

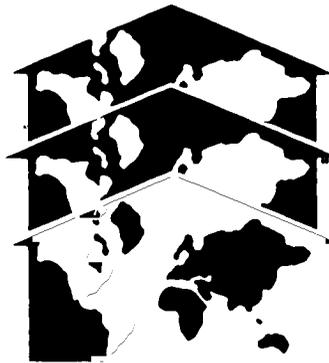
**Urbanization in the
Caribbean: Prospects &
Management Priorities**

St. Lucia Case Study

October 1990

OFFICE OF
HOUSING AND URBAN
PROGRAMS

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT



W O R K I N G P A P E R

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Caribbean: Prospects &
Management Priorities**

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October 1990

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The views herein are those of the authors and do not necessarily reflect those of the Office of Housing and Urban Programs or the U.S. Agency for International Development.

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ABSTRACT

This report on St. Lucia is one of five case studies prepared as a part of an overall study of urbanization in the Caribbean region. The final report (Urbanization in the Caribbean: Prospects and Management Priorities, by G. Thomas Kingsley, Jeffrey P. Telgarsky, Ivor Jackson and Milagros Nanita-Kennett) pulls together the findings of all five case studies and region-wide analyses of demographic, economic, and urban trends. It also offers a number of guidelines for policy that are suggested by the analysis.

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PREFACE

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ECONOMIC OVERVIEW

Economic Trends

In the early 1980s, St. Lucia suffered through an economic decline caused by hurricane damage in 1980-1981 and by a rising population which absorbed previous economic gains. Since 1982, however, economic performance has steadily improved, with GDP growth averaging 4.5 percent annually during 1982-1985 and rising to 5.4 percent during 1985-1989 (despite a slowdown in 1987 due to drought that cut banana production by 25 percent). This buoyant growth has been the result of a recovery and upsurge in banana production and earnings, significant growth in the tourism and construction sectors (with more than 1,000 rooms scheduled to be added to existing capacity and several large infrastructure projects), and encouraging signs from the nascent manufacturing sector. However, this recent surge in growth raises the possibility of the economy beginning to overheat, with particular strains beginning to show in the construction sector as public and private sector projects compete for labor and materials. Inflation, which fell from 4.6 percent in 1982 to 2.0 percent in 1986, has been rising and reached 6.0 percent in 1989.

Like other Caribbean countries, the Government of St. Lucia (GOSL) has recently undertaken significant reforms of public sector revenues and expenditures. Public finances have improved noticeably and public sector savings have increased from virtually zero in 1982 to about 11 percent of GDP in 1987. This has permitted a high level of domestic investment in the tourism sector and on

Table 1
St. Lucia Economic Data 1980-1988

	1980	1985	1986	1987	1988
GDP (1980 EC\$ m)	264.2	317.1	335.5	342.5	365.8
GDP Growth (%)	-0.6	6.0	5.8	2.1	6.8
Structure of GDP (%)					
Agriculture	11.7	15.4	16.4	15.3	n/a
Manufacturing	9.3	9.7	9.3	9.2	n/a
Other Industry	15.5	9.7	10.3	11.2	n/a
Services	63.5	65.2	64.0	64.3	n/a
CPI Inflation (%)	17.2	1.0	4.5	5.1	1.6
External Accounts (US\$ m)					
Export	87.5	121.5	166.2	171.8	219.9
Bananas	10.5	30.1	55.5	42.3	65.5
Travel & Tourism	n/a	43.7	56.8	66.4	68.5
Imports	135.4	154.9	185.7	209.3	252.7
Current Account	(33.3)	(12.5)	1.7	(12.9)	(13.6)
External Debt (US\$ m)	n/a	28.4	31.5	n/a	n/a
Debt-Service Ratio (%)	n/a	2.5	2.1	n/a	n/a

Sources: EIU (1990), IMF (1989), World Bank (1989).

infrastructure, averaging 37 percent of GDP during 1982-1987, and allowed the GOSL to clear all arrears from its previous borrowings from domestic and foreign lenders. The World Bank (1988), however, has expressed concern that public sector savings may be eroded if the public sector wage bill (which accounts for about half of GOSL current expenditure, is not kept under tight control; early estimates for the 1989/90 financial year indicate current revenues falling behind current expenditure, reducing the fiscal surplus. Maintaining the fiscal surplus is necessary to continue financing investment required for employment generation.

The external accounts showed improvement through the 1980s to 1986, reflecting increased earnings from bananas and tourism. The current account improved from a deficit of 36 percent of GDP in 1980 to 3 percent in 1986. Since 1986, the deficit has slipped back to 8 percent of GDP in 1988 as higher earnings from banana exports and tourism have been offset by increases in imports (mainly associated with the high levels of investment). Total external debt has risen moderately in the 1980s, from US\$25.5 million in 1983 to US\$31.5 million in 1986. With the large improvements in export earnings during the 1980s, the debt service ratio has fallen to only 2.1 percent in 1986.

The growth of the economy since 1980 has caused unemployment to decline significantly, but the rate still remains high at between 15 percent and 20 percent. Lack of employment is concentrated among recent graduates and women in the labor force. Current high rates of fertility and population growth imply employment creation will be a pressing issue throughout the coming years. The GOSL is looking to manufacturing (primarily the garment and electronics industries) to absorb those currently unemployed, while the tourism sector and new high tech industries (such as data processing) would provide job opportunities for recent graduates.

Sectoral Developments and Policies

The growth of the St. Lucian economy in the 1980s can be linked to the boom in the banana industry in the agricultural sector plus the continuing expansion of the tourism and manufacturing sectors. This section looks at each of these sectors in turn.

Agriculture. The agricultural sector is the leading employer in the economy, providing jobs to about one-third of the workforce. Since 1980, the share of agriculture in GDP has increased from 11 percent to about 16 percent in 1988.

Bananas are the dominant crop, earning EC\$176.9 million in 1988; accounting for 80 percent of value added in the agricultural sector and 55 percent of merchandise exports. The banana export market is almost entirely concentrated in the United Kingdom (U.K.), which buys bananas from certain Caribbean producers at above-market prices and keeps out other banana imports from the "dollar" producers in Central and South America through quotas and tariffs. The recent rise of sterling against the U.S. dollar has increased the incomes of banana growers (as the EC dollar is tied to the U.S. dollar). In addition to improved price incentives, two other factors have contributed to higher levels of output: (1) improved growing technology and practices; and (2) redistribution of land from large estates to small-holder plots which are farmed more intensively—yields on these small plots are often twice the national average. Between 1981 and 1988, annual banana production increased from 43,600 metric tons to 133,700 metric tons.

The future of the banana industry is threatened by the arrival of the single market in the EEC in 1992. The present banana import arrangements (enshrined in the Lomé Convention), involving divergent national legislation and restrictions on the free trade of bananas within the EEC, are not compatible with the objectives of the 1992 single market. While negotiations are currently underway to reach a satisfactory compromise (France also has a similar import arrangement), it seems certain that current advantageous arrangement is bound to be scaled back over time. In the case of St. Lucia, it will be difficult to match the economies of scale and low wages of the dollar banana producers and compete effectively in the world market. However, the St. Lucia Banana Growers' Association (SLBGA) believes production could be doubled again and is impressing upon its members the need to maintain and improve quality (at all stages of production from the farmgate to delivery) in order to keep St. Lucia's position in the market as strong as possible (Van de Velde, 1989).

Crop diversification is also being promoted for a number of reasons: (1) to soften the blow of the likely decline of the banana industry; (2) to improve St. Lucia's food self-sufficiency; and (3) to establish other export markets for agricultural goods. St. Lucia could provide fresh fruit, such as papayas, mangoes, and pineapples, to North America and Europe as well as open the possibility for agro-processing industries to produce juices and other preserved foods. (Processing possibilities for the banana crop are almost non-existent.) Indeed, part of the GOSL's long-term strategy for the Mabouya Valley is to develop these sorts of agro-industries in Dennery as an extension of the land reform and integrated rural development project currently under way in the area.

