprising since such units contain almost half of the labor (as measured by number of farm operators) in the small-farm sector and 28% of the acreage (computed from Table 2). The experience of other Caribbean

islands confirms the production patterns observed above, *i.e.*, that small farms account for a majority of the food crop, vegetable and fruit and nut production (Bourne and Weir, 1980).

Determining the relative efficiency of small farms was plagued not only by census data limitations but also by the unavailability of acceptable local estimates for allocating acreage to specific crops and livestock rearing in the highly mixed intercropping systems characteristic of the USVI. These factors precluded the utilization of more sophisticated efficiency criteria commonly employed elsewhere to assess productivity in mixed farming (Harwood, 1979). As a result, two crude measures were constructed: output and/or livestock per acre and output per tree of bearing age.

Tables 8 and 9 present the results. In the first case, relative efficiency was estimated for 1983 by dividing the total output produced by each farm size for each fruit/nut selection by the respective acreages in fruit/nut production for each farm size classification. According to this method, the smallest scale of under 3 acres was most efficient, achieving the highest production per acre in every fruit/nut category. A similar analysis of livestock productivity—total number of sheep/goats/hogs/cattle divided by total acreage in pasture and grazing land—generated similar results. With the exception of bananas, coconuts, and grapefruits, 3-9 acre holdings were second in efficiency. However, although these findings do capture the intensity of effort on the two smallest-scale classifications, they should be accepted guardedly because of the aggregative nature of the methodology, which ignores intercropping patterns and variations in land quality, and because of the assumption of constant output quality, especially with respect to livestock, across farm size categories.

In the second experiment, the ratios of harvested fruit/nut production to respective trees/hills of bearing age were calculated for each farm size for only two years for which census data were available, 1975 and 1983. Although the figures in Table 9 indicate some large productivity differences for the same farm sizes across the two years—perhaps due to topographical variations, tree stock maturity differentials, and/or the vagaries of weather—the overall results generally suggest that sizes of under 3 acres and 20-49 acres were relatively most efficient in non-citrus and citrus products respectively, while units of 10-19 acres were, with some exceptions, least efficient.

CONCLUSIONS

In summary, these analyses of relative productivity, confined by the limitations of crop selection imposed by census data, suggest that in terms of gross output contributions to the territorial economy farms of 3-9 acres were generally superior in small livestock and non-citrus fruit/nut production while farms of 20-49 acres were superior basically in citrus produce and sheep and cattle. In terms of relative efficiency or production per acre and per tree/hill of bearing age, farms of under 3 acres were most efficient across all tests with differentials clearest in non-citrus fruit/nut products while farms of 20-49 acres demonstrated their comparative advantage in citrus. In all cases, farms of 10-19 acres scored the lowest performance.

Such findings should assist policy-makers in view of:

1. The resource constraints that circumscribe such efforts and call for prioritizing;
2. Escalating USVI food imports which have risen from $5 million in 1960 to over $80 million presently (Government of the Virgin Islands, 1980:26);
3. The long period of USVI agricultural decline; and
4. The common problems infesting agriculture here and elsewhere in the region (Belisle 1983).

However, because of the rudimentary nature of the analysis and numerous data gaps, the primary implication of the study is to

TABLE 7. Distribution of selected fruits/nuts production by small-farm size. U.S. Virgin Islands, 1982.

	Under 3 ac.	3-9 ac.	10-19 ac.	20-49 ac.	Total
% Avocados	21.7	35.3	9.3	21.9	88.2
% Bananas (bunches)	17.1	29.5	17.0	6.1	69.7
% Coconuts	10.7	24.0	12.4	22.9	70.0
% Grapefruits (lbs.)	17.3	16.0	10.0	32.6	75.9
% Limes/Lemons (lbs.)	23.3	25.6	7.9	38.1	94.9
% Mangoes	8.9	25.8	5.0	17.1	56.8
% Oranges (lbs.)	11.6	37.9	3.5	28.4	81.4
% Papayas (lbs.)	33.1	30.1	11.8	18.6	93.6

SOURCE: U.S. Census of Agriculture for the Virgin Islands, 1982. Bureau of the Census, Washington.

TABLE 8. Selected fruits/nuts and livestock per acre by small farm size. U.S. Virgin Islands, 1983.

	Under 3 ac.	3-9 ac.	10-19 ac.	20-49 ac.
Total acres in fruits/nuts	38	170	65	148
Output per acre:				
Avocados	182	66	46	47
Bananas (bunches)	52	20	30	5
Coconuts	51	26	34	28
Grapefruits (lbs.)	21	4	7	10
Limes/lemons (lbs.)	77	19	15	32
Mangoes	492	319	160	243
Oranges (lbs.)	19	14	13	12
Papayas	42	9	9	6
Total acres in pasture and grazing land	22	217	182	506
Total cattle, sheep, goats, and hogs	1,564	2,735	952	1,995
Total livestock per acre	71	13	5	4

SOURCE: See Table 7.

TABLE 9. Ratios of harvested output to trees of bearing age for selected fruits/nuts. U.S. Virgin Islands, 1975 and 1983.

	Under 3 acres	3-9 acres	10-19 acres	20-49 acres
Avocados				
1983	29.0	22.1	17.4	44.8
1975	38.7	14.8	25.9	12.1
Bananas (bunches)				
1983	0.55	0.44	0.16	0.38
1975	0.70	0.54	0.43	1.29
Coconuts				
1983	9.4	10.3	3.7	5.4
1975	22.8	10.4	7.5	7.8
Grapefruits (lbs.)				
1983	22.2	10.3	4.9	31.3
1975	7.1[e]	2.3	7.9	10.7
Limes/Lemons (lbs.)				
1983	12.0	7.3	8.9	22.4
1975	24.6	15.4	13.5	25.0
Mangoes				
1983	82.0	47.7	34.6	94.4
1975	61.4	66.0	19.4	8.7
Oranges (lbs.)				
1983	12.3	15.0	8.8	15.0
1975	7.1	7.8	2.6	10.5
Papayas				
1983	8.6	2.7	2.2	7.8
1975	6.5	4.5	5.4	3.4

SOURCES: U.S. Census of Agriculture for the Virgin Islands, 1974 and 1982. Bureau of the Census, Washington.

[e]Estimated

clearly point up the general need for more serious survey research to uncover actual small-scale mixed cropping patterns, adjustments to constraints, levels of farm effort and productivity, and so on (W. Shaner et al., 1982). In particular, these findings suggest that the two smallest scale farm classifications deserve further scrutiny not only because of their relatively superior efficiency and output performance, but also because one of the most glaring deficiencies identified in the territory is the existence of large tracts of "essentially semi-abandoned" agricultural land (Government of the Virgin Islands, 1980:61) highly suitable for the kinds of intensive small-farm crop cultivation documented above.

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