

HUMAN SETTLEMENT COUNTRY PROFILE

BARBADOS

Decision-Making

Programmes and Projects

- A. Providing Adequate Shelter for All
- B. Improving Human Settlement Management
- C. Promoting Sustainable Land-Use Planning and Management
- D. Promoting the Integrated Provision of Environmental Infrastructure: water, sanitation, drainage and solid waste management
- E. Promoting Sustainable Energy and Transport Systems in Human Settlements
- F. Promoting Human Settlement Planning and Management in Disaster-Prone Areas
- G. Promoting Sustainable Construction Activities
- H. Promoting Human Resource Development and Capacity-Building for Human Settlement Development

Status

Capacity-Building, Education, Training and Awareness-Raising

Information

Research and Technologies

Financing

Cooperation

Decision-Making: *Human settlements:* The Ministry of Housing, Lands and the Environment along with the Town and Country Development Planning Office are responsible for all new settlements. Home ownership is a fundamental goal of government's policy and in this regard eligible tenants of Government rental units have the option to purchase their residences. Financial packages are available to families in the various income groups to assist in the purchase, repair or improvement of their homes. In 1997, the Urban and Rural Development Commission Acts provided for improvements in social amenities, slum clearance and redevelopment and for developmental funding for financially disadvantaged groups. Generally clean water, sanitation service, free education and health care are available to all.

Poverty: The National Assistance Act (Cap. 48) of 1969 and the National Insurance and Social Security Act (Cap. 47) are the major longstanding legislative instruments, which specifically seek to redress problems arising from poverty. These acts have not been reviewed after Rio. In 1997, the Urban and Rural Development Commission Acts provided for improvements in social amenities, slum clearance and redevelopment and for developmental funding for financially disadvantaged groups. The main gap in the legislation is the lack of national policy defining poverty. Some agencies have working definitions but none of these attempts to quantify the number of poor.

New initiatives were introduced between 1998 and 2000, for empowerment of the poor through economic, educational and vocational programmes geared towards generating and sustaining self-sufficiency – for example the Poverty Alleviation Bureau, the Poverty Alleviation Fund, which targets the most vulnerable groups (those normally excluded from access to traditional funding) and Relief 2000, a social work intervention programme focusing also on training for sustained self-sufficiency. Communities and NGOs are empowered to address poverty issues through the democratic process, freedom of speech and their representation on committees and boards. Generally clean water, sanitation service, free education and health care are available to all. Subsidized school lunches are provided at the primary school level; and a subsidized textbook loan scheme is available at the secondary school level.

Population: The Ministry of Health and the Statistical Services Department address demographic issues. The Government Ministries are engaged in integrated policy coordination in the field of population, environment and development policies. The following Ministries and departments are involved: Finance, Economic Development, Health, Housing, Lands and the Environment, Labor and Social Security, Community Development, Education, Youth Affairs and Sports and the Division of Women's Affairs. Steps have been taken to involve women in decision-making at all levels of population and sustainable development strategies, policies, projects and programmes. The Government has been involved in supporting NGO activities related to population, environment and development. Among the NGOs, which have received support, are the Barbados Family Planning Association, Barbados National Trust, Caribbean Conservation Association, Barbados Museum and Historical Society and National Council on Ageing.

Land use planning: The Town and Country Development Planning Office (TCDPO) are responsible for the development and implementation of national policy on land use and physical planning in Barbados. The TCDPO seeks to ensure compliance with policy for land use and physical development through the development control process. Applications for new developments, as well as changes in existing developments, are submitted to the TCDPO. These applications are evaluated for compliance or non-compliance with national policies and standards, and if deemed necessary are subject to Environmental Impact Assessments (EIA) through the oversight of an EIA Panel. The TCDPO has strong powers of regulation and enforcement, with which to ensure compliance with the legislation and policies of the Physical Development Plan (PDP). The main policy document for land use planning is the PDP, which is a document that is grounded in law. It contains specific provisions for physical development, the use of land and natural resources, including heritage resources, and the Barbados National Park. The 1998-revised PDP has classified island into hierarchical sections. These sections for land use are: National

Centre (Bridgetown) – which is intended to serve as the primary focus for major office, government, and shopping functions in Barbados; Regional Centres (Speightstown, Holetown, Oistins, Six Cross Roads) – which are intended to evolve as regionally important activity areas with a wide mix of uses, including a strong residential component; Suburban Centres (Warrens and Wildey) – which are located on main highways and serve as important employment and shopping areas. The suburban centres are developed in a more automobile – oriented form than National or Regional Centres (Planning Department is in the process of preparing a detailed plan for Warrens Area) – There are plans to extend Six Cross Roads Area – taking 100 acres of agricultural land for the extension of this centre; Local Centres (Eagle Hall, Worthing, Hastings and St. Martins) – which provide shopping, business and professional services to local communities and neighbourhoods, and may also accommodate more intensive residential developments and Mixed use Corridors (Collymore Rock, South Coast, Highway 7, Baystreet, Carlisle bay, Fontabelle, Coleridge Street, White Park, Baxter’s Road, Roebuck Street) – which are linear areas of intensive mixed use development, oriented along a major street or highway, and are intended to accommodate the same range of uses as Centres. Mixed Use Corridors shall generally have a strong pedestrian and transit orientation, although each designated corridor has its own unique characteristics and development policies. A detailed land use policy was prepared for the Central Bridgetown urban corridor. There are also plans to extend the urban corridor to utilise more of the area formerly under agricultural use.

