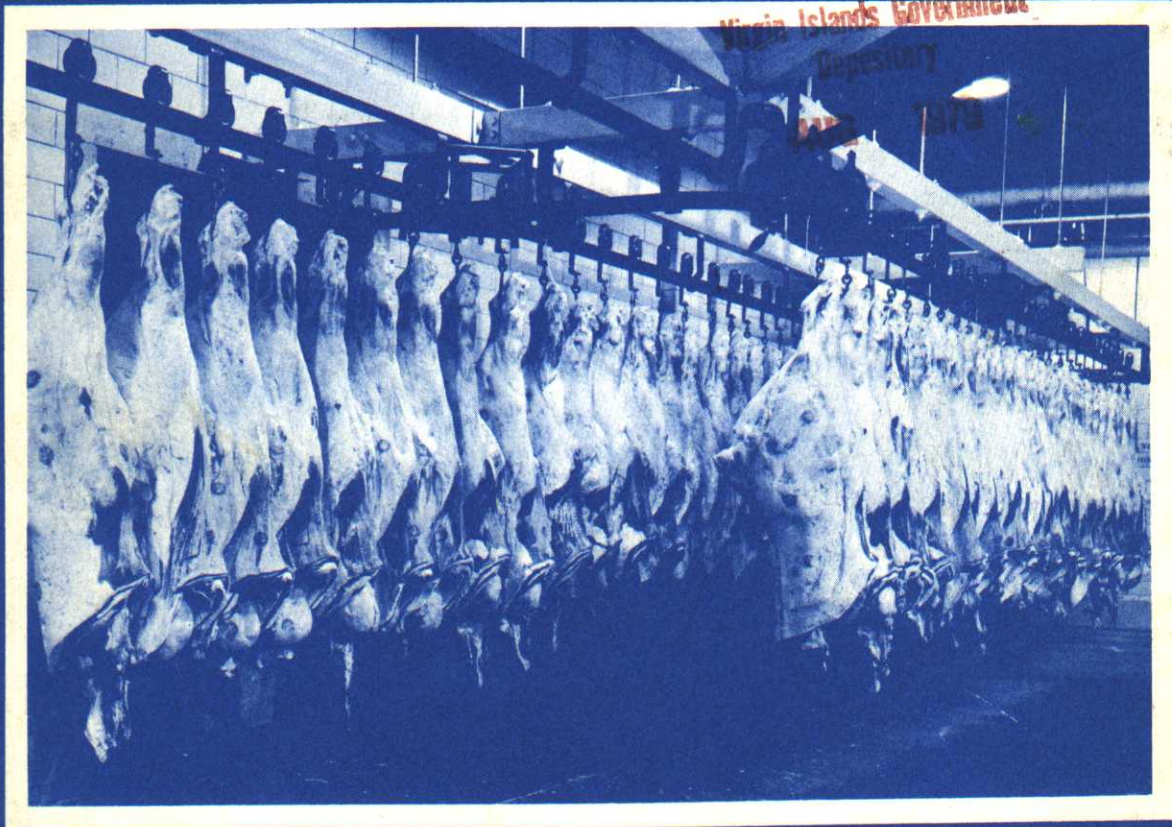


Virgin Islands
Agricultural Experiment Station
Report No. 8
October 1974

Marketing Potential for
LIVESTOCK PRODUCTS
in the U.S. Virgin Islands



V.I. 1179

VIRGIN ISLANDS AGRICULTURAL EXPERIMENT STATION
Fenton B. Sands, Director
St. Croix, U.S. Virgin Islands

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**College of the Virgin Islands
Virgin Islands Agricultural Experiment Station
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FOREWORD

This report, "Marketing Potential for Livestock Products in the U.S. Virgin Islands," is one of a series of feasibility studies sponsored by the newly created Virgin Islands Agricultural Experiment Station, College of the Virgin Islands. These investigations were financed totally with Federal funds made available to the Station under the provisions of the Hatch Act, Amended.

Preparation of this report was accomplished by contracting for the services of Dr. Richard W. Stammer, Assistant Professor, Department of Agricultural Economics and Marketing, Rutgers University, New Brunswick, N.J. Dr. Stammer conducted the study and wrote the manuscript for this report.

The objective of these studies was to try to determine the agricultural enterprises, both plant and animal, that have economic potential on the Virgin Islands. It is my belief that the agricultural industry must be economically sound in order to be viable.

On the Virgin Islands, agriculture has been on the decline since the early part of the 1960's. The average number of farms, farmers, and production of agricultural commodities (with the exception of fluid milk) have all declined at a consistent rate. Among the questions which are uppermost in the minds of many people are: What factors have been responsible for these declines? Can these downward trends be stopped and perhaps reversed? What is the future of the agricultural industry, particularly on St. Croix where 85 percent of the farmland is located? This report on the marketing potential for livestock products, along with the others, sheds some light on these questions.

These feasibility reports have also revealed the areas where lack of training and education on the part of the farmers has adversely affected production. These subjects have now become part of the new program of the V.I. Extension Service. At the same time, the lack of information about the response of crops and livestock in this environment, which also limits production, has been recognized. These gaps in our knowledge have become the basis for the planned research program of the V.I. Agricultural Experiment Station. Thus, these studies have given more direction to the efforts of the Extension and research programs of this land-grant institution. More importantly, the results of these studies are expected to be beneficial to full- and part-time farmers, as well as to potential investors.

This series of reports rests squarely on the belief that a revival of agriculture would contribute substantially to the general welfare through increased output of goods and services and by providing additional employment. Moreover, expanded production and marketing of farm products could provide greater, and in some cases cheaper, sources of nutritious foods for consumers.

A more fully developed agriculture would complement the major industry—tourism—in two ways. First, visitors would be pleased to be served local products, especially tropical fruits and vegetables, by hotels and restaurants where such products are often not now available. Second—and perhaps more important—an expanded agriculture would tend to preserve the environment of exotic tropical islands. Most visitors and some permanent and semi-permanent residents come to the Virgin Islands to seek this environment. If this attraction is destroyed, the basis of the major industry of the Islands will be undermined.

The Virgin Islands Agricultural Experiment Station gratefully acknowledges the cooperative assistance and contributions from many St. Croix farmers; Rudolph Shulterbrandt, Commissioner, V.I. Department of Agriculture and his staff; and Bennett S. White, Jr., project consultant and former USDA agricultural economist, now retired.

Fenton B. Sands, Director
March 1974

SUMMARY AND CONCLUSIONS

The present and future market potential for locally produced meat products in the U.S. Virgin Islands is very good. In 1972, local production accounted for only 5 percent, by weight, of total meat consumption on the Islands. Local beef production accounted for 81 percent of local red meat marketings, and this comprised 16.8 percent of total beef consumption. However, it was estimated that even production of local beef could be expanded from 60 to 100 percent, at the present time and at present prices, without creating an oversupply situation. Production of most other meat products could be expanded more than beef. Furthermore, a fairly large future growth in the demand for most meat products is expected because of a continued growth in population and per-capita income.

For livestock products as a whole, the U.S. Virgin Islands are most self-sufficient in the production of fluid whole milk. In 1972, they produced 90 percent of total local consumption. It was estimated that at the present time and with present prices, production of fluid whole milk could probably be increased 20 percent without creating an oversupply situation. It was also estimated that local demand would probably increase 100 percent by 1980, subject to qualifications on population composition, tourist expenditure, and composition of tourist population discussed in the body of this report.

When one considers market potential, market structure, resource base, welfare considerations, and a cursory cost analysis, the most feasible areas for expanded livestock production appear to be grass-fed beef, fluid whole milk, and goat products. These enterprises all would utilize a portion of the considerable grazing resources available on St. Croix. The feasibility of expanding production in grain-based livestock enterprises depends on the feasibility of economically producing grain locally, since importing grain does not appear to be an economically viable alternative. Even if studies indicate the feasibility of producing local grain, new systems would have to be developed to facilitate the marketing of any considerable expansion in the production of poultry or pork products. The present marketing system for beef and

fluid whole milk is relatively efficient and probably capable of handling a doubling in local production. Finally, there will continue to be a small, fairly select market for locally produced large and extra large eggs and this market will probably double over the next ten years.

This study has uncovered several potentially fruitful areas of further research, among which are the following:

1. Determine the relationships between the composition of tourist expenditures and the welfare and livestock consumption patterns of the resident population.
2. Determine local preferences for various livestock products and examine how these preferences change with changes in consumer disposable income.
3. Examine the cost-benefit relationship between subsidizing, if necessary, local grass-fed beef production and improving the welfare of the native population.
4. Examine ways of encouraging increases in local milk production, since the marketing system for this product is capable of handling more output and since milk provides the population with a relatively low-cost source of animal protein.
5. If it proves feasible to produce grain crops locally, a careful analysis of where this grain should be utilized is in order. There are several possibilities. First, grain could be used in the local dairy industry which has proven its economic viability. Second, it could be used to increase the output of poultry and pork products. Third, it could be used as a basis for cattle feeding operations to supply butchers, independent grocers, and supermarkets. Or, grain could be used to feed beef for the institutional market. All of these alternatives should be examined in some detail and the respective benefits costs and welfare implica-

tions for each possibility should be considered.

6. Since there is a ready market for pork products and an available supply of high quality garbage from the institutions, the feasibility of a more widely used and a better-managed garbage-fed hog operation should be examined.

7. If the meat production industry does expand to a considerable extent, the feasibility of producing some processed meat products should be examined. There is a large demand for these products on the Virgin Islands and such an operation would result in a greater utilization of total livestock production.

Marketing Potential for **LIVESTOCK PRODUCTS**

in the U.S. Virgin Islands

by

RICHARD W. STAMMER

The cost per unit of production and the underlying factors affecting the supply of livestock products in the U.S. Virgin Islands have been analyzed in several other reports in this series. This report concentrates on the demand for livestock products and the effects of the present marketing system structure on prices received by producers and paid by consumers. Thus, although this report can stand alone as a marketing study, it should be considered in conjunction with the other reports in this series when analyzing questions of economic feasibility.

The relevant demand from the standpoint of livestock producers is that which is derived from demand at the consumer level. The relationship between consumer demand and derived farm demand depends on the structure of marketing channels and the performance of the marketing system in assembling products from producers and distributing them to consumers. Thus, in determining the relevant derived demand, it was necessary to analyze both consumer demand and the performance of the marketing system.

The marketing system serving the Virgin Islands livestock industry is not a single system but actually a complex of four distinct but somewhat interrelated systems. In any analysis of Virgin Islands livestock marketing, we must recognize the special functions of these individual systems. Basically, they are:

1. A small-store marketing system on St. Croix selling primarily locally produced meat products to the native population. These stores also market some imported non-beef products.
2. A small-store marketing system on St. Thomas selling primarily imported meat products to the native population.
3. A chain supermarket system on St. Croix and St. Thomas that imports high quality meat products and sells them to local continentals and some natives.
4. A marketing system on St. Thomas and St. Croix that services the institutions dealing primarily with the tourist trade, that is, hotels and restaurants.

The special functions and interrelations of these four systems will be analyzed in more detail later in this report. However, it should be recognized that they work jointly in supplying the total demands of the Islands, and if one channel does not operate effectively, another must compensate or some sector will not be adequately served.