Manufacturing. Manufacturing activity in St. Lucia is concentrated mainly in the assembly of electronic components and garments for export and in the production of food and beverages. The sector accounted for about 8 percent of GDP in 1988, but growth in the sector since 1983 has not kept up with the overall expansion of the economy. However, with the island's population increasing by almost 3,000 persons annually, a key issue is expanding employment opportunities for a growing workforce. Despite its relatively slow growth, the manufacturing sector has increased its share of the workforce from 9.3 percent in 1980 to 11.2 percent in 1988.

The 5,400 manufacturing workers are spread across approximately 230 firms. Most of these firms are small: only 5 firms have more than 250 employees and only 12 have between 100 and 250 workers. Data (covering firms representing about 82 percent of national manufacturing employment) from the National

**Table 2
Manufacturing Sector Structure and Employment 1989**

Industry	Total		Castries		Vieux Fort		Other	
	Workers	Firms	Workers	Firms	Workers	Firms	Workers	Firms
Apparel/Textile	2,347	22	1,034	16	803	5	510	1
Appliances	35	2	35	2	0	0	0	0
Data Entry	97	2	97	2	0	0	0	0
Electronics	602	4	0	0	602	4	0	0
Food/Beverage	811	11	528	8	132	1	151	2
Furniture	57	5	53	4	4	1	0	0
Miscellaneous	482	8	289	4	193	4	0	0
TOTAL	4,431	54	2,036	36	1,734	15	661	3
Percent Share	100	100	46	67	39	28	15	6

Source: National Development Corporation.

Development Corporation (NDC) indicates that about two-thirds of all manufacturing firms and about half of all manufacturing employment are located in the Castries-Gros Islet (CGI) corridor. Vieux Fort contains most of the balance of the activity in the sector, accounting for about one-quarter of all firms and 40 percent of employment (Table 2).

Vieux Fort had been targeted as the location of the island's major manufacturing activity in the early 1980s. An industrial estate covering 120 acres and free zones covering 105 acres were to be developed. Approximately 290,000 square feet of space (built mainly as factory shells by the NDC) have been occupied by 15 industrial operations. However, further expansion of the manufacturing sector in Vieux Fort appears to be hampered by its role as a secondary city and by labor market conditions in the southern part of the island.

Attracting labor to work in manufacturing in Vieux Fort is becoming increasingly difficult. Although transportation is relatively cheap, the added cost (both in terms of cash outlays and commuting time) is an inhibiting factor on labor supply. In addition, earnings in agriculture and tourism are comparable with manufacturing wages. However, manufacturers cannot raise wages without decreasing their international competitiveness. As a possible solution, the GOSL is exploring the possibility of providing subsidized transport for workers commuting to the Vieux Fort area.

In the meantime, the NDC is now concentrating its efforts to develop new industrial estates in the northwest of the island where demand for industrial space remains unfulfilled. A 45 acre industrial estate already exists at Bisee and new estates are being developed at Odsan (42.5 acres) and Union (8.5 acres), with plans for development of the coastal area of the Cul de Sac valley as the next industrial zone. The estate at Union is intended to serve data entry and processing operations serving the North American market. The other estates are available for use by light manufacturing concerns with "dry" operations (i.e., whose processes do not involve chemicals or other possible sources of contamination). The NDC is concerned to reduce the environmental risk associated with these new developments and has already turned down applications from some investors which did not conform to these criteria.

Apart from acting as the main provider of industrial production space, the GOSL also provides tax incentives including: tax holiday on profits for up to 15 years; duty-free entry for raw materials, machinery, and spare parts; unrestricted repatriation of profits. In 1988, GOSL revenues forgone from these incentives totalled EC\$12.7 million; 1989 subsidies were estimated at EC\$29.1 million and were extended to 154 enterprises.

The GOSL realizes that the current emphasis on 807-type assembly manufacturing (eligible for duty-free re-entry of products to the U.S.) provides an important source of employment. It also recognizes that such industries are transient in nature and can easily move to other locations that offer better conditions (such as lower wages or more preferential tax treatment). St. Lucia has so far been able to remain competitive by keeping pace with conditions in other Eastern Caribbean countries. However, the possibility of too-rapid growth could

push wages up out of the competitive range (as happened in Barbados) and the World Bank (1988b) has suggested that the lack of skilled manpower—supervisors, mechanics, and accountants, in particular—could discourage manufacturing investors. As a result, the GOSL is looking to increase the stability of the sector and expand the linkages between the domestic economy and the manufacturing sector through diversification of activity away from the garment export industry, increased development of agro-processing operations, and increased import substitution where local manufacturers are competitive with foreign suppliers (such as garments and paper packaging).

Tourism. The limitations of the manufacturing sector have placed the tourism sector in St. Lucia in the role of the non-agricultural mainspring of the island's economy. The sector generated an estimated EC\$151.9 million of economic activity in 1988 (about 30 percent of GDP). About 3,000 persons (representing 6 percent of the workforce) were directly employed in the sector and about twice this number (taxi drivers, street vendors, farmers) are supported indirectly by the sector's activities.

The number of stayover visitors has risen from 70,200 in 1981 to 125,300 in 1988, mainly arriving by air on daily flights from New York, Miami, and Puerto Rico. On a per capita basis, St. Lucia attracts a higher level of visitors than other more-established Caribbean destinations such as Jamaica and Barbados. St. Lucia markets itself as a travel destination both in Europe and North America and has been successful in carving out a market niche for both up-market tourists lured by the climate and high-quality resorts and so-called "green" tourists who are attracted by the wide variety of ecologies found on the island. This orientation of tourism will be important for tourism development that occurs outside the Castries-Gros Islet (CGI) corridor (which is mainly oriented toward the beaches at La Toc, Vigie, Choc, and Reduit/Rodney Bay) and around the southern west coast near Soufriere (which relies on the natural setting of the Pitons and the surrounding forest as its main drawing attractions).

In addition to these stayover visitors, St. Lucia has also been recording increasing levels of cruise ship passengers. The new duty-free complex at Pointe Seraphine has facilities to handle two ships and has made the island more attractive as a cruise ship destination. Cruise ship passenger arrivals totalled 79,500 in 1988.

The sector is expanding at a rapid pace. In 1988, the 24 hotels on the island offered 2,150 rooms. It is expected that an additional 1,000 rooms will be added by the end of 1990 and that total capacity will exceed 4,000 rooms by 1995. So far, the industry has not encountered problems with labor supply, as most tourism development has been concentrated in the CGI corridor, including the large majority of hotel rooms, 60 percent of all marina berths (the others are found at Marigot Bay and Soufriere), and most of its boat charter and repair facilities. However, many persons who work in the sector but live outside the Castries area choose not to commute (because of the cost and inconvenience) but either rent rooms or stay with relatives in town.

The same cannot be said for supporting infrastructure, which is often hard pressed to meet the demands of the sector. The GOSL is undertaking major investments to expand Hewanorra International Airport in Vieux Fort to handle increased passenger traffic. In addition, the West Coast Road linking Castries and Soufriere is to be widened and upgraded in three phases over the next five years; Phase I is to be completed by the end of 1990. Road capacity in the CGI corridor is already thought insufficient to support much more tourism development in the area and the East Coast Road linking Castries and Hewanorra is deteriorating under consistent heavy use. Tourism developments are also usually required to install their own sewage treatment facilities, as there is no central sewerage treatment. However, the package plants installed by most resorts do not provide reliable service and untreated effluent is often discharged into the sea.