Agriculture: The Ministry of Agriculture and Rural Development (MARD) is responsible for this sector. A National Consultation on Agriculture was convened in 1998. The outputs from this forum form part of the recommendations of the Consultants hired to analyse the agricultural sector in Barbados and identify the roles and functions of the MARD and its para-statal organisations, particularly, the Barbados Agricultural Development and Marketing Corporation. That consultancy is completed and the report was submitted in 2000. Government is currently assessing the recommendations.

The following legislation is relevant: Cap. 347 Factories Act, 1984; Cap 355 Registered Sugar Factories Smoke Control, 1962; Cap 395 Pesticides Control, 1974; Cap 396 Soil Conservation, 1959; Cap 397 Trees (Preservation), 1981; Cap. 398 Wild Birds Protection, 1907 (to be amended); Cap. 390 Cultivation of Trees, 1951; Cap. 391 Fisheries Regulation, 1904 (amended 1993); Cap. 252 Agricultural Aid; Cap. 253 Animals (Diseases and Importation); Cap. 260 Dairy Industry (Regulation and Control); Cap. 261 Fertilizers and Feeding Stuffs; Cap. 263 Irrigation; Cap. 264 Love Vine and Wild Native Cotton (Eradication); Cap. 266 Plant Pest and Diseases (Importation). Apart from Cap. 391, legislation has not been amended recently. While there are no expressed provisions in law to prohibit the transfer of productive arable land, one of the objectives of the national land use policy is to ensure the availability of a prescribed area of arable agricultural land. This policy is enforced by the Town and Country Development Planning Office, which is responsible for granting permission for change of use, for example from agricultural to housing, industrial or other uses. In support of the use of solar technology island wide, Government provides a tax rebate for the purchase and installation of solar water heaters.

Barbados has not established a national strategy or policy on sustainable agriculture and rural development (SARD), but has taken a number of initiatives and implemented programmes, which address sustainable agriculture and rural development. For example, an Area Development Plan (ADP) has been developed for Barbados that stipulates appropriate land use options for various parts of the island. It includes specifically agricultural development areas, rural development areas, soil classification, data base development, storage and management, policy reforms and rural planning policies. It is envisaged that the recommendations of the Area Development Plan will be integrated into the overarching document, which guides national planning and development, the Physical Development Plan. The issue of pesticides and the safe use thereof is currently being explored in some detail. The Pesticide Control Board is currently responsible for monitoring and managing the importation of pesticides used in agriculture. It has been recognised that the existing system needs to be upgraded in order to deal effectively with evolving issues

including: Increasing demand for pesticides, implications for human and environmental health, national requirements in accordance with Multilateral Environmental Agreements (MEA) such as Prior Informed Consent (PIC) and Persistent Organic Pollutants (POPS) and the Basel Convention. Collaboration is ongoing between the relevant agencies, including the Ministry of Agriculture and Rural Development, Pesticide Control Board and the MPE, towards finding a suitable and timely solution to these pressing issues.

National consultations, committee meetings, community group meetings as well as small and specific consultations convened by the Ministry of Agriculture and Rural Development are mechanisms which promote the integration of stakeholder concerns into the decision making process with regards to agricultural development. A Rural Development Commission has been established which has among its priorities, the funding of commercial enterprises in rural areas. This includes all types of self-employed businesses that may be ongoing or new initiatives. Government in the mid 1990's enacted special Development Areas legislation to establish certain enterprise zones within the rural areas to encourage investment and development. Women have been involved in addressing rural welfare. Women and Youth have been involved in food security issues, enhancing self-reliance of farmers, and in integrated pest management. Local communities, small farmers and landless people also participate in these activities. Farmers' organisations and other stakeholders are involved in the following: creating farm employment opportunities, collecting data and establishing databases, establishing land reclamation programmes for degraded land, and improving and implementing plant protection and animal health services. Local communities are involved in the establishment of national and local agricultural planning bodies and in drawing up land reclamation policies for degraded land.

Energy: The Energy Division, Ministry of Public Utilities is responsible for decision-making in this area. The national policy for energy in Barbados is geared toward: promoting energy conservation practices and the use of renewable energy technologies, where possible, and becoming self-sufficient in oil and gas production; plans to develop renewable sources of energy are focused on wind energy, solar photovoltaic, solar thermal, fuel cell and biogas/biomass. There are currently legislative proposals to deal with proper disposal of oil wastes, storage of products and remediation of vacated sites. Among the Major Groups, the following are regularly involved in energy management in Barbados: UWI Centre for Environmental Research Management and Environmental Studies; Barbados Light & Power Company Ltd; Caribbean Solar Energy Society (C.S.E.S.); Additionally, government solicits involvement of industry before implementing new proposals.