FACTORS AFFECTING TOTAL DEMAND

Total demand for any product is a function of many factors; the primary ones are population, consumer disposable income, consumer tastes and preferences, and the prices of complementary and supplementary products. In analyzing the demand for livestock products in the U.S. Virgin Islands, it became apparent that consumers were a quite heterogeneous group with respect to tastes, preferences and per-capita disposable income. Thus, to facilitate the analysis, consumers were divided into three broad

groups: natives, continentals, and tourists.¹ Of course, these groups are not mutually exclusive nor are they homogeneous. For instance, a significant number of natives have consumption patterns similar to continentals because of their incomes or changes in tastes and preferences developed from a period of residence in the U.S. mainland. However, the sole purpose of this breakdown was to assist in the analysis, and it was useful for this purpose. Furthermore, in a general sense the marketing system as previously defined has been developed to serve the needs of these consumer groups.

Population

Total resident and tourist populations in the U.S. Virgin Islands have been growing at a fairly rapid rate. From 1960 to 1970, resident population increased 94 percent and from 1970 to 1972 it increased another 12.6 percent (Table 1). By 1980, resident population is projected to be 122,340—an increase of 44.5 percent over 1972. St. Croix's rate of growth from 1970 to 1972 was approximately 3 percent greater than the rate for St. Thomas. Past and projected population increases are attributed to a resident birth rate that exceeds the resident death rate and a net migration into the Islands.

If the native and continental populations increase in the same proportion that presently exists, the growth in consumption of livestock products from 1972 to 1980 should be significantly larger than 45 percent because of changes in incomes, tastes and preferences. One complicating factor affecting this projection arises from assuming that continental and native populations will have the same proportions in 1980 as in 1972. Since the per-capita consumption of certain livestock products is considerably higher for continentals, due primarily to a higher average income and different tastes and preferences, a shift in this proportion would affect the demand projection. Unfortunately, there are no reliable data available indicating how these proportions changed over time or how they are projected to change in the future. There is some evidence, however, that in the past

¹ The following definitions of consumer groups were used in this study: Natives were considered to be, for the most part, non-Caucasians born in the Caribbean area. Continentals were all Caucasians and other persons born outside the Caribbean area but residing principally in the Virgin Islands. Tourists were persons staying in the Islands for a period of less than six months a year.

Table 1.—Population growth and projections, U.S. Virgin Islands, 1970–1985

Year	Virgin Islands	St. Croix	St. John	St. Thomas
1970	75,150	35,940	1,920	37,280
1971	79,830	38,510	2,040	39,280
1972	84,650	41,160	2,150	41,340
1973	89,620	43,900	2,270	43,450
1974	94,730	46,730	2,390	45,610
1975	99,980	49,650	2,510	47,820
1976	105,380	52,650	2,630	50,100
1977	110,910	55,740	2,760	52,420
1978	113,820	57,320	2,830	53,670
1979	118,080	59,680	2,930	55,480
1980	122,340	62,030	3,030	57,280
1981	126,600	64,390	3,130	59,080
1982	130,860	66,750	3,230	60,880
1983	135,110	69,110	3,320	62,680
1984	139,370	71,460	3,420	64,480
1985	143,630	73,820	3,520	66,290

Source: Virgin Islands Department of Health

Table 2.—Air and cruise ship passengers landing in the U.S. Virgin Islands, 1965–72

Fiscal year	Air passengers	Cruise ship passengers	Total
1965	354,370	109,340	463,710
1966	436,780	117,660	554,440
1967	516,300	133,360	649,660
1968	651,100	166,120	817,220
1969	772,500	213,540	986,040
1970	669,820	251,080	920,900
1971	657,060	253,870	910,930
1972	742,850	364,640	1,107,490

year or so net immigration of continentals has declined.² This decline in net immigration, which has been attributed primarily to the Fountain Valley affair and related events, may be temporary, and, if so, it will have little effect on future consumption. But if the trend does become permanent, then the changing composition of consumers could result in a smaller increase in total demand than the percentage increase in total resident population.

² The primary evidence of this decline is a decrease in property values in prime undeveloped land. Since the supply of this land is relatively fixed, it appears that the decrease was due to a lessened demand. Primary buyers of this type of land are continentals. There is also some evidence of this decline in the consumption figures for various meat products.

Changes in the tourist population also have a significant effect on demand, especially because tourists tend to consume a relatively high proportion of livestock products. From 1965 to 1969, air and cruise ship passengers visiting the Virgin Islands increased 113 percent (Table 2). Because of the general economic conditions in the U.S. mainland in 1970–71, the number of tourists declined somewhat, but by 1972 total air and cruise ship passengers were above the level established in 1969. During the 1969–72 period, however, a dramatic shift, from the standpoint of livestock product consumption, occurred in the expenditure patterns of tourists (Table 3). Although total tourist expenditures over this period increased 8 percent, the amount spent in bars and restaurants decreased 39 percent. This decrease in tourist expenditures on food items had a significant impact on livestock product consumption in the U.S. Virgin Islands during this period.

The decline in tourist expenditures in bars and restaurants during a period when total tourist expenditures were increasing was due to a shift in the composition of the tourist population. The U.S. Virgin Islands were attracting more tourists who were interested in taking advantage of the free port privileges in a single day's shopping spree, but fewer tourists were spending their vacation on the Islands. This fact is also reflected by the 18-percent decline in tourist expenditures in hotels and in the relative increase in cruise ship passengers in relation to air passengers during 1969–72. The impact on St. Croix was even more marked than on St. Thomas. Tourist expenditures in St. Croix bars and restaurants declined 66 percent from 1969–70 to 1971–72, and expenditures in hotels declined 34 percent.

Although it is difficult to predict the direction of tourist expenditures in bars and restaurants, it is obvious that this factor will significantly influence future livestock product consumption in the Virgin Islands.

In summary, because population is an important factor affecting total demand for livestock and livestock products, it seems apparent that increases in resident and tourist populations will cause a marked increase in the demands for these products.

Income

Most meat products are very income-elastic and, thus, the income levels of the resident population in the U.S. Virgin Islands will have a significant impact on total demand. Moreover, it is important to exam-

ine not only average per-capita income but also distribution of income when analyzing changes in consumption.

According to the 1970 census, the median cash income for all families and unrelated individuals in the U.S. Virgin Islands was \$4,656—more than 1,000 percent over the 1950 figure (Table 4). In real terms, this increase in median income was approximately 730 percent. Distribution of incomes also changed significantly over this period. For instance, in 1970 10 percent of all persons reporting had incomes of less than \$250, while 31 percent had incomes in excess of \$10,000. In 1950, 14 percent of those reporting had incomes of less than \$100 and more than 50 percent had annual incomes of less than \$500.

Improvement in both median income and the distribution of income over the past 20 years has undoubtedly had an impact on livestock product consumption in the Virgin Islands. However, there is still a significant proportion of the resident population that probably cannot afford to purchase these livestock products in any significant quantity. Forty-five percent of all families had incomes of less than \$6,000 in 1970 (average family size was five persons) and, 56 percent of unrelated individuals had incomes of less than \$3,000. Also, the greatest impact of low income fell upon the native Negro population where 55 percent of the households (average household size was 5.5 persons) have incomes of less than \$6,000 and 64 percent of unrelated individuals had incomes of less than \$3,000.

Estimated per-capita income for all persons in the U.S. Virgin Islands was \$1,992 in 1970, Negroes having an estimated per-capita income of \$1,732. These income levels are significantly below those of the U.S. mainland where average per-capita income of all persons was \$3,910 in 1970. Income distribution was also quite different since in the U.S. mainland 26 percent of all families had incomes of less than \$6,000, and 46 percent had incomes over \$10,000 in 1970.

The important factor, from the standpoint of livestock product consumption, is that median incomes in the U.S. Virgin Islands have increased about three times as fast as median incomes in the U.S. mainland between 1950 and 1970. If this trend continues, the income gap between the mainland United States and the Virgin Islands will continue to narrow and many more persons will enter the meat consuming market and others will be able to greatly increase their meat purchases. It seems likely that median income for all

Table 4.—Cash income of families and unrelated individuals, U.S. Virgin Islands, 1969

Item	All U.S. Virgin Islands				St. Croix only
	Total	White	Negro	Other	
Families	13,135	2,987	8,940	1,217	6,744
Percent of families with incomes less than					
\$250	4	2	4	3	3
\$3,000	17	7	21	14	17
6,000	45	19	55	48	47
\$10,000	69	35	79	75	70
25,000	95	84	98	97	95
Median income	\$6,612	\$13,373	\$5,512	\$6,272	\$6,442
Mean income	9,062	16,082	6,884	7,889	8,926
Estimated per capita for persons in families	1,810	4,470	1,250	1,610	1,970
Number of unrelated individuals	8,112	1,605	6,444	393	4,137
Percent of individuals with incomes less than					
\$250	20	9	22	21	19
\$3,000	56	27	64	47	54
6,000	82	51	91	81	82
\$10,000	92	75	98	95	93
25,000	99	97	99	99	99
Median income	\$2,479	\$5,845	\$1,948	\$3,221	\$2,637
Per-capita mean income	3,467	7,269	2,512	3,596	3,633
All families and unrelated individuals ¹					
Median income	\$4,656	\$10,299	\$3,821	\$5,381	\$4,661
Mean income	6,873	12,996	5,052	6,841	6,914
Estimated per-capita income	1,992	4,830	1,396	1,732	2,168

Source: U.S. Census of population

¹ Estimated from U.S. census figures

persons could double between 1970 and 1980. A doubling in income in combination with the projected population increases could result in nearly a 100-percent increase in resident livestock product consumption.

No data are available detailing what has happened to per-capita incomes since 1970. However, in spite of what was projected in the previous paragraph, there is one situation that should be closely analyzed: the income effects of the aforementioned decline in tourist expenditures in hotels, bars and restaurants during the past few years. These declines could have a greater negative impact on low income persons than the positive effects generated by increased tourist expenditures in other categories. It should be remembered that the upward income mobility of low income persons will have a greater impact on live-

stock product consumption than any other changes in personal incomes. By observation, it appeared that a much larger proportion of low income persons were employed in hotels and restaurants than in any other sector of the tourist industry. Since both total wages paid and gratuities will decline in some proportion to expenditures in this sector, the \$11.8 million decline in such expenditures in the past two years was bound to have a significant effect on the welfare of low income people.

A decline in expenditures will also have an indirect effect. Because low income people will spend most of their income in the Islands and because they also have a very high marginal propensity to consume, the multiplier effect will be quite large and the decline in total income will be several times the initial decline in wages and gratuities. In addition, probably a larger

proportion of total expenditures in hotels, bars, and restaurants remains on the Islands than expenditures in other tourist enterprises. If this is true, then the multiplier effect of changes in tourist expenditures in these establishments will be much greater than for other tourist businesses and, thus, declines in these expenditures will have a greater impact on the total income picture for the Islands than increases in tourist expenditures in other areas. This whole area warrants more research, but if the trend of the past few years is not altered, then the increase in total resident meat consumption between 1970 and 1980 will probably fall quite short of the projected 100 percent.

Consumer Preferences

Environment, ethnic group, experience spectrum, and cultural background will all affect consumption patterns for livestock and livestock products. Thus, tourists, natives, and continentals will all have somewhat different between-group and within-group consumption preferences. It was not possible, within the time limits of this study, to analyze the consumption patterns of the various groups comprising the Virgin Islands population. Also, the interpretation of per-capita consumption figures (as will be done later) does not yield a clear cut indication of tastes and preferences since per-capita income also has a significant effect on these figures. However, from observation and cursory analysis, it did appear that, as a whole, Virgin Islanders have a greater preference for goat, lamb, mutton, and poultry, and a lesser preference for dairy products and possibly pork than the average continental U.S. consumer does. For other products, it was more difficult to differentiate between preference effects and income effects. Some overall change in taste and preferences for the resident Virgin Islands population can probably be expected. However, this change will probably be very gradual and not have a large effect on meat consumption in the next 10 years unless there is a major change in the composition of the resident population.