Of the three main sectors in the economy, tourism has proved the most resilient during times of recession. The sector has also developed important linkages with the rest of the economy: to agriculture because hotels have made a strong effort to maximize their use of locally-produced foods; to the construction industry as many building materials and furnishings are provided by domestic producers; and the increased employment in the service sector, which has resulted from greater numbers of visitors.

ENVIRONMENTAL IMPACTS: MANUFACTURING AND TOURISM

Manufacturing activities produce a variety of wastes in liquid, sludge, and solid form. Environmental concerns derive from the characteristics of the wastes, method of disposal, and the nature and extent of impact. Other forms of industry-related service activities add to the overall stream of hazardous waste, including vehicle mechanic shops, service stations, boat yards, and slaughter-houses. The transshipment fuel depot at Cul de Sac constitutes an environmental threat of grave proportions relative to a possible oil spill. A relatively large spill could cause major damage to the resources of the West Coast.

The rugged topography of St. Lucia limits present and future manufacturing activity to the coastal zone. Land use trends and development proposals for the CGI corridor indicate that manufacturing will continue to be woven into the urban fabric rather than emerging at isolated non-urban sites, perhaps due to land constraints. The management of waste in urban settings is relatively difficult and is made more complex by the coastal zone in which urban development occurs in St. Lucia. Mitigation of environmental impacts should be a major occupation of policymakers in the future.

The environmental impacts of tourism activities are more difficult to describe, as they mainly aggravate existing situations, such as raising levels of bacterial pollution which are based in other urban activities. Another direct impact from tourism is the destruction or degradation of sensitive environmental areas, such as reefs and forests, which receive heavier use when opened to tourism use. Indirect effects are also present: increased construction activity requires sand and aggregate, which are often mined from local beaches; conflicts arise between fishermen and those using the same waters for recreational purposes.

Infrastructure Impacts

Water. Rivers are the primary source of potable water in St. Lucia. In the cycle of water production, watersheds play a key role in regulating the flow of water to rivers. Both the volume and quality of water supply are affected by land uses in watersheds above the intakes because of: (1) the relative reduction of water stored in the soil that augments flow in dry spells; (2) increased sedimentation in the rainy season that blocks treatment filters and reduce treatment capacity; and (3) the use of agro-chemicals that may contaminate water via run-off or sediments—chemical use increases during the wet season in the application of fertilizers and the control of weeds.

Agriculture, not tourism and manufacturing, is the main area of concern for poor watershed land use practices. However, when reduction in water supply requires rationing, preferential treatment may be afforded tourism and manufacturing facilities over some communities. Tourism development proposals for Soufriere could induce such conditions for the Delcer, Chateau Belair, and Malgretoute communities unless: (1) investment is made to maximize the supply from the intake serving the communities and to tap a complimentary source to meet new demands of the proposed tourism facilities; and (2) improved management of the watershed occurs to ensure regularity in supply.

These problems are already being felt in the CGI corridor, where hotels, manufacturing, and other industrial uses account for 22 percent of water consumption. Water demand is suppressed because of less than adequate treatment capacity for present levels of demand, leaving consumers at some higher elevations without a continuous 24 hour supply.

Waste Infrastructure. Waste problems derive mainly from a lack of, or inadequate facilities for, collection and treatment infrastructure. Development of tourism facilities in St. Lucia requires adequate treatment for sewerage from hotels and other developments. However, without central piped sewerage and treatment, package treatment plants are seen as the only feasible alternative. Unfortunately, these plants often suffer breakdowns and are not speedily restored to working condition. A privately-owned activated sludge (extended aeration) treatment plant, designed for 100,000 gallons per day and located at the St. Lucian Hotel, services part of the Rodney Bay development and is already overloaded (Archer, 1985).

Results of water quality monitoring work at Rodney Bay lagoon and harbour by the Caribbean Environmental Health Institute (CEHI) indicate that a relationship could be drawn between increased yachting uses and pollution. To date, the impact of wastes on water quality has not reached proportions that threaten the use of recreational beaches in the area (Archer, 1985). However, further increases in yachting activity could present major health risks in the bay unless relevant pollution control measures are taken to minimize impacts from faecal, bilge, and boatyard wastes (e.g., anti-fouling paints, solvents, and lubricants). Already, the seagrass in the bay is reported not to be particularly healthy (Ward, 1990).

The environmental impacts from manufacturing wastes have not been monitored for St. Lucia. The probable environmental threats from selected

**Table 3
Selected Manufacturing Operations of Major Environmental Concern**

Company	Location	Product	Possible Characteristics of Waste
COPRA Manufacturers	Soufriere	Margarine, edible oil	High organics, oil
Windward Brewery Ltd.	Vieux Fort	Beer and malt	High dissolved organics, nitrogen, starches
Bottlers (St. Lucia) Ltd.	Castries	Aerated beverages ice cream	High PH, suspended solids BOD
Du Boulays Bottling Ltd.	Castries	Aerated beverages	High PH, suspended solids BOD
East Caribbean Distillers Ltd.	Roseau	Various spirits	
St. Lucia Distillers Ltd.	Castries	Rum	
Chemico	Vieux Fort	Bleach, disinfectants, fabric softener	High BOD, phosphates
Hess Oil	Cul de Sac	Oil storage	High BOD

manufacturing operations are indicated in Table 3. The characteristics of the wastes, method of treatment, and point of final discharge could not be properly assessed within the time frame of this study. The probable characteristics and the likelihood of environmental threats are therefore based on results obtained elsewhere (e.g., Wade's (1985) study of organic pollution in Kingston Harbour, Jamaica).

The location of the plants warrant some level of concern for Castries Harbour, Vieux Fort, and Soufriere bays, assuming that wastes are usually inadequately treated. The Heineken brewery at Vieux Fort uses an oxidation treatment system before discharging the effluent via a drain to the sea (Shim, 1990). The effectiveness of the treatment is not known. Sewage and industrial wastes of the other factories in the area are drained untreated to the sea (Morton Billand, 1987).

Effluent of at least one of the bottling plants in Castries is reported to be discharged in the Castries River and nutrient loading is suspected from bottle washing activity. Elevated levels of BOD, organics, nutrients, and suspended solids

produce well-known impacts on water quality and health risks to human and marine organisms, the extent of which depends on the volume of effluent discharged and the ability of the receiving body of water to cleanse itself.

Measuring the linkage between manufacturing activity and environmental impacts require adequate study. In light of the plans to establish new industrial areas, baseline studies to provide the basis for future monitoring should be considered. Meanwhile bathing in areas known or suspected to be contaminated from various sources and types of pollution, such as Soufriere Bay, should be discouraged.

Sand Use, Dredging, and Beach-Related Impacts

Beaches constitute one of the major natural assets of St. Lucia's tourism. Maintaining resort beaches at the quality that existed prior to the construction of hotels is a critical resource management problem for two main reasons.

The first is the use of beach and nearshore sand for construction and/or landfilling. Williams (1985) links severe erosion of beaches in the CGI corridor in the 1960s and 1970s to sand mined for the construction of four large hotels, dredging of the Rodney Bay lagoon, and construction of a tourism related causeway linking Gros Islet to Pigeon Island (see Table 4 for estimates). The causeway project destroyed seagrass and coral reefs and induced littoral changes that limited sediment transport to Reduit Beach.

The second derives from land use practices that allow tourism facilities to be constructed too close to the high water mark (HWM), which in the long term may cause irreparable damage to the beach profile through interference with dynamic coastal processes.

Table 4
Estimates of Sand Mining from Beaches 1960-70
(cubic yards)

Beach	Estimated Volume
Vigie Beach	110,000
Choc Beach	68,000
Gros Islet	151,000
Dennery	24,000
Soufriere	7,000

Source: Williams (1985).