Prices of Complementary and Supplementary Products

The lower a person's disposable income, the more conscious he is of price differences between supplementary products. Thus, there is a higher probability that he will change his consumption pattern when relative prices change. Since a large portion of the

resident Virgin Islands population would be classified as low income people, it was expected that any change in relative prices would cause some shift in consumption. Of course, because of personal tastes and preferences, most consumers will hold to some minimum level of consumption for some products. A much smaller portion of the Virgin Islands resident population will have a relatively small cross elasticity of demand for livestock products due to their relatively high incomes. Finally, tourist demands for livestock products are not very responsive to changes in meat prices, since raw product cost is a relatively small part of the cost of a meal away from home. Thus, meal prices are not as variable as raw product cost.

In this study, some analysis was made of consumer shifts in response to relative price changes. Time did not permit a complete analysis of these shifts and only shifts between meat products were considered. However, if livestock product prices increase relative to other food products, a shift away from livestock products will occur. This is especially true for low-income persons. If world demand for livestock products continues to increase faster than world supply (which is quite possible) there will be a tendency for some shifting from livestock to nonlivestock food products within the Virgin Islands. This shifting will dampen the positive effects on consumption exerted by population increases and higher per-capita incomes.

DEMAND FOR LIVESTOCK PRODUCTS

This section presents a brief analysis of the present demand situation, changes in demand over the past three years, and potential future changes in demand for each of the major product groups. This analysis depends, to a large extent, on functional demand relationships developed in the previous section of this report.

Several types of consumption data are presented for each commodity. First, since the major portion of total livestock product consumption in the Virgin Islands is imported, an analysis of import data for 1970-72 is presented. These analyses will include data on total quantities imported, average price per unit of quantity imported, and point of shipment. Prices reported in the tables are f.o.b. shipping point; a delivered price can be derived by using the representative transportation costs in Table 5. It should be recognized that a large part of meat shipments reported as being from

Table 5.—Transportation rates per cwt.
for full truckloads

<i>Point of origin</i>	<i>Poultry</i>	<i>Carcass beef</i>	<i>Frozen packaged beef</i>
New York	\$2.96	\$4.48	\$3.25
Florida	2.78	4.22	3.04
San Juan	1.75	1.75	1.75

San Juan, Puerto Rico are actually transshipments that originated in the U.S. mainland. Values shown in the tables, however, are f.o.b. San Juan.

Per-capita consumption figures for livestock products (1971 and estimated consumption) for the population of the Virgin Islands, together with a comparison with U.S. mainland figures, are given in Table A-1 in the Appendix.

Beef

From 1970 to 1972, total beef imports into the U.S. Virgin Islands declined 45 percent (Table A-2). During the same period, local beef production, which was about 16.8 percent of total consumption in 1972, increased by 20 percent. However, total beef consumption declined by 39 percent (Table 10). At first glance, this appears to be inconsistent, for during this period population was increasing and presumably per-capita incomes were also increasing. However, the decline in beef consumption reflects the full impact of the primary and secondary effects of declines in tourist expenditures in hotels, bars and restaurants. Beef is the primary livestock product consumed by tourists and virtually all this beef is imported.

Locally produced beef is consumed primarily by natives and a small percentage of continentals. The correlation between beef imports during this period and tourist expenditures in bars and restaurants was .95. This figure indicates that a large part of the decline in beef consumption was directly attributable to a decline in tourist beef purchases. It is also believed that the previously mentioned secondary effects of the decline in tourist expenditures are reflected in beef consumption figures. Beef has the highest average price per pound of any livestock product grouping. Thus, when the incomes of low and low-middle income persons decline, the first meat item sacrificed would be beef, especially the higher grade and higher priced imported beef. Moreover, when wage and gra-

tuity incomes for people employed in hotels, bars and restaurants decline, they purchase either more local beef or other less expensive food items.

The future demand for beef depends largely on what happens to the tourist industry and other sources of employment. If tourist expenditures in hotels, bars and restaurants can be increased or even stabilized, or other employment opportunities opened up for residents, beef consumption should start to increase. Resident per-capita beef consumption was only 59 percent of that in the U.S. mainland and native per-capita consumption was only 51 percent in 1971. Thus, as the income level of residents increases, per-capita consumption and total consumption of beef should increase significantly, depending on what happens to beef prices in relation to other food prices. However, regardless of what happens to total beef consumption, the production of locally produced grass-fed beef could probably double at the present time without creating an oversupply.

Local production gives residents an opportunity to buy beef at prices that average about 25 percent less than imported beef. On St. Croix where most of the local beef is produced, butchers cannot supply their customers with all the products they wish to purchase. On St. Thomas there is practically no locally produced beef available. Furthermore, about 12.5 percent of the 1972 beef imports came from countries outside the continental United States—New Zealand, Argentina, Panama and the Dominican Republic. Generally, this beef is grass-fed and it tends to supply a group of St. Thomas consumers similar to those supplied by local production on St. Croix. This imported beef is more expensive than locally produced beef, but less expensive than the USDA choice beef imported from the U.S. mainland. Wholesalers indicated that this foreign beef is becoming harder to obtain and is getting more expensive all the time. Local producers could undoubtedly capture this market easily, the potential of which is at least 60 percent greater than present production. Thus, there is a large potential market for locally produced grass-fed beef and this market will exist for many years.

Pork

The overall trend in pork consumption is somewhat similar to that for beef (Table A-3). From 1970 to 1972 pork imports declined 25 percent, local pork production declined 4 percent, and total pork con-

sumption declined 23 percent. Basically, two factors underlay this decline in consumption. First, the decline in tourist expenditures in hotels, bars and restaurants had similar effects on pork and beef consumption. Second, the cause of the decline in pork consumption was a price effect. Pork production in the U.S. is quite cyclical and prices fluctuate widely from year to year (foreign pork represents only 1 percent of total consumption). Prices declined about 16 percent from 1970 to 1971 and consumption increased 18 percent over this period (beef consumption declined from 1970 to 1971). In 1972 pork prices increased 17 percent, and this was associated with a 36 percent decline in pork consumption. Thus, pork consumption was affected somewhat by the decline in tourist expenditures (especially in 1972) but not to as great an extent as beef, and the price elasticity of demand for pork appears to be relatively high. As mentioned previously, a high price elasticity of demand is to be expected when a large proportion of consumers comes from low and middle-low income groups.

Domestic pork production accounts for about 8 percent of total consumption. Most domestic pork comes from small backyard operations. Per-capita consumption of pork in the U.S. Virgin Islands is only 59 percent of that on the U.S. mainland. Native per-capita consumption is 38 percent of the U.S. figure. Thus, there is a very large potential market for local pork, not only because producers can easily capture a larger share of the present market, but also because the present market will undoubtedly expand as population and per-capita income on the island increase. Finally, pork consumption is not quite as dependent as beef consumption on tourist expenditures in bars and restaurants.

Poultry

From 1970 to 1972, poultry imports into the U.S. Virgin Islands and total poultry consumption both increased 7 percent (Table A-4). It appears that most poultry products imported into the Islands are consumed by the local population. Native per-capita consumption of poultry products was approximately 2.5 times larger than per-capita consumption in the U.S. mainland. This is to be expected because poultry products were the lowest-cost source of meat protein and Virgin Islanders appear to have a stronger preference for poultry than consumers in the U.S. mainland.

The price effect on quantity consumed is evident from the data, but price elasticity is not as large for poultry as it is for beef and pork, because there is no other lower cost meat product to which a consumer can switch when poultry prices rise.

From 1971 to 1972, weighted average poultry prices increased 5.7 percent and total consumption declined 2.3 percent. There was evidence that a high cross elasticity of demand between various poultry products existed. This was shown by the large amount of consumer shifting between whole chickens, chicken parts, other poultry products, and poultry livers in response to changes in relative prices. For instance, in 1972, the average price of whole chickens and chicken parts increased 12 percent and consumption of these products declined 28 percent. At the same time, price of other poultry products declined 25 percent and the price of poultry livers declined 76 percent, which increased consumption 275 percent and 2,300 percent respectively. Thus, although price elasticity for the total poultry group was relatively low, there was a large amount of substitution between poultry products and the within-group cross elasticities were very high.

Future total consumption of poultry products will probably increase at a slower rate than population and quite possibly total consumption could decline even though population is increasing. This is due to the fact that Virgin Islanders will most probably substitute other meat products for a portion of their present poultry consumption as their incomes increase.

Regardless of what happens to total consumption, there is a very large potential market for locally produced poultry products. At present, local production accounts for only .1 percent of total consumption and most of this production comes from selling cull laying flocks. Producers indicate that the demand for fresh poultry is so strong that they can sell their entire flock to individuals in less than a day, in spite of the fact that they are selling only old hens.

Miscellaneous Meat Products

Native Virgin Islanders have a strong preference for meat dishes made from goat and lamb. Per-capita consumption for these products by the native population was approximately 210 percent larger than per-capita consumption in the U.S. mainland during 1972. From 1970 to 1972, imports of goat, lamb, and mutton increased 28 percent; local production de-

creased 1 percent and total consumption increased 28 percent (Table A-5). In 1972, consumption of these products increased 25 percent even though prices rose 2 percent. Finally, goat, lamb, and mutton consumption were not affected by the primary effects of declines in tourist expenditures in bars and restaurants, but they might have been affected somewhat by secondary income effects.

At present, local production accounts for only 3.3 percent³ of total consumption of goat meat, mutton and lamb. These products probably have the greatest market potential for local production of any meat product produced on the Islands. All of the imported goat meat was frozen and the majority of it was produced in either Texas or New Zealand. At the time of this study, July 1973, butchers reported difficulty in obtaining goat meat. Moreover, the retail price was 14 percent higher than the price of locally produced sirloin steak.

In the future, goat consumption should continue to increase as both population and incomes increase, and at a greater rate than the rate of population growth, assuming that the composition of the resident population remains the same or that the proportion of natives increases.

The 940 percent increase in consumption and 68 percent decrease in price of meat from bovine animals between 1970 and 1972 represents a change in the composition of items reported in this classification (Table A-5). In 1970, the major import in this category was veal and it had a high average price. In 1972, the majority of meat imports in this category were cull cow beef, a much smaller percentage being veal. This large increase in imports of lower grade beef indicates increased efforts on the part of the resident population to obtain inexpensive beef.

Processed Meat Products

The price effect on the quantity of processed meat products consumed is quite evident over the past three years (Table A-6). The weighted average price of processed meat products decreased 14 percent over this period. This resulted in a 36 percent increase in the quantity of processed meat products

³ Actual local production is probably higher and may be as much as 5 percent of total consumption since a fairly large amount of backyard slaughtering of goats and lambs exists and poundages for these animals are not recorded.

purchased as consumers shifted from other products such as beef and pork to processed meats. Future changes in demand for this classification of livestock products are somewhat difficult to predict because composition of the class is so varied. Some items are used primarily by institutions and their consumption is directly related to tourist expenditures in bars and restaurants; other products are used primarily by residents.

Liver and Edible Offals

Consumption of liver and edible offals bears some similarity to that for processed meat products. From 1970 to 1972, weighted average price increased 13.7 percent for these products and consumption declined 17 percent (Table A-7). However, in 1972, both prices and consumption increased. The indeterminate nature of the price effect on consumption is due to the fact that some of these products would be classified as economically inferior goods while other products would be considered normal or even luxury goods. Also, some of the products are consumed primarily by tourists and continentals while others are consumed by natives. However, on the basis of an informal sample, it appears that the preference of Virgin Islanders for liver and edible offal products is at least equal to that of the average Continental U.S. consumer. At present, per-capita consumption of these products by Virgin Islands residents is about 40 percent of U.S. per-capita consumption. Hence, as per-capita income in the Virgin Islands increases, consumption of liver and edible offals should increase at a rate greater than population growth.

Eggs

Between 1970 and 1972, imports of eggs into the Virgin Islands declined 5.3 percent, local production fell 13.4 percent, and total consumption declined 6 percent (Table A-8). Price of imported eggs did not change over this period. The primary reason for the decline in consumption was the decline in tourist expenditures in hotels, bars, and restaurants. Per-capita consumption of eggs by tourists is probably three times that of the resident population, hence, any decline in meals eaten by tourists will significantly affect total egg consumption.

The market potential for expanding local production is very large, since 91 percent of all eggs are now imported. Furthermore, most imported eggs are

mediums because large and extra large eggs incur a high degree of breakage in transportation. Local producers receive a premium price for their large eggs and have no problems in marketing their total production. In fact, local producers have not even tapped the chain store market. Per-capita consumption of eggs by residents in the Virgin Islands is approximately 62 percent of the U.S. mainland consumption and this percentage should increase as incomes increase. Thus, the consumption of eggs should increase at a faster rate than population growth, assuming that tourist expenditures in hotels, bars, and restaurants level off or start to increase. Along with projected increases in total demand, the egg market is also attractive since local producers have a virtual monopoly on large and extra large egg supplies.

Milk and Dairy Products

Fluid whole milk is the one livestock product in which the U.S. Virgin Islands is nearly self-sufficient. Estimated fluid whole milk and cream consumption for 1972 was 4,111,000 quarts, the Virgin Islands producing 90.2 percent of this amount (Table 6). Total fluid whole milk production within the Virgin Islands was, by necessity, estimated since it was not

possible to obtain exact production figures for St. Thomas. Total production figures for St. Croix were supplied by Island Dairies and, thus, should be quite accurate. Total fluid milk consumption in the Islands was somewhat larger than fluid whole milk production since the processors on St. Thomas and St. Croix are reconstituting milk for the school lunch program and the processor on St. Thomas is selling some reconstituted milk to consumers. However, the St. Thomas processor would not release sales figures for reconstituted milk.

Fluid whole milk consumption has continued to increase over the past 10 years, and from 1970 to 1972 it rose 22 percent which was approximately 1.74 times the growth in resident population. Even with this growth, per-capita consumption of fluid whole milk by Virgin Islands residents was still only 36 percent of that in the U.S. mainland. Thus, as per-capita incomes increase, total consumption of fluid whole milk should continue to expand at a rate considerably above population growth, and it is possible that consumption will double by 1980. Local production could probably be increased by 20 percent without creating an oversupply of fluid milk in relation to present prices. Local producers definitely have an absolute advantage in producing fluid whole milk because of the high weight-to-value ratio which

Table 6.—Milk production, U.S. Virgin Islands, 1959–1972

<i>Year</i>	<i>St. Croix</i> ¹	<i>St. Thomas</i> ²	<i>Total</i>	<i>Percent change</i>
	-----Quarts-----			
1959	325,600			
1960	398,600			
1961	400,000			
1962	473,200			
1963	729,500			
1964	880,400	526,200	1,406,600	
1965	1,050,700	703,000	1,753,700	+25%
1966	1,232,300	838,000	2,070,300	+18%
1967	1,371,800	946,500	2,318,300	+12%
1968	1,414,000	990,000	2,404,000	+4%
1969	1,797,200	1,284,800	3,082,000	+28%
1970	1,895,100	1,413,000	3,308,100	+7%
1971	2,124,900	1,554,000	3,678,900	+11%
1972	2,007,100	1,700,000	3,707,100	+8%
Change from 1964 to 1969				+119%
Change from 1969 to 1972				+20%
Change from 1964 to 1972				+163%

¹ Production information was obtained from Island Dairies for St. Croix.

² Production information for St. Thomas was estimated for 1964 and 1969 from census data and for 1972 from data provided by St. Thomas Dairies; years in between were interpolated.

makes milk a relatively expensive item to transport.

Imports of dairy products declined 30 percent from 1970 to 1972 (Table A-9). Again, the major reason for the decline was the decline in tourist expenditures in hotels, bars, and restaurants. Per-capita tourist consumption of these items is four times as large as per-capita resident consumption. However, most of these products are very income elastic and if per-capita incomes continue to increase, consumption of dairy products will grow at a considerably faster rate than population. Since per-capita resident consumption of these products was only 23 percent of Continental U.S. consumption, it would not be surprising to see total Virgin Islands consumption increase by 150 percent between 1970 and 1980.

Total Livestock Product Consumption

The composite consumption figures for livestock products are presented in Table 7. From 1970 to 1972, total U.S. Virgin Islands consumption (in pounds) of livestock products declined by 5 percent. During this same period, population was estimated to have increased by 12.6 percent. The underlying reasons for this surprising decline in consumption are evident when the consumption patterns for individual products are examined. The consumption of products that were most heavily demanded by tourists, or were relatively expensive, declined because of the primary and secondary effects of declines in tourist expenditures in hotels, bars, and restaurants. The consumption of products for which natives had a strong preference, or which were relatively low-priced, increased. Examination also showed evidence of high within-group and between-group cross elasticities of demand. It is expected that total livestock product consumption will increase in the future as both the island population and per-capita incomes increase. The magnitude of the increase in total consumption and the composition of this increase depend primarily on four factors: change in resident population, change in resident per capita incomes, changes in tourist expenditures, and changes in the composition of the resident population.

LOCAL MARKETINGS, DEMAND AND MARKET POTENTIAL

The data in Tables 8 and 9 indicate the trends in local meat marketings (excluding poultry) during the past four fiscal years. During this period local market-

ings of beef increased 28 percent, pork 11.4 percent, goat .4 percent, and lamb decreased .4 percent. Total meat marketings (carcass weight) increased 25.5 percent. Approximately 65 percent of the increased beef marketings came from St. Croix; the remainder came from St. Thomas and St. Johns. Beef accounted for approximately 81 percent of local Virgin Islands red meat marketings during this period. Goat and pork marketings declined somewhat on St. Croix but increased on St. Thomas during this period; lamb marketings declined on St. Thomas but increased on St. Croix. St. Croix produced 89 percent of the total Virgin Islands red meat marketings in 1970-71 and 86 percent in 1972-73. It should be cautioned that these figures represent marketings and do not necessarily represent an increase in production or production potential. In beef, for instance, an increase in marketings could have resulted from either an increase in herd production or increased marketing of breeding animals in response to higher prices or higher costs. The latter case would be one in which increased marketings meant decreased production potentials.

Data indicating the percentage of total consumption supplied from local production for most Virgin Islands livestock products are presented in Table 10. By weight, local production supplied 26 percent of total livestock product consumption in 1972. However, this high percentage was due primarily to the fact that 90 percent of total fluid whole milk consumption

Table 7.—Livestock and livestock product consumption patterns U.S. Virgin Islands

<i>Product</i>	<i>Change in consumption 1970-71</i>	<i>Change in consumption 1971-72</i>	<i>Change in consumption 1970-72</i>
	Percent		
Beef and veal	-23	-21	-39
Pork	+17	-34	-23
Goat, lamb, mutton	+2	+25	+27
Poultry	+10	-2	+7
Other meat products	+5	+29	+36
All meat and meat products	-2	-6	-9
Eggs	-5	-1	-6
Milk and cream	+11	+10	+22
Other dairy products	-34	+6	-30
All livestock and livestock products	-4	-1	-5

Table 8.—Meat marketings in the U.S. Virgin Islands, liveweight basis

	1969-1970	1970-71	1971-72	1972-73
St. Croix	-----Pounds-----			
Beef and veal		994,460	1,181,880	1,465,700
Goat		10,910	9,500	10,100
Lamb		17,420	20,000	21,300
Pork		200,770	190,200	190,500
TOTAL		1,223,560	1,401,580	1,687,600
St. Thomas				
Beef and veal		95,000	153,400	210,100
Goat		6,000	2,380	7,600
Lamb		4,400	5,400	4,100
Pork		52,100	41,500	64,720
TOTAL		157,500	202,680	286,520
Total U.S. Virgin Islands				
Beef and veal	1,308,700	1,089,460	1,335,280	1,675,800
Goat	17,100	16,910	11,880	17,700
Lamb	26,600	21,820	25,400	25,400
Pork	224,600	252,870	231,700	255,220
TOTAL	1,577,000	1,381,060	1,604,260	1,974,120
Percent change from previous period		-12.4%	+16.2%	+23%

Source: Figures in the first 3 columns above are estimated from data on number of head slaughtered at the St. Croix and St. Thomas abattoirs. Figures in the last column are based on actual liveweight data for July 1972 to May 1973, plus an estimate of slaughter in June 1973.

Table 9.—Meat marketings in the U.S. Virgin Islands, carcass weight

	1969-70	1970-71	1971-72	1972-73
St. Croix	-----Pounds-----			
Beef and veal		576,800	685,500	850,120
Goat		5,500	4,750	5,050
Lamb		8,700	10,000	10,650
Pork		140,500	133,150	133,350
TOTAL		731,500	833,400	999,170
St. Thomas				
Beef and veal		49,400	79,800	109,250
Goat		3,000	1,200	3,800
Lamb		2,200	2,700	2,050
Pork		36,400	29,000	45,300
TOTAL		91,000	112,700	160,400
TOTAL U.S. VIRGIN ISLANDS				
Beef and veal	746,000	626,200	765,300	959,370
Goat	8,500	8,500	5,950	8,850
Lamb	13,300	10,900	12,700	12,700
Pork	157,200	176,900	162,150	178,650
TOTAL	925,000	822,500	946,100	1,159,570
Change from previous year		-12%	+15%	+22.6%

Source: Data derived from Table 8

Table 10.—Local production and consumption of livestock products, U.S. Virgin Islands

<i>Product</i>	<i>1970</i>	<i>1971</i>	<i>1972</i>
Beef and veal (pounds)			
Local production	713,520	649,560	857,630
Imports	7,679,730	5,786,680	4,255,740
Total consumption	8,393,250	6,436,240	5,113,370
Percent local production	8.5%	10%	16.8%
Pork (pounds)			
Local production	169,640	169,260	163,050
Imports	2,438,600	2,889,700	1,842,000
Total consumption	2,608,240	3,058,960	2,005,050
Percent local production	6.5%	5.5%	8.1%
Goat, lamb, mutton (pounds)			
Local production	20,640	18,325	20,365
Imports	463,010	473,110	593,890
Total consumption	483,650	491,435	614,255
Percent local production	4.3%	3.7%	3.3%
Poultry (pounds)			
Local production	11,700 ¹	10,800	9,800 ²
Imports	8,457,600	9,283,600	9,068,500
Total consumption	8,469,300	9,294,400	9,078,300
Percent local production	.1%	.1%	.1%
Eggs (dozen)			
Local production	165,191 ¹	154,150	143,100 ²
Imports	1,508,513	1,430,815	1,428,770
Total consumption	1,673,704	1,584,965	1,571,870
Percent local production	9.9%	9.7%	9.1%
Milk & cream (quarts)			
Local production	3,308,100	3,678,900	3,707,100
Imports	50,388	44,700	404,300
Total consumption	3,358,500	3,723,600	4,111,400
Percent local production	98.5%	98.8%	90.2%
Meat and meat products			
Local production	913,500	847,950	1,050,850
Imports	32,531,200	22,106,500	20,490,200
Total consumption	33,444,700	22,954,450	21,541,050
Percent local production	3.9%	3.7%	4.9%
All livestock and livestock products			
Local production	8,273,700	8,988,800	9,235,800
Imports	29,105,500	27,080,600	26,423,600
Total consumption	37,379,200	36,069,400	35,659,400
Percent local production	22%	25%	26%

¹ Source: U.S. Census of Agriculture

² Based on a current estimated poultry population of 13,000 birds

Note: Local figures in this table may differ somewhat from previous figures because these are on a calendar basis and previous figures were on a fiscal year basis.

was produced locally. Local production accounted for approximately 5 percent of total meat consumption in 1972, and this ranged from 16.8 percent for beef and veal to .1 percent for poultry. The 16.8 percent total consumption accounted for by local beef marketings was up from 8.5 percent in 1970 because of the joint effects of a decrease in total consumption and an increase in local marketings of beef.