Other Impacts

Other impacts, past and potential, are worth noting. These include:

- In the Rodney Bay/Gros Islet area, tourism has and will continue to influence the process of urbanization which would, depending upon how the area is managed, exacerbate problems with pollution control, water quality, overcrowding, and traffic congestion. The 1985 population of the area was approximately 5,840, while population at full development is projected at 17,450 (Archer, 1985).
- In Soufriere, tourism development projects approved or planned for the Pitons area could result in degrading the aesthetic and visual quality of one of the outstanding landscapes in the region. A land use policy, inherent to which would be zoning and area protection, is required to cope with existing and anticipated development pressure.
- Scuba diving has been implicated, along with certain types of fishing activity, with damage to coral reefs along the coast of Soufriere. Additional tourism development will increase diving activity and impacts unless effective dive site management is exercised.
- Conflicts between fishing and yachting uses exist in Soufriere Bay and along the coast near the Pitons. Plans for development of the Soufriere waterfront by the Soufriere Development Programme (SDP) along with other tourism projects planned for the town, will further increase yachting activity. Further difficulties are anticipated in prohibiting yachting uses from fishing priority areas delineated by law at the advocacy of Fisheries Management Unit (FMU).

DEMOGRAPHIC TRENDS AND URBAN STRUCTURE

Demographic Overview

The population of St. Lucia was estimated at 145,000 in 1988. Since 1946, St. Lucia has displayed a relatively high rate of population growth, but this has been tempered by a high rate of out-migration. The rate of out-migration was equal to about 40 percent of natural population increase during the 1980s, but its effect on population growth has been diminished by a rising rate of in-migration since 1983. The crude birth rate in the 1980s has been falling, but this effect has been offset by the increased rate of in-migration and a fall in the crude death rate. As a result, the rate of net population increase remains relatively high and has averaged 2.0 percent since 1980.

The age composition of the St. Lucian population shows a high proportion of persons under age 15; 43.5 percent of the population in 1980. This generates age-dependency ratios near 100, the level at which there are as many persons of working age in the population as persons who are supported by those of working age. The implication of a high age-dependency ratio, in this case, is heavy

demands on the educational system and other social infrastructure supporting children. The proportion of the population under age 15 declined between 1970 and 1980, but the absolute increase in population during the 1970s implies that the number of job seekers entering the labor market (now about 3,800 annually) will continue to increase in the 1990s.

Urban Structure

The Castries-Gros Islet corridor in the northwest of the island is the dominant urban concentration, with a population of about 53,000 in 1989. Aside from being the national capital, Castries and its surrounding area is also the major economic center: the Northwest corridor accounts for two-thirds of all manufacturing operations and almost half of all manufacturing employment;¹ tourism development has mainly been concentrated along the coast north of Castries (in Rodney Bay and Gros Islet); Castries is a port of call for many cruise ships; and has the island's most advanced cargo handling facilities (for both containers and bulk cargo).

Vieux Fort, on the southern tip of the island, is the main secondary town. Its population in 1983 was about 5,500 and it has grown significantly since that time; its current population is probably between 9,000 and 10,000 persons. Three industrial estates near the town make Vieux Fort the second-ranking concentration of manufacturing in St. Lucia (with about 40 percent of all manufacturing employment). Vieux Fort is also the site of the island's main international airport.

Other towns include Dennery and Micoud on the east coast and Soufriere, Laborie, and Anse-La-Raye on the west coast; all of these towns have less than 10,000 residents.

The small size of St. Lucia (only 238 square miles) means that the traditional urban-rural division of population is difficult to define. The hinterlands of major settlements are characterized by low-density urban sprawl, with ribbon-like development spreading along the roads leading to the town. Indeed, the road network (in conjunction with topography) has been the main determinant of development on the island. This development is usually confined to the roadside and is not very intense (i.e., housing units may be over one hundred yards apart). This has led to a reticulated settlement pattern with insufficient density to be classed as "urban." However, neither are these settlements fully "rural" in character, since many households are not dependent on agricultural or other non-urban activities, but commute into town centers. (It is not uncommon for individuals to travel daily between Dennery and Castries, a distance of about 12 miles.)

This merging of urban and rural areas is particularly strong in the areas surrounding Castries-Gros Islet and in the areas north of Vieux Fort. It perhaps makes more sense to think of the settlement pattern of St. Lucia being primarily

¹Based on 1989 data collected by the St. Lucia National Development Corporation covering manufacturing firms accounting for 80 percent of all employment in the sector.

urban and suburban, rather than urban and rural, since most locations on the island are relatively close to either Castries or Vieux Fort.

URBAN SERVICE PROVISION

Water and Sewerage

The Water and Sewerage Authority (WASA) is responsible for the provision of potable water and sewerage services across the island. WASA is a statutory agency established by the GOSL and is governed by a government-appointed Board.

St. Lucia depends on catchment from mountainous watersheds for its water supply. At present, water from these sources is about adequate to meet the island's needs—about 6 million gallons per day (MGD). However, growth in water demand in the northwest will soon outstrip these sources. In addition, notional water demand in the northwest part of the island is estimated by WASA to be about 3.4 MGD; current water treatment facilities serving this area only have a total capacity of 3.0 MGD. This results in interruptions in service and pressure losses in some hillside settlements (especially in the rainy season when water treatment throughput declines because of high turbidity in the untreated water). Outside the northwest, WASA has capacity in place to handle most future growth: Vieux Fort is served by a 1.0 MGD plant; the Dennery treatment facility provides 0.3 MGD.

To address these issues, WASA has begun construction of a dam and reservoir in the Roseau Valley south of Castries. The reservoir will provide adequate storage to supply water to the northwest of the island through a five-month drought. A 4.8 MGD treatment facility will also be constructed (replacing the 2.0 MGD plant at Sarot) to meet projected water demand to 2010. The dam will also provide enough water to supply a second 4.8 MGD treatment facility and meet projected water demand to 2025.

WASA currently services about 23,000 residential connections. The loss rate within the distribution system is approximately 25 percent and has been declining gradually over the past few years. Approximately 90 percent of all households have access to potable water either through household connections or public standpipes provided by WASA. All connections—including standpipes—are metered. The cost of water provided through public standpipes is borne by the government. The average cost of residential service for a six-person household is EC\$50 every two months. Service is cut off to those customers more than six months in arrears on their payments.

WASA provides service to any property owner with an approved development plan from the Development Control Authority (DCA). Tenants may also receive service, but only with the approval of the property owner since the owner is strictly liable for water charges incurred on his property. WASA will not provide any service to households squatting on public land; these households are served by public standpipes.

Since 1987, WASA has been responsible for sewerage and sewage treatment. Piped, central sewers are found only in the Castries area and serve about 1,200 households. (Some resorts in the CGI corridor also have their own central sewerage and treatment facilities.) The Castries system is old, but has been restored to good operating condition by upgrading existing pumping stations. A feasibility study sponsored by the French government is currently investigating possible system extensions in Castries, development of a new central system in Rodney Bay, and treatment options. Currently, untreated effluent is piped to an outfall in Castries harbor.

In St. Lucia as a whole, about 50 percent of the population relies on septic tanks or soakaway pits for their sewage disposal. Another 30 percent are about evenly split between indoor water closets and shared facilities. The remaining 20 percent have no facilities and use night soil buckets.

Electric Power

The St. Lucia Electricity Services Ltd. (LUCELEC) provides power for residential and commercial use on St. Lucia. LUCELEC currently has a total of 24.9 megawatts (MW) of generating capacity, all using diesel power. An additional 12.6 MW in two units is being installed at a new generating station in Cul de Sac; the station can accommodate one more unit in addition to the two planned at present. It is expected that these additions will be sufficient to meet St. Lucia's power needs for the next few years.