The potential for expanding the market for locally produced livestock products is very good if the proper marketing channels are available to distribute the local production. However, it must be recognized that the U.S. Virgin Islands is very definitely a grain-deficit region and any grain-fed livestock enterprise must be based on imported inputs unless it is shown to be feasible to produce feed grains locally. If one assumes that it is not economically feasible to grow a large amount of feed grain locally and assuming that other costs of production are similar for the U.S. mainland and the Virgin Islands, then it is not economically feasible to raise grain-fed livestock on the Virgin Islands. This conclusion was reached thru an analysis comparing the cost of transporting a pound of final livestock product with the cost of transporting an equivalent amount of feed from Miami to the Virgin Islands. The results of this analysis are presented in Table A-10. On the basis of this analysis, it is not economically feasible to produce grain-fed beef, pork, poultry, or eggs within the Virgin Islands. Two possible exceptions to this conclusion are that it may be feasible to operate a garbage-fed hog operation and some egg producers can probably make a profit by exploiting their local favorable position in the market for large and extra large eggs.

Hence, the most feasible livestock products for expanded production, based on market potential and a cursory cost analysis, are grass-fed beef, fluid whole milk, and goat. As noted earlier, goat is very much in demand on the Islands and imported supplies are scarce, high priced, and frozen. The market potential for expanding production of this product is very good. Fluid whole milk production also has a strong market potential because of its high weight-to-value ratio and the fact that milk is a relatively inexpensive protein source. At present prices, milk production could probably be increased 20 percent without creating an oversupply, and there should be a good deal of future growth in the demand for milk. Grass-fed beef provides the native population with a source of beef that is cheaper and leaner than imported U.S. beef.

At present prices, the marketing of this product could probably increase 60 percent without creating an oversupply.

Of course, the economic feasibility of expanding production of any of these products depends on costs and profits as well as market potential. Even if it does not prove economically feasible to expand production of a product such as grass-fed beef, the Virgin Islands government may want to consider the costs and benefits of subsidizing production as a part of a consumer welfare program. This would be especially advantageous to low or middle-low income natives. Finally, it should be noted that all three of these enterprises would utilize the grazing resources that exist on the Islands.

MARKETING CHANNELS

The hearts of the marketing systems for locally produced red meat products on the Virgin Islands are the St. Croix and St. Thomas abattoirs. These operations are run by the Virgin Islands Department of Agriculture, and virtually all of the beef, veal, goat, pork and lamb produced locally and marketed thru commercial channels is processed at one of the abattoirs, which also provide U.S.D.A. meat inspection and cold storage facilities. Some goats and sheep produced for home consumption do not go through the abattoirs, which charge 1¢ per pound liveweight for services. This charge also entitles the owner of the meat to store it at the abattoir for one week with no extra charge. The 1-cent per pound charge is considerably less than the estimated cost of operation which was 9 cents per pound (Table A-11). The 9-cent figure was estimated for the St. Croix abattoir through which most of the meat is processed. This figure may be somewhat lower for fiscal 1973 because poundage processed was higher and because the V.I. Department of Agriculture hired an efficiency expert who initiated several operating economies. The 8-cent difference between operating cost and processing charge probably represents a consumer subsidy rather than an agricultural subsidy. Given present market conditions, if the full rate were charged most of the additional 8 cents would be passed on to the consumer. Finally, it was estimated that the St. Croix abattoir operated at approximately 35 percent of capacity in 1972. Hence, the slaughtering facilities on the Island do not present a bottleneck to expanded meat production since the abattoir could fairly easily triple its output.

Beef

As noted in the introduction, there are four fairly distinct marketing channels for beef on the U.S. Virgin Islands. One supplies natives and some continentals with local beef on St. Croix; one supplies natives and some continentals on St. Thomas; one supplies beef to supermarkets on St. Croix and St. Thomas; and one supplies the tourist institutions on St. Croix and St. Thomas. Since the supermarket and tourist institution supply channels are essentially the same for all meat products, these will be discussed after the other channels are described.

There are several channels for marketing locally produced beef on St. Croix. At the time of the study, there were two types of wholesalers operating on the Island. One type was a vertically integrated producer who also bought beef from other producers. He provided transportation from the farm to the abattoir and also delivered to butcher shops, independent grocery stores, and some local restaurants. Approximately 90 percent of the beef wholesaled by this firm was from his own production unit. The other type of wholesaler purchased animals from local producers and provided transportation from the farm to the abattoir and also delivered to butchers, independent grocery stores, and local restaurants.

Butchers were of three types: those who purchased only from wholesalers and paid a delivered price; those who bought cattle on the hoof (at farm) and paid a contract hauler to transport cattle to the abattoir at a cost of approximately \$5.00 per head and then provided his own transportation from the abattoir to his store; and a third type of butcher who was similar to the aforementioned butcher except he also produced some of his own cattle.

Small grocery stores and local restaurants purchased local beef from either of the two types of wholesalers. The production, wholesaling, and butcher enterprises would all have to be classified as oligopolist—that is, a small group having control of a commodity in a given market. At the time of this study, local beef sold at the farm for approximately 40¢ per pound liveweight and was wholesaled at approximately 85¢ per pound carcass weight. Retail prices for local beef are presented in Table 11, columns 1 and 2. The weighted average price in butcher shops was estimated to be \$1.25 per pound by using USDA conversion figures. After converting farm prices to retail equivalent prices, the farm-retail price



Quality standards sought in carcass grading by a Federal meat inspector stationed at the St. Croix abattoir, are being pointed out to Dr. Fenton B. Sands (left), Director, V.I. Agricultural Experiment Station.

spread was estimated to be 34¢ per pound. This farm-retail margin compares very favorably with the U.S. margin of approximately 37¢ per pound. Of course, the margin would be higher if the abattoir charged a price that equaled the full cost of slaughtering. However, the present marketing and distribution system for locally produced beef appears to be operating relatively efficiently.

The butchers and independent grocers on St. Thomas are supplied beef from wholesalers who purchase grass-fed beef from brokers in New Zealand and USDA standard and choice beef from brokers in the U.S. mainland. This sector of the wholesale beef industry has one dominant firm and a few much smaller fringe firms. The dominant firm wholesales sirloin steak from \$1.55 to \$1.80 a pound and chuck from \$1.25 to \$1.35 a pound.

Retail prices for this beef are shown in column 3, Table 11. It was not possible to obtain enough information to calculate the farm-retail price spread for

this portion of the beef-marketing system. It should be noted, however, that consumers on St. Thomas pay more for grass-fed beef than those on St. Croix because of the joint effects of higher procurement costs and market performance.

Pork

The distribution system for locally produced pork on St. Croix is simpler than that for beef because there are no wholesalers. There are basically four types of producers, most of whom do their own marketing: (1) the producer selling only to individuals who pick up live animals at the farm; (2) the producer selling to individuals and butchers, both of whom pick up live animals at the farm; (3) the producer who transports live hogs to the abattoir and then delivers and sells carcass pork to butchers; and (4) the producer who sells and delivers carcass pork to independent grocers and individuals.

The price of pork on the hoof varies from 40 to 55 cents a pound, and carcass pork varies from 80 cents to 90 cents a pound. This wide range of prices is due to the fairly unorganized nature of the pork marketing system. Local pork retails for an average price of \$1.25 per pound. Thus, the farm retail price spread varies from 17 to 46 cents a pound as compared to a farm retail price spread of 38 cents per pound in the

U.S. mainland. It thus appears that some sectors of the local pork marketing system are operating very efficiently and others are not.

If it is economically feasible to expand local pork production, a more organized marketing system will have to be developed in order to effectively market the larger output. However, it should be noted that local production does provide consumers with pork at a price that is from 16 to 26 percent lower than imported pork products.

Small stores on St. Croix buy some imported pork products from independent wholesalers. The price of pork chops from these wholesalers varies from 90 to 98 cents a pound and they sell for an average retail price of \$1.35 per pound. The wholesale-to-retail price spread for these pork products varies from 30 cents to 39 cents, which is considerably above the average wholesale-retail price spread of 19 cents in the U.S. mainland.

Butchershops and small stores on St. Thomas receive their pork through the same channels they receive beef. Pork wholesalers servicing this market obtain their product from brokers in the U.S. mainland. The wholesale price of pork chops from this source varies from 90 cents to \$1.45 per pound, depending on cut, and the average retail price in small stores was approximately \$1.69 a pound.

Table 11.—Comparative retail meat prices, U.S. Virgin Islands, June 20—July 1, 1973

Product	Butcher shop prices, St. Croix	Ave. small store price, St. Croix	Ave. small store price, St. Thomas ¹	Supermarket prices, Virgin Islands	Supermarket prices, New Jersey
	-----Dollars-----				
Sirloin steak (with bone)	1.40	1.55	2.69	1.85	1.59-1.69
Sirloin steak (clear)	1.45-1.50	1.69	—	—	—
T-Bone	1.40	—	2.29	2.09	—
Fillet	1.95	—	3.99	3.79	—
Liver	1.10-1.20	—	—	.85	—
Ground chuck	1.10	—	1.49	1.29	1.09
Stew meat	1.10	1.25	1.49	1.49	1.39-1.49
Lamb chops	1.25-1.60	—	2.89	1.65-2.25	2.29-2.39
Pork chops	1.25	1.35	1.69	1.49-1.61	1.59-1.69
Goat	1.30-1.60	—	—	—	—
Whole	.70	.75	.75	.59-.79	.59
Chicken legs	.75	.89	.99	.99-1.08	.99

¹ The sample of stores on St. Thomas was much smaller than that on St. Croix; hence, these average price figures may not be as statistically reliable as those for St. Croix.