Current power demand peaks at about 15 MW, which, because of the difficulty of keeping all generating units running and the limitations of the distribution grid, have often caused current fluctuations and required load-shedding. Aside from the added generating capacity, LUCELEC is upgrading their primary distribution network from 11 kilovolts (KV) to 66 KV, which will allow the grid to carry more power more efficiently. Plans eventually include linking of the two main grids, one in the north half of the island and one in the south to create a single national grid.

LUCELEC was granted a rate increase in 1989 (its first since 1984) plus the inclusion of a fuel surcharge—currently equal to EC\$0.13 per kilowatt-hour—has kept the utility's financial status stable. Base rates are EC\$0.21 per kilowatt-hour for residential customers and EC\$0.52 per kilowatt-hour for commercial customers. The utility has a total of 26,000 connections. Of these, about 22,300 are residential, 3,500 are commercial, and the remaining 200 are industrial. Revenues are currently adequate to cover operations and maintenance plus debt service on borrowing. However, because of the heavy investment program that is being undertaken, LUCELEC has experienced some temporary cash flow problems.

LUCELEC has experienced some difficulty in keeping up with the expansion of housing and the tourism sector in the CGI corridor. An additional MW of demand is expected to be added in the Rodney Bay area with the completion of two new hotels under construction plus new residential development. For tourism projects, the utility brings power to the site, but the developer is responsible for stepping-down the power and distributing it over the site. For residential

developments, LUCELEC installs all distribution networks. In both cases, the developer is required to cover all costs associated with extension of the distribution grid.

Roads and Transport

The road network of St. Lucia covers approximately 600 miles, of which about 500 miles are paved or otherwise improved. The main road system consists of two highways, the East Coast Highway (extending from Vieux Fort to Castries) and the West Coast Highway (linking Vieux Fort and Gros Islet through Castries). The East Coast road is in good condition, but suffers from heavy use by traffic travelling to and from Castries (including users of Hewanorra Airport and commuters from Dennery and other towns who work in Castries).

The West Coast road is currently being widened and improved; for much of its length it is in poor condition and barely wide enough for two vehicles. The first phase, between Castries and Anse-La-Raye, is due for completion in August of 1990. Its cost is set at EC\$13 million and is being financed by the British Development Division. Consultants for the second phase, between Anse-La-Raye and Canaries, are currently being selected, and it is expected that work will be under way within the next two years. The third phase, from Canaries to Soufriere, is not expected to be started until the end of the second phase; completion of all three phases is probably at least five years away. The remainder of the road, from Soufriere and Vieux Fort, is in fair condition, though it also is showing signs of deterioration from heavy use.

Traffic congestion is a significant problem in central Castries, as all through traffic must traverse the city center. A study by the GOSL in 1987 counted peak levels of 2,000 vehicles per hour at the Market junction in Castries. The Public Works Department is currently completing installation of traffic signals in the central Castries area to improve the flow of traffic.

Public transport is provided mainly by private minibuses, which operate both as buses on established routes and as taxis. The routes and frequency of operation are decided by the minibus operators association. The GOSL sets the fares between points, which are quite cheap (reportedly only EC\$5 between Castries and Vieux Fort). There is some concern on the part of the minibus operators about the rising number of vehicles (which has risen from 750 in 1981 to 1,120 in 1986), the increase being boosted by the country's strong foreign exchange earnings. Weaker foreign exchange earnings and increased competition could reduce the attractiveness of operating minibuses and lead to a deterioration of service. The government also has designated two terminus points in Castries for minibuses from the north and south, respectively. Thus, there is no through service and, because the termini are located on opposite sides of the city center, passengers must walk to their connecting bus. The GOSL intends to incorporate a central bus station to alleviate this problem in its planned redevelopment of the central market area.

URBAN LAND AND SHELTER

Urban Land Market

The expansion of the St. Lucian economy over the past few years, though primarily based on banana exports, has also been fueled by greater emphasis on tourism and manufacturing. These urban-based activities have led to increased demand for urban land and significant urban spread, as land (formerly used for agriculture or zoned for future commercial or industrial development) on the periphery of urban areas have been converted to residential use.

In the CGI corridor, this demand for urban land has led to increased residential and commercial development north of Castries around Rodney Bay. While this development has been mainly carried out through the formal, private sector—most of the land is in private ownership. (Indeed, Garnett and Miller (1988) state that throughout St. Lucia, excluding the national forest reserve, 80 percent of all land is privately owned.) In other areas, the pressures on the urban land market have manifested themselves mainly through squatting. Land slated for the expansion of the port in Castries has been occupied by squatters for several years. In Vieux Fort, lands designated for industrial development by the NDC have also been occupied by squatters.²

These pressures on urban land have been translated into higher land prices. Land in Rodney Bay has increased in price from EC\$2.50 to as high as EC\$10.00 per square foot during the period 1982-88. In Vieux Fort, peripheral urban land for residential use increased from EC\$2.00 to EC\$3.25 in the same period. Land costs have also risen in central urban areas: from EC\$40.00 per square foot in 1982 to EC\$100.00 per square foot in 1988 in the Castries central business district. The Urban Development Corporation (UDC) has also been involved in land sales. However, its typical sale price of EC\$2.00 per square foot of serviced land seems low considering that comparable unserviced land for residential purposes in rural areas is selling for more than EC\$2.00 per square foot.

Land Management and Regulation

St. Lucia is facing a difficult land management problem, as economic development and urbanization place increasing pressures on the limited supply of land (particularly in and around urban areas). These pressures are evidenced by the growth of squatter settlements throughout the island and the rapid spread of development along the CGI corridor. These phenomena demonstrate that the land delivery system has problems both at the low-income end of the land market (there are no affordable means for low-income households to gain access to land in areas

²It should be noted that land pressures in St. Lucia are not strictly an urban phenomenon. Agricultural land in rural areas is also being converted to mixed residential/ agricultural use and squatters have been steadily encroaching on the less productive areas of estates where cultivation has stopped or on the national forest reserve.

of high economic activity) and in the middle-income range (where inadequate infrastructure and lack of appropriate development regulations lead to large lot sizes and low densities that contribute to increasing urban sprawl).

This inefficient use of a scarce resource such as land has serious implications for the future economic health of the island: higher costs for development of the key sectors of tourism, manufacturing, and agriculture; environmental degradation (contamination of watersheds, deforestation and soil erosion, deterioration of natural surroundings that attract visitors); and continued capture of public lands by low-income households who bypass the high costs of the formal land delivery system (i.e., loss of a public asset without any return).

The GOSL has not yet developed a national land policy, although there is an increasing recognition of the need to establish such a framework. Without such regulations to guide development in a more efficient pattern, the DCA lacks the instruments to control development in an effective and legally binding fashion. The DCA did produce a draft land use strategy in 1983, that sought to protect productive agricultural land from urban sprawl, to promote economic growth in Gros Islet, Vieux Fort, and Soufriere, as well as Castries; to contain growth pressures in Castries; and to protect environmentally sensitive areas. The strategy was never formally adopted and has not been consistently applied by the DCA and GOSL.

Phillip (1989) has, however, identified the main threads of the GOSL's *de facto* land policies. The need for residential land apparently has not been given a high priority by the GOSL, since lands set aside for housing have often been given up for other uses while new land needed for housing has only been acquired as needed, rather than through land banking or acquisition of land ahead of development pressures. (The GOSL has recently revitalized the UDC to fill the public sector role in the housing sector—see the following section.) In contrast, GOSL actions regarding land for tourism and industrial development have been much stronger; significant amounts of land have been vested in the National Development Corporation for these purposes. Agricultural lands are also strongly protected. Thus the GOSL has been willing to provide land for the key sectors leading economic growth, but has been less cognizant of the costs imposed by inefficient development in the residential sector (such as the high cost of providing urban services, which must ultimately be borne by the purchaser or service provider).

At the same time that lack of regulations are hampering the control of land use and development at the macro level, other standards in use set minimum prices for developed land beyond the affordable range for the majority of the population. The minimum plot size of 3,000 square feet (where—as is the case for most of the island—centralized sewage disposal is not available) implies costs of between EC\$7,500 and EC\$15,000 for land alone. Other subdivision standards (such as complete servicing of each lot, costly road reservations and construction, and high open space requirements) push the cost of developed land far outside the affordable range and drive low-income households to occupy public land and develop settlements informally.

Box 1
St. Lucia Squatter Settlements

Squatters in St. Lucia, like elsewhere in the world, are motivated mainly by better economic opportunities and better living conditions. They are also forced into informal settlements by the lack of opportunity to purchase affordable land and housing. Garnett and Miller (1988) give this description of squatter settlements:

Squatters in St. Lucia have quite knowingly chosen government land to move to. They believe the risk of being removed or relocated is not great and as each day passes they are more convinced of this. They chose their sites for varying but sound reasons, particularly in areas not yet densely settled], where the selection of sites is greatest

Families will plan for the move—accumulating scrap or new materials as they can, some for many years knowing they will build one day. Wood may be secured, for instance, from friends who work at a box factor. As in most countries, once begun, actual construction of a basic structure is rapid. The family will be assisted in construction by extended family and friends, an informal system called *cou de main*. A basic 10 by 16 foot structure is built, usually of wood with a tin roof, on a raised platform of wood or blocks. The single room will be partitioned into two, one in which the family sleeps, the other for kitchen and living. Furniture comes later. Such a home may cost about EC\$1,000 in cash outlay.

. . . Besides their own resources, a family may seek a loan from a financial institution, even a commercial bank. If their credit record is good, regardless of the fact that they do not own the land, they may get a EC\$5,000 loan for the purchase of materials to further expand and improve the home.

The growing area of a squatter settlement may well already have accessible public services—a public facility with toilets, shower, and washing equipment, a waste bin for garbage and trash disposal, metered electricity to the home. . . . Plot and house layout are unplanned and inefficient; a stream serving as an open sewer runs through the area.

Squatters who develop these informal settlements occupy public land almost exclusively. The perceived risk of removal or relocation is not high; the GOSL apparently only takes action when the land is required for some competing purpose (see Box 7.1). For example, the Conway squatter community recently removed from the site of new Government Office Building in Castries had occupied their lands for over 30 years. The lack of affordable land and the practical acceptance of squatting has led to the establishment of substantial communities with housing units that have been upgraded to permanent materials (like concrete block). Future options for upgrading these communities, either through relocation or regularization, will be expensive.

Housing Production

In recent years, almost all housing production has been provided through the private sector. The Morton Billand Company (1987) estimated that the current state of the housing stock would require the production of 1,500 units annually to keep up with new demand, provide replacement units, and reduce the existing deficit. However, production levels in the formal sector have been far short of this—only 508 applications for residential construction were approved by the DCA in 1989. Between 50 and 60 percent of the island's households satisfy their housing needs through the informal sector.

The formal private sector housing providers are developers who operate at differing scales, from small family businesses that subdivide land they already own to large developers who concentrate on acquiring and subdividing land. Previously, these developers concentrated mainly on providing serviced lots upon which households built their housing. In the past few years, however, developers have started to offer completed dwelling units and land as a package. Among the larger developers, their focus is not exclusively upon housing, but also upon commercial, tourism, and sometimes industrial properties, as well. Except for the small-scale developers who may operate in the informal sector at times, none of these private sector developers attempt to meet the demand of low-income households for land or housing.

The main public sector institution in the housing sector is the Urban Development Corporation (UDC). The UDC was established in 1971 to develop land for residential purposes. However, it suffered from management problem (serviced land was being sold at prices below market prices or full costs to middle-income households) and accumulated a large deficit in the years following its start-up. In the 1980s, land continued to be sold, but the UDC was not involved as a developer in these sales.

Since 1989, the GOSL has been revitalizing the UDC to play a stronger role in the housing sector. The corporation's immediate task is to close out its old portfolio of projects—one recently completed project was begun ten years ago—and develop its remaining lands. The UDC is currently undertaking an inventory of the land it possesses plus is identifying other potential sites for future acquisition (either through vesting of Crown land from the GOSL or by acquisition from private owners).

The UDC plans to focus on low-income housing (i.e., for households with annual incomes below EC\$12,000)—although it will still provide middle-income housing in areas where its properties are in attractive locations. UDC projects are built by private contractors and the corporation is also looking to the private sector for joint venture partners. So far, however, only all private sector interest has been directed to middle-income housing (except for one developer who plans to offer financing for low-income households with initial low interest rates).

It plans to offer serviced lots (with a minimum size of 3,000 square feet) beginning in 1990 at a cost of about EC\$2 per square foot. Households will then face the cost of building their housing unit (which must meet standards and receive

DCA approval). Purchasers must also begin building within two to five years of buying the lot and, to discourage speculation, cannot resell the lot except back to the UDC for an initial period of about five years. The UDC estimates a minimum housing unit will cost EC\$30,000 using "self-help" techniques of construction and EC\$60,000 if built by a construction firm.

At those costs, however, these units will be extremely difficult for low-income households to afford. Even the lowest cost package will require monthly mortgage payments of EC\$410 under current mortgage terms (15 year fixed rate mortgages at 11 percent interest)—over 40 percent of monthly income.

Housing Finance

Housing finance in St. Lucia is available both through public and private sector institutions. Public sector institutions include banks wholly or partially owned by the GOSL, such as the St. Lucia Development Bank (SLDB), the St. Lucia Mortgage and Finance Bank (SMFC), and the Rodney Bay Mortgage and Finance Company, which lend both for subdivision development and land and housing purchase. The National Insurance Scheme (NIS) acts as a wholesaler of funds to these banks. In 1988, these three banks disbursed a total of EC\$6.3 million for land and housing.

Private sector finance is available from commercial banks, insurance companies, Barclay's Finance Corporation of the Leeward and Windward Islands (BARFINCOR), and credit unions. While all of these institutions provide conventional mortgage credit, some commercial banks and credit unions will also provide small loans for property purchase or home improvement. These loans are often extended based on the borrower's credit history and employment status, rather than being secured by the property.

Mortgages offered are typically of relatively short duration (15 years being the norm) and with fixed interest rates (although some adjustable-rate mortgages are now being offered). The lending institutions are generally liquid, with a large pool of resources available for lending from savings and NIS contributions.

EFFECTS ON THE ENVIRONMENT BY INCREASED URBAN GROWTH

Land Use and Land Management Issues

Public Space and Coastal Public Recreation. Continued urbanization of beach lands will have major long-term consequences for the preservation of open spaces as parks and for public beach recreation. It is assumed that further development of Vigie Beach will be prohibited and that it will remain in full public usage under the management of the Parks and Beaches Commission. Incumbrances to public use of other recreational beaches in the CGI corridor could arise unless land use and building setback policies dictate otherwise. Land ownership and land values could present difficulties in preserving open spaces for recreational and aesthetic reasons, which will be paramount as the CGI corridor experiences progressively higher settlement density.

Coastal Development and Sea Level Rise. Impending sea level rise from thermal warming of oceans could have significant environmental consequences for coastal areas. Water levels should be gauged and monitoring should commence immediately to allow accurate prediction of future levels and to provide the basis for future sea defense. The slightest rise in sea level could be disastrous for Dennery, whose urban centre is already extremely vulnerable to storms and hurricanes, because it is built between the edge of a swamp and the berm of a beach that runs its entire length.

Waterfront developments at Rodney Bay and Gros Islet could also be at risk if beaches erode and move landward in response to higher water levels. Complications for developments in the low-lying area seaward of the Castries-Gros Islet highway could also emerge in the next 20 or so years from the likely rise in the water table and/or the submersion of such areas.