Goat and Mutton

The availability of locally produced goat and mutton for commercial sale is very limited and the channels for marketing these products are very informal. A significant portion of the local sheep and goat herds is produced for home consumption, and, hence, the meat never enters commercial channels. The animals that do enter the commercial channels are usually purchased on the hoof by local butchers who provide the necessary transportation. Occasionally, however, some producer will deliver a dressed carcass to the butcher. Goats and sheep on the hoof sell for 55 to 60 cents per pound; dressed prices range from \$1.00 to \$1.15 a pound. A substantial amount of the goat products sold through local butcher shops is imported from Puerto Rico and Texas. These carcasses are frozen and wholesale for approximately \$1.10 per pound. Retail prices for goat and mutton products range from \$1.30 to \$1.60 per pound. Thus, the farm-retail price spread for these products ranges from \$.70 to \$1.05 per pound, which is considerably greater than the spread of approximately 59 cents in the U.S. mainland. Although these spreads may not be directly comparable, because of different breeds and dressing percentages, most of the larger margin can probably be attributed to the unorganized nature of the marketing systems for these products. If production of goat and mutton products is expanded to any significant extent, more efficient marketing channels will have to be developed.

Poultry and Eggs

The marketing system for local poultry products on St. Croix is fairly simple. Producers sell the largest quantity of their eggs through home deliveries, but some producers also deliver to small independent grocery stores, hotels, and restaurants. The price received for large eggs varied from \$1.00 to \$1.25 a dozen and the price received for mediums varied from 65 cents to \$1.00 a dozen at the time of this study. No producers distribute to chain supermarkets at present. When examining these prices in terms of expanding production, it must be emphasized that present producers sell a relatively small volume of eggs to a specialized market. If egg production was expanded to any large extent, the eggs would have to be marketed through the more conventional chain store channels and producers could not expect to

receive the premium prices they presently enjoy from their specialized channels. They could expect to receive a price that equaled the Miami price plus transportation cost and a breakage factor. As mentioned previously, the breakage factor for large and extra large eggs is probably high enough that producers could obtain a somewhat premium price for these eggs. However, the market for large eggs that sell at 20 cents per dozen over medium eggs will still be quite limited.

Local poultry meat production on St. Croix is limited to the selling of cull birds by egg producers. These producers advertise the sale of their flocks in local newspapers and sell their birds live to individuals at from 60 cents to \$2.00 each.

Independent grocery stores on St. Croix and St. Thomas are supplied poultry and egg products by primarily two types of wholesalers. One type receives their poultry and egg products from a central distribution center in the U.S. mainland and distributes these supplies between independent groceries. They also supply one of the chain supermarkets with eggs. The other type of wholesaler operating primarily on St. Thomas buys eggs directly from large producers and poultry products directly from packers in the U.S. mainland. They then distribute these products to independent groceries and some hotels and restaurants. The average wholesale price for medium eggs, at the time of this study, was 73½ cents a dozen and the average retail price was \$1.00 a dozen in independent groceries and 86 cents a dozen in chain supermarkets.

The wholesale price for whole chickens varied from 55 to 74 cents a pound, depending on grade and wholesaler, and the wholesale price of chicken legs varied from 70 to 88 cents a pound. The retail price on whole chickens in small stores and butcher-shops varied from 70 to 85 cents a pound, and for legs from 75 to 99 cents a pound.

Fluid Whole Milk

The marketing system for fluid whole milk in the Virgin Islands is characterized by the existence of two local monopoly processors, one on St. Croix and the other on St. Thomas. The processor on St. Thomas has a completely vertically integrated operation. He produces all the milk he processes and he delivers this milk to supermarkets, independent groceries, hotels and restaurants. He is the sole source of fluid whole milk on St. Thomas. This processor also reconstitutes

milk and sells it to supermarkets, independent grocery stores, retailers on other islands, and the school-lunch program. He also produces a fairly full line of dairy products. The delivered price of fluid whole milk on St. Thomas is 36 cents a quart and the delivered price of reconstituted milk is 34 cents a quart. Prices in the supermarkets are 37 cents and 35 cents respectively.

On St. Croix the only processor of fluid whole milk is partially vertically integrated but he also purchases milk from six other producers. This processor picks up milk at the farm, processes it, and distributes it to hotels, restaurants, independent grocery stores, and chain supermarkets. He also sells reconstituted milk to the school lunch program and produces some dairy products as a service item for some customers. This processor pays farmers 23 cents a quart for raw milk and wholesales processed fluid whole milk for 36 cents a quart. The out-of-store price for this milk varies from 37 cents a quart in chain supermarkets to 41 cents in independent grocery stores. Thus, the farm-retail price spread for fluid whole milk on St. Croix varies from 13.5 to 17.5 cents a quart. This compares quite favorably with the average farm-retail price spread of 15 cents a quart in the U.S. mainland. In fact, it appears that the fluid milk marketing system is operating quite efficiently on St. Croix in view of the following facts:

1. The U.S. mainland margin is based on half-gallons, which generally have a smaller farm-retail price spread than quarts. The St. Croix figures are based on quarts.

2. The capacity of the St. Croix processing facility is approximately 20,000 pounds a day, which is small in comparison to processing plants in the U.S. mainland. Hence, since St. Croix plants cannot achieve the economies of scale obtained by U.S. plants, a larger marketing margin would be expected.

Supermarket Distribution System

There are two chain supermarkets, Grand Union and Pueblo, providing a full line of livestock products to Virgin Islands consumers. These markets service both St. Thomas and St. Croix.

Grand Union is a chain based in the U.S. mainland. In their Virgin Islands stores, they market some locally produced beef products purchased from a local wholesaler but most of their fresh beef is imported from the U.S. mainland. They also market some frozen beef imported from Costa Rica. All the fluid milk

products marketed in the Virgin Islands Grand Union stores are purchased from local processors, but most of the processed dairy products are imported from the U.S. mainland. In previous years, Grand Union has purchased some locally produced eggs but there were problems in obtaining a constant supply. At present, Grand Union purchases their eggs from a local wholesaler who imports them from the U.S. mainland. All of Grand Union's chicken and pork products are imported from the U.S. mainland. Goat products are purchased frozen from Puerto Rico. The Grand Union Company has always followed a policy of purchasing local agricultural products when they are available in sufficient quantity and quality. This policy pertains not only to the Virgin Islands but also to the U.S. mainland. Hence, if sufficient quantities of good quality locally produced livestock products were available, it appears that the Grand Union supermarkets would potentially be a very viable retail outlet.

All livestock products shipped to the Virgin Islands from the U.S. mainland by the Grand Union Company originate from their Washington, D.C. warehouse. From this warehouse, the products are transported by ship to Puerto Rico. The ships are then reloaded in Puerto Rico and sent on to St. Thomas and St. Croix.

Pueblo Inc., the other supermarket chain serving the Virgin Islands, is a Puerto Rico-based firm. Except for fluid milk, Pueblo does not market any locally produced livestock products. All of the fresh beef marketed in Pueblo outlets is produced in the U.S. mainland from primarily two packing houses. This beef is shipped out of the Port of New York. Frozen beef products, which comprise approximately 30 percent of total beef sales, are purchased from Costa Rica. All pork marketed in Pueblo outlets is frozen, and about 80 percent originates in the U.S. mainland and 20 percent from Puerto Rico. All of the chicken products sold in Pueblo outlets originate in the U.S. mainland and are sold frozen. All eggs sold by Pueblo also are imported from the U.S. mainland.

It was hard to gauge the feeling of Pueblo management towards the marketing of locally produced livestock products. However, it appeared that Pueblo was not as amenable to marketing such products as was the Grand Union Company. Again, it may be possible to convince Pueblo management to market locally produced livestock products if they could be assured of a constant supply.

Retail prices for livestock products in the two

chains were virtually identical. It was not possible to obtain information on raw product prices paid or marketing margins utilized by these firms. However, at the time of the study choice steers in Omaha were selling at an average price of \$46.50 per cwt.; hogs in Omaha at an average price of \$39.80 per cwt.; dressed grade A broilers in New York for 45 cents a pound; and large white eggs in Chicago were selling for 56.5 cents a dozen. The comparison of average retail meat prices in the Virgin Islands and U.S. mainland supermarkets (Table 11) indicated that these chains were probably not exploiting their local competitive position and that their Virgin Islands marketing margins were probably similar to those in the U.S. mainland. This is especially true when the factor of additional handling and transportation costs is considered.

There is also one discount supermarket operating on St. Croix that markets a very limited line of livestock products. This line is comprised of fluid whole milk, frozen poultry and poultry parts, eggs, and some processed dairy products. All of these products except the fluid whole milk are imported from the U.S. mainland. Due to the nature of its marketing mix, this supermarket will probably not be a viable potential outlet for locally produced livestock products other than fluid whole milk.

Institutional Distribution System

Except for fluid whole milk and some fresh eggs, most of the livestock products marketed through hotels and restaurants are imported. The only restaurants utilizing locally produced livestock products are those catering to primarily the native market. These establishments purchase their meat products from local butchers. All of the fluid whole milk marketed through these institutions is produced and processed locally.

The institutional livestock distribution system is dominated by two firms on St. Croix and three on St. Thomas. Two of the dominant firms operate on both St. Croix and St. Thomas. The third one on St. Thomas caters primarily to the native restaurant trade. A number of smaller firms also distribute some livestock products to hotels and restaurants, and at least one St. Croix hotel imports some of its livestock products directly from the U.S. mainland. These organizations account for probably no more than 5 percent of the total institutional business.

The two dominant firms, which handle most of the business for institutions serving tourists, carry a very similar product line. The livestock products handled by these firms are very high quality; all of the red meat is USDA choice or prime. Most of the red meat products are sold in portion controlled cuts, oven ready. All livestock products except butter, hams, and some cheeses are imported from the U.S. mainland and they are shipped in containerized vessels from either New York or Miami. Butter, hams, and approximately 75 percent of the cheese products are imported from Europe. A representative list of average wholesale prices charged by these firms is presented in Table A-12.

On the basis of price, the institutional livestock market within the Virgin Islands appears to be a very attractive potential outlet for locally produced meat products. However, because of several problems relating to grade and marketing services, this market is not, at present, open to local producers. First, the beef sold in this market is all either USDA choice or prime and Virgin Islands producers would have to go into the feedlot business to produce these grades of product. Second, the institutions are service-oriented businesses and they are interested in a consistent year-round supply that would vary in quantity with the tourist season. They are also interested in buying from wholesalers who can supply a well-rounded product line and not just a few items. This second fact would preclude Virgin Islands wholesalers from marketing just a speciality product, such as lamb, to the institutions without also having a fairly complete line of other products, particularly beef. Conversely, if a beef line was developed it would probably be possible and desirable to market some other livestock products through this channel. Third, institutional buyers demand a portion cut, oven-ready product. Providing this type of a product would necessitate developing a meat fabricating facility on the Islands.

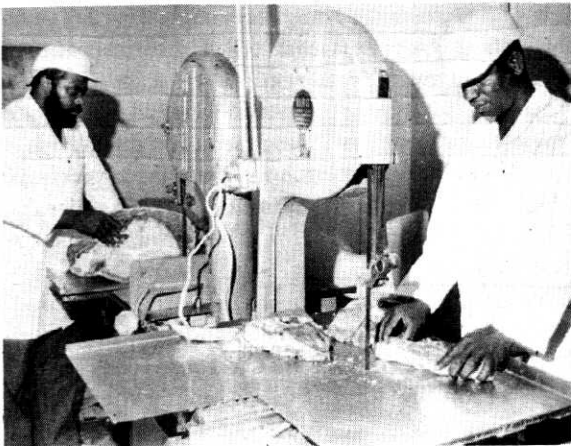
It should be realized that institutional buyers have a high demand for certain meat cuts, such as steaks, and little or no demand for other products such as stew meat and tripe. Therefore, a profitable institutional supply business depends, in part, on a secondary market for products not demanded by the institutions. It is quite possible that this secondary market exists within the Virgin Islands among the low and middle-low income consumers. This would certainly be true if the secondary beef products were priced at a level similar to the locally produced grass-fed beef.