Prime Agricultural Lands. Building on prime agricultural land should not be a major issue (most of the areas surrounding Castries-Gros Islet and Vieux Fort are mainly scrub forest and only marginally cultivable), except if this occurs in the Cul de Sac valley, which is currently under cultivation. Any agricultural land used for urban expansion in Dennery would not be critical given the fairly large agricultural acreage available in the rest of the administrative district. It is conceivable that development could occur on marginal lands now used for agriculture in all urban areas, but this would not be of major environmental consequence.

Traffic Circulation. Traffic circulation and congestion problems in Castries could get much worse unless measures are taken to expedite free vehicular movement across town. A suitable by-pass to move traffic from south of Castries going to northern destinations and visa versa is needed, particularly in light of plans for upgrading and further development of the southern Castries waterfront and the Vigie airport.

Urban Infrastructure Deficiencies

Water Supply. From an environmental point of view, potable water issues are more related to watershed management than to urban development. Reduced stream flow and sedimentation are effects of deforestation and both affect supply to consumers; the former during the dry season and the latter in wetter months due to the need for extra filtration treatment. Probable contamination of water supply from the use of agro-chemicals on private lands above intakes should be investigated as a potential health risk.

Water supply problems of the CGI area related to level of production, treatment, and distribution capacity should be largely resolved at the completion of the Roseau Valley project. Demand/supply problems could affect Soufriere in the immediate future, mainly due to tourism development. Increased demand from proposed tourism and food processing developments in the Dennery area could be met without major new investment. Similarly, there is adequate supply in place to meet future needs in Vieux Fort.

Sewerage Infrastructure. Waste management is far from satisfactory in all urban areas and the potential risks to the health of residents and visitors suggest the need for urgent solutions. Archer (1985) claims that more than half of the homes of Gros Islet Village have no excreta disposal facilities and pollution of adjacent lands and the beach with faecal matter occurs. Ward and Singh (1987) state that levels of total coliform, faecal coliform, and faecal streptococci (bacteria) in Castries Harbour exceeded selected international standards, and it should thus be "considered unsuitable for the moderate degree of recreational activity it currently supports."

Human waste disposal in Dennery is problematic because of bedrock conditions on slopes and adverse soil conditions in low-lying flood prone areas. About 570 of 720 residents of a very congested area called Coin de Lance in Soufriere use a public latrine located over the sea or buckets that are emptied into the sea (Califf, 1985). Grey water discharged untreated into the streets or other surface drains in Soufriere and Dennery find its way to their respective bays, where bathing occurs daily.

In a study of sewage disposal problems in the Eastern Caribbean, Archer found a relatively higher incidence of water/sewage related communicable diseases, such as typhoid, gastro-enteritis and viral hepatitis in St. Lucia and other Windward Islands and linked it to sewage and excreta disposal conditions similar to those found in Coin de Lance, Soufriere, Dennery, and Gros Islet Village.

In addition to the effects on human health, urban source run-off can cause considerable harm to marine organisms and also degrade the aesthetic quality of bathing waters. Castries Harbour may contain no critical ecological resources, but Shim (1987) found species diversity in the inner harbour close to pollution discharge points to be lower than the outer harbour. Fairly well-developed coral reefs used for diving exist in areas north and south of Soufriere Bay. These areas also support important coastal fisheries. Given the influence of coastal currents, significant increase in waste loads from further development would be detrimental to these resources. The solution calls for appropriate municipal sewerage disposal and treatment systems to handle bacterial wastes from a variety of sources and where possible industrial wastes are generated in urban areas.

Solid Waste. Management of urban solid waste is also not very efficient. Responsibility for collection, disposal, and landfill/dump site management is that of local district or municipal authorities, such as the Castries and Soufriere City Councils. Regulatory oversight in accordance with applicable public health laws is done by the Environmental Health Branch, Ministry of Health.

For years the Choc dump, which received most of the waste from the CGI corridor, created a visual nuisance to residents and tourist alike until it was screened off and eventually closed. Due to its proximity to the Choc river and the sea, the dump was a suspected source of bacterial and chemical pollution of the bay through run-off and leaching. Until fairly recently, the official Soufriere dump was a cliff at the northern part of Soufriere Bay. It was visually offensive and a threat to adjacent coral reefs.

In Dennery an unmanaged dump was observed at the edge of a swamp, and major littering of the beach, river and ravine banks and various sections of the residential community occurs. It is reported, but not confirmed, that the landfill sites selected to replace the Choc and Soufriere dumps are only temporary solutions; the former for ecological reasons and the latter because of distance from Soufriere. Finding suitable landfill sites to accommodate the growing volume of urban wastes is a major issue for small developing countries. It may be advisable for St. Lucia to consider recycling relevant waste material and incineration of the remainder as an option to landfilling.

Effects of Increased Squatter Settlements

Squatter settlements in St. Lucia are characterized by overcrowding and may often be vulnerable to flooding (Faux-a-Chaud, Castries) and storm surge (Coin de Lance, Soufriere). For urban areas, the primary environmental concern relates to difficulties of managing excreta wastes and the generally unsanitary conditions of overcrowded settlements. In the heavily congested Coin de Lance area of Soufriere persons bathe in water adjacent to a public latrine built over the sea and are therefore vulnerable to excreta-related water borne diseases. Poorly handled garbage may also trigger health problems due to increases in rodent and fly populations.

Squatter settlements may also contribute to the overall impact of urban wastes on coastal water quality through pollution. Eutrophication stress to coral reefs, for example, can result from nutrient overloading under such conditions. It is however, difficult to isolate the impacts derived from squatter settlements from other urban sources.

DEVELOPMENT ISSUES AND POLICY IMPLICATIONS

Sectoral Issues

Agriculture. The uncertainty about the future of the banana export market implies actions need to be taken to soften the blow should the U.K. act to reduce the preferences that the industry currently enjoys. Given the scale of the industry and its major role in St. Lucia's export earnings, a sudden end to the preferential U.K. exports in 1992 would be a tremendous shock to the island's economy. Even the phasing out of the preference over time (say, ten years), which seems the most likely outcome, will place large strains on the economy as it attempts to adjust and find other means to earn foreign exchange.

There is probably some capacity within the banana industry for higher quality production and increased productivity that would allow part of the industry to remain competitive with the dollar producers of Central and South America. Elsewhere within the agricultural sector, the GOSL will be required to continue its efforts to promote production of other export crops. However, the markets for these crops will be much less certain, and will require more intensive marketing efforts than has been required to date in the banana industry.

Manufacturing. The key issue facing St. Lucia is whether it will be able to develop a competitive manufacturing sector with sufficient depth to reduce its reliance on assembly/export operations so as to be less reliant on its low wages as its main competitive edge. The NDC has already shifted its focus away from developing the Vieux Fort area (which was mainly targeted to these types of operations) and looking to more stable industries, such as food processing for regional markets and data entry/processing. However, continued growth will be reliant on wages remaining competitive to give local manufacturers time to develop and to continue to provide wage employment for the growing labor force.

The evolution of a more diversified and deeper sector is hindered by the NDC's concentration on developing only large-scale industrial space. This fosters a sectoral structure that is highly segmented between large concerns (mainly foreign-owned) and small, local manufacturers. The Industrial Small Business Association (ISBA) states that most small manufacturers are forced to operate in residential areas for lack of small-scale industrial space. This lack of space suitable for small- to medium-sized firms will become more of a constraint as entrepreneurs with experience gained from the existing manufacturing operations set up their own firms and attempt to expand.

The ISBA indicates that opportunities are already being forgone—small firms find it difficult to expand from 5 workers to, say, 20 to 50 workers while apparel contracts go unfulfilled because of lack of capacity. Facilitating this type of growth, either through increased development of small-scale space or linking small manufacturers with large-scale operations, will be key if the manufacturing sector is to gain more depth and become less reliant on foreign-owned, footloose assembly operations.