This could be done if the local institutional wholesaler utilized a form of third-degree price discrimination where, in a sense, he may take a small loss on secondary beef products which would be more than offset by the higher profits obtained on products sold to the institutions. It should be noted that this practice would provide an economic benefit to low income consumers. Finally, it should be realized that the whole feasibility of this type of operation depends on the feasibility of producing grain-fed livestock on the Islands.

MARKETING STRUCTURE AND POTENTIAL

Because of the present structure of the marketing systems for local livestock products, certain segments of total market potential are more easily realized than are others.

The St. Croix system for marketing local beef products through independent grocery stores, butcher shops, and restaurants serving the native population is fairly well developed. The present system could probably efficiently market twice its present beef production. This is particularly true since a large producer of local beef has embarked on a wholesale marketing operation and plans to expand his facilities in accord with raw product availability. Also, as mentioned previously, the abattoir is operating at only 35 percent capacity and it could greatly increase its output. The present system could also supply expanded supermarket sales of local beef if an adequate supply was available. It should be realized that the market for grass-fed beef through supermarket outlets is



Butchers preparing consumer-size cuts in a local meat market in Christiansted, St. Croix.

somewhat limited and will probably decline if consumers develop a preference for grain-fed beef. Also, it may be difficult to convince the Pueblo chain to market local beef. The beef-marketing system could also efficiently market any grain-fed beef produced for consumption on St. Croix.

If the production of grass-fed beef on St. Croix was expanded beyond the level of local demand, at present prices, excess supplies could be shipped to St. Thomas where a ready market for this beef exists. To facilitate the distribution of this beef on St. Thomas, the St. Croix wholesaler would probably sell his beef to a St. Thomas wholesaler, such as Merchants Market, which has an established system for marketing imported grass-fed beef products to independent grocers and restaurants serving the native trade. With this type of distribution system, retail prices for grass-fed beef on St. Thomas could probably be reduced.

The present marketing systems for hogs, mutton, and goat products are very unorganized. If there was to be any substantial increase in the production of these products, a more organized system would have to be developed to ensure efficient market performance. It is quite possible that wholesalers presently marketing beef products would also provide marketing services for these products if sufficient supply were available. Again, the excess abattoir capacity would facilitate the expansion of goat, mutton, and hog production since a new major processing facility would not have to be constructed.

The marketing of poultry products is also very unorganized at the present time. Large scale egg production would require a much broader distribution system than exists at present. In order to develop a broiler industry, an entirely new distribution would have to be established. This type of industry would also require a new facility to process the broiler products. Thus, there could be substantial marketing oriented costs associated with the development of a broiler industry.

If production of meat products is increased on the U.S. Virgin Islands, consideration should be given to developing a facility to produce processed meat products, which comprise over 15 percent of all meat products consumed on the Islands. The production of processed meat products would result in a greater utilization of total livestock production and perhaps provide a relatively inexpensive source of animal protein for local consumers.

The marketing systems for fluid milk on St. Croix

and St. Thomas are fairly well-developed and appear to be operating relatively efficiently. Both systems are capable of marketing the increases in total demand expected over the next 10 years. The processing of this expanding output, if available, will probably require a two-shift operation at each of the processing

plants and an expansion of delivery routes. However, if anything, this expanded production will probably result in more efficient marketing, since fixed resources will be more fully utilized and the percentage increase of variable inputs will probably not be as great as expanded output.

APPENDIX

Table A-1.—Per-capita consumption figures, 1971, and estimated consumption

<i>Product</i>	<i>Per-capita consumption for total population, U.S. Virgin Islands</i>	<i>Estimated per-capita consumption for resident population U.S. Virgin Islands</i>	<i>Estimated per-capita consumption for native population, U.S.V.I.</i>	<i>Per-capita consumption for Continental U.S.</i>
	-----Pounds-----			
Beef and veal	74.7	63.5	55.3	108
Pork	35.5	28.8	23	60.2
Poultry	108	112	124	50.1
Lamb and mutton	5.7	5.91	6.4	3.1
Edible offals	5.0	4.5	3.3	11.1
Eggs (doz.)	18.4	16.7	14.8	26.8
Fluid milk and cream	43.2	38.2	25.4	107.2
Other dairy products	34.2	27.6	10.6	120.5

Explanation of Estimated Per-Capita Figures in Table A-1

Figures in the first column of Table A-1, per capita consumption for the total population of the U.S. Virgin Islands, were estimated by dividing total island consumption by the sum of the tourist and resident populations. The figure for resident population was obtained from Table 1. The estimate of tourist equivalent population, from the standpoint of food consumption, was made by using a set of data transformations developed by Robert Bohall for use in the V.I. Agr. Exp. Sta. Report No. 2, "Fruits and Vegetables: Production and Consumption Potentials and Marketing Problems in the U.S. Virgin Islands." These transformations were:

1. Cruise ship passengers consume an average of one meal on the island, three meals equaling one tourist day.
2. Air arrivals spend an average of three tourist days on the islands. The average tourist day may be slightly longer, but this is partially offset by the fact that many Virgin Island residents travel to other areas for business and vacation.
3. Navy personnel spend an average of two tourist days on the Islands.
4. Ferry passengers and Antilles Air Passengers were excluded from the analysis, since they tend to represent traffic which is offset by Virgin Islands businessmen and tourists visiting other areas.
5. Each set of 365 tourist days represents one tourist equivalent resident.

By utilizing these transformations, a tourist equivalent population of 6,320 was estimated for 1971, which meant the total food-consuming population was 86,150. The figures in Column 2 were computed by subtracting estimated tourist consumption from total consumption for the various food groupings and dividing by resident population. For purposes of this analysis, it was assumed that, on the average, tourists will consume twice as much beef and pork per capita and 1.5 times as many eggs as the average mainland consumer. This is due to the fact that people on vacation tend to consume more beef and pork and eat more full breakfasts than at home and also because tourists tend to have a higher average income than the average mainland consumer. This last factor is particularly important in determining beef and pork consumption. In the other livestock product categories, it was assumed that tourists would have the same per-capita consumption patterns as the average mainland consumer.

Column 3 was calculated by subtracting the estimated consumption of various meat products by continentals and tourists from total consumption and dividing by an estimated native population. It was assumed that continentals have the same consumption patterns as the average mainland consumer.

Finally, all figures in Column 4, except those for beef and pork, were taken directly from published USDA figures on per-capita consumption. The beef and pork figures had to be adjusted to make them compatible with Virgin Islands consumption figures,

because the Virgin Islands data contained a mixture of retail weight and carcass weight statistics. The data were adjusted by utilizing estimates that 75 percent of Virgin Islands beef consumption represented carcass

weight and 25 percent represented retail cut weight, and 50 percent of pork consumption represented retail cut weight and 50 percent represented carcass weight.

Table A-2.—Fresh-frozen beef imports into the U.S. Virgin Islands, 1970-72

Point of shipment	1970		1971		1972	
	Quantity	Average price per pound	Quantity	Average price per pound	Quantity	Average price per pound
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Miami	1,278,908	1.04	1,069,222	1.08	979,093	1.09
New York	25,644	.87	161,941	1.47	160,796	1.66
San Juan	5,818,977	.67	4,173,222	.66	2,529,330	.68
Tampa	24,079	.86	66,142	1.05	53,305	1.15
Foreign	532,120	.56	316,156	.61	533,217	.65
TOTAL	7,679,730	.72	5,786,683	.72	4,255,741	.78
Percent change from previous year	—	—	-25%	0	-26%	+8%

Source: U.S. Dept. of Commerce

Table A-3.—Fresh and frozen pork imports into the U.S. Virgin Islands, 1970-72

Point of origin and item	1970		1971		1972	
	Quantity	Average price	Quantity	Average price	Quantity	Average price
	Cwt.	Dollars	Cwt.	Dollars	Cwt.	Dollars
San Juan						
Pork carcasses	11,008	.43	15,159	.38	9,585	.40
Fresh ham shoulder	468	.46	414	.53	145	.60
Cut pork (excludes offals)	4,890	.49	5,695	.47	2,118	.68
Miami						
Pork carcasses	—	—	102	.46	106	.41
Fresh ham shoulder	77	.88	37	.53	269	.44
Cut pork (excludes offals)	2,968	.63	3,128	.50	3,127	.58
New York						
Pork carcasses	—	—	—	—	81	.39
Cut pork (excludes offals)	2,045	.72	379	.38	669	.49
Tampa						
Cut pork (excludes offals)	2,688	.46	3,656	.43	2,075	.58
Foreign						
Pork ham shoulders	242	.77	327	.71	244	.69
TOTALS						
Carcasses	11,008	.43	15,261	.38	9,772	.40
Fresh hams	787	.60	778	.60	658	.57
Cut pork	12,591	.55	12,858	.46	7,989	.60
GRAND TOTAL	24,386	.50	28,897	.42	18,420	.49
Percent change from previous year			+18%	-16%	-36%	+17%

Table A-4.—Poultry imports into the U.S. Virgin Islands, 1970-72

<i>Point of origin and item</i>	<i>1970</i>		<i>1971</i>		<i>1972</i>	
	<i>Quantity</i>	<i>Ave. price per pound</i>	<i>Quantity</i>	<i>Ave. price per pound</i>	<i>Quantity</i>	<i>Ave. price per pound</i>
	<i>Cwt.</i>	<i>Dollars</i>	<i>Cwt.</i>	<i>Dollars</i>	<i>Cwt.</i>	<i>Dollars</i>
New York						
Chickens	19	.56	69	.36	977	.42
Chicken parts	53	.34	141	.45	915	.43
Other poultry	114	.50	17	.55	193	.53
Poultry livers	—	—	—	—	22	.68
Miami						
Chickens	5,885	.33	4,140	.31	4,280	.355
Chicken parts	8,039	.34	10,085	.34	10,278	.38
Other poultry	568	.60	2,629	.39	12,541	.34
Poultry livers	10	.38	—	—	138	.47
San Juan						
Chickens	17,753	.31	17,833	.33	7,410	.33
Chicken parts	25,556	.36	34,347	.37	25,977	.44
Other poultry	7,378	.48	2,489	.56	1,528	.55
Poultry livers	115	1.24	57	1.27	13,138	.30
Tampa						
Chickens	14,983	.30	18,276	.32	6,586	.33
Chicken parts	4,080	.32	2,672	.32	6,246	.345
Other U.S. ports						
Chickens	—	—	—	—	350	.43
Chicken parts	25	.56	73	.67	106	.44
TOTALS						
Total chickens	38,639	.31	40,317	.32	19,602	.34
Total chicken parts	37,753	.35	47,328	.36	43,522	.40
Total other poultry	8,059	.49	5,185	.48	14,263	.36
Total poultry livers	125	1.17	58	1.27	13,298	.30
TOTAL ALL POULTRY	84,576	.35	92,836	.35	90,685	.37
Change from previous year			+9.8%	0	-2.3%	+5.7%

Table A-5.—Miscellaneous meat products imports into the U.S. Virgin Islands, 1970-72

Point of origin and item	1970		1971		1972	
	Quantity	Ave. price per pound	Quantity	Ave. price per pound	Quantity	Ave. price per pound
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
San Juan						
Meat of bovine animals	41,864	1.54	62,562	1.23	424,193	.35
Goat, lamb, mutton	224,600	.63	235,325	.52	194,900	.49
Miami						
Meat of bovine animals	13,482	.76	86,942	.52	42,347	.70
Goat, lamb, mutton	47,197	1.01	54,138	.77	91,545	.78
New York						
Meat of bovine animals	—	—	214	3.29	10,056	2.26
Goat, lamb, mutton	—	—	385	1.92	8,170	1.43
Tampa						
Meat of bovine animals	—	—	845	1.25	—	—
Goat, lamb, mutton	56,989	.26	112,867	.29	67,193	.34
Foreign						
Veal	—	—	27,714	.51	44,000	.56
Goat, lamb, mutton	134,226	.41	70,394	.41	232,080	.38
Corned beef	300,100	.58	205,234	.89	307,020	.89
TOTALS						
Meat of bovine animals	55,346	1.35	178,277	.77	520,600	.43
Goat, lamb, mutton	463,012	.61	473,109	.48	593,890	.49
Corned beef	300,100	.56	205,234	.89	307,020	.89
TOTAL ALL PRODUCTS	818,458	.64	856,620	.64	1,421,510	.55
Change from previous year			+5%	0	+66%	-14%

Table A-6.—Processed meat products imports into the U.S. Virgin Islands, 1970-72

Point of origin and item	1970		1971		1972	
	Quantity	Price per pound	Quantity	Price per pound	Quantity	Price per pound
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
San Juan						
Pork, ham cured	798,714	.60	1,006,955	.63	550,763	.61
Other cured pork	84,661	.62	118,545	.53	86,125	.46
Dried beef, pork, poultry	67,937	.48	57,341	.54	65,259	.49
Sausage, bologna, franks	392,143	.54	384,195	.55	267,033	.66
Canned meat products	231,881	.50	282,075	.71	587,190	.53
Other meat products (not canned)	27,492	.76	91,543	.36	558,724	.30
Miami						
Pork, ham cured	29,248	.82	76,944	.83	27,576	1.02
Other cured pork	63,376	.75	55,513	.41	137,126	.65
Dried beef, pork, poultry	16,685	.68	8,309	.80	45,652	.59
Sausage, bologna, franks	105,701	.77	109,351	.81	141,977	.83
Canned meat products	34,859	.55	191,345	.37	253,290	.40
Other meat products (not canned)	69,829	1.07	12,955	1.50	21,022	1.04
New York						
Pork, ham cured	2,721	.52	28,005	.65	51,977	.60
Other cured pork	17,665	.31	27,750	.24	20,970	.80
Dried beef, pork, poultry	24,216	.40	6,825	.39	5,300	.54
Sausage, bologna, franks	26,043	.69	17,250	.73	21,195	.82
Canned meat products	61,721	.48	26,682	.42	64,291	.80
Other meat products (not canned)	64,419	1.90	27,597	1.87	2,108	1.29
Other U.S. ports						
Other cured pork	—	—	64,438	.26	77,035	.29
Dried beef, pork, poultry	—	—	3,500	.40	12,805	.54
Sausage, bologna, franks	—	—	10,700	.59	12,960	.41
Canned meat products	33,750	.52	576	2.32	42,637	.87
Foreign						
Pork, ham cured	201,381	.75	194,380	.71	221,169	.74
Sausage, bologna, franks	87,810	.72	57,368	.67	51,503	.77
TOTALS						
Pork, ham cured	1,032,064	.64	1,306,284	.65	851,385	.66
Other cured pork	165,702	.64	266,246	.41	321,256	.52
Dried beef, pork, poultry	108,838	.49	75,975	.55	129,016	.53
Sausage, bologna, franks	611,700	.61	578,864	.62	494,668	.72
Canned meat products	362,211	.50	500,678	.57	947,408	.53
Other meat products (not canned)	161,740	1.35	132,095	.79	581,854	.33
TOTAL PROCESSED MEATS	2,442,260	.65	2,860,142	.61	3,325,587	.56
Change from previous year			+17%	-6%	+16%	-8.2%

Table A-7.—Liver and offal imports into the U.S. Virgin Islands, 1970-72

Point of origin and item	1970		1971		1972	
	Quantity	Ave. price per pound	Quantity	Ave. price per pound	Quantity	Ave. price per pound
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
San Juan						
Beef and veal	200,434	.49	82,033	.56	78,821	.50
Lamb and mutton	200,180	.61	184,244	.54	127,900	.53
Pork and other	232,772	.25	83,031	.22	51,375	.39
Tampa						
Beef and veal	—	—	—	—	14,819	.16
Pork and other	8,250	.22	24,540	.22	8,400	.16
Miami						
Beef and veal	37,836	.52	39,241	.34	121,717	.73
Lamb and mutton	2,484	1.56	3,676	1.61	18,290	1.13
Pork and other	12,637	.24	12,958	.81	155,556	.30
TOTALS						
Beef and veal	238,270	.50	121,274	.49	215,357	.61
Lamb and mutton	202,664	.62	187,920	.56	146,190	.60
Pork and other	253,659	.25	120,529	.28	215,331	.31
TOTAL LIVER AND OFFALS	694,593	.44	429,723	.46	576,878	.50
Change from previous year			-38%	+4.5%	+34%	+8.7%

Table A-8.—Egg imports into the U.S. Virgin Islands, 1970-72

Point of origin and item	1970		1971		1972	
	Quantity	Ave. price per dozen	Quantity	Ave. price per dozen	Quantity	Ave. price per dozen
	Dozen	Dollars	Dozen	Dollars	Dozen	Dollars
San Juan						
Shell	704,190	.42	664,830	.46	420,440	.49
Other	23,180	.50	27,674	.48	—	—
Miami						
Shell	760,660	.34	716,212	.32	924,551	.32
Other	20,480	.32	1,000	.52	17,288	.58
Tampa						
Shell	—	—	19,050	.30	57,390	.33
Other	—	—	—	—	—	—
New York						
Shell	—	—	1,550	.34	9,100	.46
Other	—	—	496	1.13	—	—
Total						
Shell	1,464,854	.38	1,401,645	.39	1,411,482	.38
Other	43,659	.41	29,170	.49	17,288	.58
GRAND TOTAL	1,508,513	.38	1,430,851	.39	1,428,770	.38
Change from previous year			-5.1%	+2.6%	-.1%	-2.6%

Table A-9.—Dairy imports into the U.S. Virgin Islands, 1970-72

Point of origin and item	1970		1971		1972	
	Quantity	Value per pound	Quantity	Value per pound	Quantity	Value per pound
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
San Juan						
Evap. and condensed milk and cream	1,789,100	.175	655,840	.21	740,630	.18
Whole dry milk	241,960	—	103,570	—	38,400	—
Non-fat dry milk	272,120	.26	365,390	.24	204,790	.26
Fresh milk & cream (gal.)	7,310	1.29	10,421	1.50	9,734	2.20
Butter	195,100	.61	130,930	.55	129,610	.48
Natural cheese & curd	366,620	.44	443,680	.47	626,500	.41
Processed cheese	264,970	.51	97,970	.59	440,860	.28
Miami						
Evap. and condensed milk and cream	5,630	.21	40,595	.21	33,840	.20
Whole dry milk	63,063	.26	10,475	.34	12,450	.27
Non-fat dry milk	—	—	73,171	.16	—	—
Fresh milk & cream (gal.)	1,157	2.90	751	2.83	88,100	.90
Butter	—	—	92,701	.52	67,239	.77
Natural and curd cheese	6,012	.71	15,423	.75	15,967	.93
Processed cheese	25,350	.71	30,297	.58	51,030	.63
New York						
Evap. and condensed milk and cream	—	—	—	—	74,027	.32
Whole dry milk	17,835	.26	840	.89	40,000	.29
Non-fat dry milk	468,000	.10	198,080	.12	221,236	.20
Butter	—	—	900	.78	62,128	.33
Natural and curd cheese	20,650	.53	4,310	.29	18,620	.29
Other U.S. ports						
Non-fat dry milk	—	—	—	—	51,000	.46
Butter	—	—	4,773	1.00	59,750	.73
Foreign						
Fresh milk, cream	4,130	.38	—	—	3,231	.93
Butter	656,649	.23	625,706	.39	181,880	.61
Cheese	69,799	.47	51,973	.54	51,360	.76
TOTALS:						
Evap. and condensed milk	1,794,730	.18	696,437	.21	848,493	.20
Whole dry milk	332,862	.25	114,884	.29	90,850	.25
Non-fat dry milk	740,137	.16	636,642	.19	447,027	.26
Butter	851,746	.32	855,010	.43	544,579	.58
Natural cheese and curd	393,278	.45	463,417	.47	661,094	.42
Processed cheese	290,318	.53	128,068	.59	491,894	.31
Imported cheese	69,799	.47	51,973	.54	51,360	.76
GRAND TOTAL						
(excludes fresh milk)	4,472,870	.26	2,946,431	.37	3,135,287	.35
Change from previous year	—	—	-34%	+42%	+6%	-9%
Fresh milk and cream (gal.)	12,597	1.14	11,172	1.59	101,065	1.03
Change from previous year	—	—	-11%	+39%	+905%	-35%

Table A-10.—Comparison of final product and grain equivalent transportation costs

Product	Feed required to produce a pound of final product ¹	Feed trans- porta- tion cost ²	Cost to transport a pound of final product ²	Difference
	Pounds		Dollars	
Grain fed beef (carcass weight)	13	.32	.042	-.278
Pork (carcass weight)	5.4	.133	.042	-.091
Broilers	3.5	.086	.028	-.058
Eggs	2.87	.07	.035	-.035

¹ Conversion ratios used are for Virgin Islands conditions and were supplied by Robert L. Park, livestock specialist.

² Transportation costs are calculated from Miami.

Table A-11.—Cost of running St. Croix abattoir

Item	Cost for fiscal year 1972
	Dollars
Labor and personal services	94,025
Utilities and insurance	12,000
F.I.C.A. and retirement	10,919
Maintenance and repairs	12,000
Depreciation ¹	8,000
Interest on investment at 8%	10,000
Other operating expenses	7,789
TOTAL	154,733
Estimated cost per pound (liveweight)	.096
Estimated cost per pound (carcass)	.164
Estimated % of capacity of operation	35%
Estimated liveweight cost per pound, less interest	.09
Estimated liveweight cost per pound, less interest and depreciation	.085

¹ The depreciation figure should be approximately 50% higher, but some equipment replacement costs were included in the maintenance and repair figure.

Costs in this table were derived from figures obtained from the V.I. Dept. of Agriculture.

Table A-12. Average livestock product prices charged to hotels and restaurants by institutional wholesalers

Product	Portion size	Price per pound
	Ounces	Dollars
Choice strip loin steak	10	4.40
Filet mignon	8	5.48
Prime tenderloin steaks	8	5.54
Choice filet of sirloin steaks	7	3.08
Choice T-Bone steaks	12	3.73
Salisbury steak	6	1.31
Choice stew beef	—	2.07
Ground beef patties, lean	4	1.36
Chopped sirloin steak	8	1.38
Choice top round roast	—	1.83
Breaded veal steaks	4	.96
Calves liver	4	3.25
Choice loin lamb chops	4	4.36
Lamb for stew	—	2.10
Center cut pork chops	5	2.51
Center cut pork roast	—	1.80
Rock Cornish hens	16	1.20
Split broilers	12	.92
Premium turkeys	—	.79
Chicken legs	—	.86
Belgium butter	—	.89