Tourism. Tourism will play an important role in the future development of the St. Lucian economy. However, constraints are already emerging that be addressed if the sector is to continue its growth. The industry and the GOSL have recognized that traditional beachfront property available for development is running out on the west coast. Efforts now being made to develop an island-wide tourism industry which takes advantage of St. Lucia's ecological diversity and attractiveness to the so-called "green" tourist need to be continued. A side benefit of such a development strategy is that it raises the awareness of the industry and the population about the vital role of the environment in the country's economic success. Already, under pressure from the tourism industry, increased efforts are being made by the GOSL to keep beaches and other public areas cleaner and safer through the use of litter wardens.

Future expansion of the tourism is bound to place a heavier load on existing infrastructure that already shows signs of being strained. However, in both the established tourism zone of the CGI corridor and newly-developing areas of the west coast near Soufriere, tourism development has outpaced the provision of infrastructure. Thus, in the northwest, traffic clogs the roads leading to and from Castries and existing sewerage treatment systems are overwhelmed. New hotels are planned or under construction in Soufriere, yet there will be no quality road link between the town and Castries for perhaps another five years and the road from Vieux Fort shows signs of marked deterioration.

The expansion of tourism into the Soufriere area may also provide the needed push for the development of Vieux Fort which the NDC's industrial estates have been unable to spark. The lack of a good road connection between Castries and Soufriere means Vieux Fort is well-placed to act as the supply point (taking advantage of the airport and upgraded port facilities) for the new tourism facilities being developed near the Pitons. The increased employment from the new hotels will also raise cash incomes in the area and increase the demand for consumer goods and services; this also will provide an opportunity for Vieux Fort to develop into a regional center for the southern half of the island.

Urban Development Issues

Urban Infrastructure. The main infrastructure providers, WASA and LUCELEC, seem well-placed to keep up with the potential growth of the manufacturing and tourism sectors. Both utilities have recently received rate increases and are covering both their operations and maintenance costs and their debt service.

Although WASA apparently will have resolved its long-term water supply problems with the construction of the Roseau Dam, it still faces two serious problems. First, the current pace of encroachment on the watershed in the national forest presents a potentially serious problem for the island's water supply. Squatters and landless farmers are moving higher up mountain slopes (pushed by increased cultivation of bananas and other cash crops). Without tenure, these farmers have little interest in preservation of the land and simply move on to another plot when the soil has been exhausted or eroded out of use. In addition, banana cultivation utilizes fertilizers and chemicals that may contaminate the water supply if these squatters move into areas above the catchment intakes in the watershed. Existing mechanisms of collaboration between WASA and the Forestry Division, which is responsible for watershed management, may not be sufficient to ensure security of urban water supply in the long term. Water resources management needs an institutional fillip to make the important linkage between conservation of the resources that augment the water production cycle and water consumption.

Second, the need for improved sewerage collection and treatment systems is recognized by WASA, but the financial scale of the investment is so large as to seemingly pre-empt any attempt to deal with the problem in a comprehensive manner. Instead, incremental improvements are being proposed. The risk that untreated sewage and industrial wastes and garbage pose to human and general environmental health and the constraints they present to the long-term growth of tourism require a stronger commitment and wider exploration of alternatives.

Provision of adequate urban waste infrastructure should be given strategic consideration in national development policy, in which case its financing should be given priority status in capital expenditure. The Rodney Bay/Gros Islet municipal system should therefore be viewed as the first in a number of waste infrastructure projects that should be implemented within the next ten years. Expansion of the Castries system and the construction of systems in Vieux Fort, Soufriere, and Dennery should follow in due course.

Land Use Management. In the context of urban land use, the GOSL has taken the commendable step to commission a Master Plan for the CGI corridor that has been completed in draft. However, the plan was apparently developed without wide consultation and the draft has been limited in circulation within the GOSL. In addition, the plan takes a narrow physical planning approach to land development without investigating the broader economic development issues which underlie urbanization. Future planning efforts should focus on "structure" plans rather than detailed master plans: outlining how urban growth is expected to be driven (i.e., what will be the leading economic sectors) and how this growth is to be accommodated by indicating future paths of trunk infrastructure and general land use as it relates to the economic development of the urban area.

This approach would allow the GOSL to implement its current land policies supporting tourism and manufacturing within a framework that explicitly recognized their leading role in the economy, but which also underlined the need to provide supporting infrastructure and adequate land for housing and to protect important agricultural lands.

From an environmental point of view, land use and economic development plans for other urban areas are needed to provide a basis for the protection of coastal resources and environmentally sensitive areas. Key policy decisions requiring broad based public/private sector consultations should focus on policies that:

- Govern shoreline development, integral to which are guidelines and standards for protection and maintenance of recreational beaches and for the security of property due to the probable effects of sea level rise;
- Buffer outstanding landscapes (such as the Pitons), sensitive areas (sea coasts and reefs), and environmental processes (rivers and wetlands), from the impacts of urbanization;
- Preserve and develop a system of open space and urban parks for public recreation and to enhance urban aesthetics and amenity through greenery;
- Relieve deplorable squatter conditions through regularization, other measures to upgrade the settlements, or relocation.

The Parks and Beaches Commission would be expected to play major policy advocacy and implementation roles in achieving the objectives for beach protection, open space, and recreation. The St. Lucia National Trust, through ongoing efforts in the planning of a parks and protected areas system, would be concerned with protecting key components of the system from urban expansion. Private land owners would be expected to respond favorably to: (1) shoreline building setback requirements; and (2) the need to acquire lands for open space/urban parks and for scenic landscape protection.

Coastal Zone Management (CZM). The major environmental effects of urban development are felt in the coastal zone. Resources of the coastal zone

provide the basis for two major economic sectors (i.e., tourism and fishing). Urban impacts could present major constraints to further tourism growth and sustainable development of coastal fisheries. Mitigating such impacts requires the consolidation and further improvement of coastal resource management efforts and a search for institutional mechanisms to integrate resource exploitation and protection. Policy initiatives should include:

- Expand, implement, and manage the system of marine reserves and fishing priority areas created through the Fisheries Act No. 10 of 1987 to protect fishing resources against conflicting scuba diving and yachting uses;
- Expand ongoing resource monitoring activities (e.g. coral reefs, water quality) to other areas where impacts from urban development are suspected. Also introduce a program for monitoring the effects of sea level rise, including shoreline attrition.
- Upgrade the institutional capacity for water quality management by (1) first seeking public/private sector understanding of standards for effluent discharge and various water quality parameters; and (2) reinforcing regulatory mechanisms for monitoring and enforcement.

An institutional coordinating mechanism to facilitate inter-agency cooperation and public/private sector consultation in the management of coastal zone resources may be necessary.

Housing. The formal housing delivery system is not addressing the needs of the lowest-income households in St. Lucia. The UDC, the main public sector producer, has only recently been revitalized and intends to focus on the production of serviced sites. Even so, affordability problems remain, as purchasers of the serviced sites are required to build housing that has been approved by the development control authorities. As a result, the "minimum" package has a total cost of EC\$36,000—barely affordable to the households with annual incomes of EC\$12,000 and just qualify for "low-income" status. Obtaining financing could also be difficult, as the sales contract with the UDC stipulates that the land can only be sold back to the UDC within the first five years after purchase of the lot.

As a result, households that are unable to obtain housing through the formal sector turn to squatting (almost exclusively on public land) to satisfy their need for shelter. In this manner, the households are able to make the provision of housing affordable (by building in an incremental fashion). However, the unplanned nature of these developments implies substantially higher costs to the country, both in terms of sub-optimal use for many of the lands occupied by squatters and the cost for regularizing the settlement and providing infrastructure at a later date.

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