Transport: The Ministry of Public Works and Transport and the Interim Transport Authority, soon to become the Public Transport Authority, are responsible for National Transport. The Ministry of Tourism and International Transport has the responsibility for International Transport. In the area of National Transport, the Government consults with its Social Partners, the Workers' Unions and representatives of the Public Transport organizations on Major issues. National Transport - Legislation, Regulations, Codes of Practice and Standards developed for transportation are contained within the Road Traffic Act and Regulations, Seat Belt legislation, Breathalyzer testing, Parking regulations etc. are now being incorporated as revisions to the Road Traffic Act and Regulations which would bring the Act more in line with international standards; a new public/private sector partnership has been formed to deal specifically with traffic management issues; all legislation and standards that exist are established by the Government and regulation to some extent is influenced by owners and operators while policy remains in the domain of the board of the Authority. Barbados is in the process of seeking to regularize the operations of all public service vehicles and devising a National Strategy for National Transport within the ambit of the Interim Transport Authority.

Programmes and Projects:

A. Providing Adequate Shelter for All: For the poor and the elderly, the Government provides an extensive welfare programme. For the elderly, assistance is provided for housing, transportation, home care and free utilities (water and utilities) as well as a non-contributory pension, assistance in kind, and food vouchers. The poor are provided with cash assistance, subsidized housing, legal aid, rents to private landlords and emergency relief for fire victims.

A Building Authority has devised a Building Code for implementation. Government is now in the process of reviewing the final report on the establishment of the Building Authority. This code should lead to improvements in the quality of the housing stock. The main benefits of the Code will be hurricane and fire resistance. The Town and Country Development Planning Office and the Coastal Zone Management Unit, using Geographical Information Systems, are also providing hazard mapping. This should result in the siting of houses. It is proposed that one of the main amendments to the Town Planning Act will be that any development outside the urban corridor, which necessitates a change of use application, should be subject to an Environmental Impact assessment (EIA) study. All homeowners within one hundred (100) metres of such development will be entitled to review the study and the developers will be responsible for holding town meetings.

B. Improving Human Settlement Management: Current programmes include: legislative measures which give eligible tenants the right to purchase their residential lots; joint public-private sector projects (for lower middle and low income housing) whereby Government provides the infrastructural services and markets the units; and the construction of public rental units for low income families and the development of serviced-sites for rent with the reserved right to purchase or option for immediate purchase. During the 1995/96 periods, Government embarked on two new housing programmes, the Urban Renewal Project and the Rural Development Programme, which are targeted to address the housing deficiencies of residents within these distinct geographic regions. Basically, the two programmes seek: to upgrade the infrastructural services and amenities; to enable homeowners to upgrade pit latrines to water closets; to acquire security of tenure to enter joint venture partnerships with private builders to construct in-fill housing; to restrict the encroachment of housing onto agricultural lands; and to conserve, preserve and sustain historical architectural and environmental areas. The pilot project phase of the Urban Renewal project was estimated to cost BDS\$1.2million.

The Housing Planning Unit has undertaken professional training for officers in the area of Urban Planning, which should serve to reinforce and integrate the housing component with the other related elements of shelter and settlements. Training in Project Management is a major thrust. Geographic Information Systems takes place within the Ministry of Housing, while integration and computerization are undertaken within the Town and Country Planning Department.

The Housing Planning Unit prepares and publishes quarterly reports on activity within the housing sector. This includes information on proposed housing, actual housing starts and completions, financing and relocations. The Unit also prepares the shelter Indicators under the Indicators Programme of HABITAT, while the Town and Country development Planning Office is responsible for preparing the settlements indicators

C. Promoting Sustainable Land-Use Planning and Management: The Environmental Management and Land Use Planning for Sustainable Development (EMLUP) project involved a comprehensive assessment of land use in Barbados including the use of GIS technology. Maps of land uses have been generated and the relevant information exists on digital databases. It is intended that the Lands and Surveys Departments will undertake on going monitoring and updating of these databases. Databases and inventories are updated regularly (usually every 3 to 5 years).

Plans to expand human settlements with respect to the impacts on farmland, landscape (open space), forest land, wetlands, and biological diversity in coastal areas, all of the factors are taken into consideration when planning applications for the expansion of human settlements are submitted to the TCDPO for approval. This kind of integrated review is essential in Barbados; not least of all because the resource of land space itself is limited. As such, the TCDPO office consults with other relevant government agencies and departments to obtain specialised advice to ensure that situations of conflict in land use do not occur and/or are resolved efficiently. Government's poverty eradication policy includes the provision of adequate low-income housing, which should be accommodated under the PDP. Government has established two commissions, the Urban Development Commission (UDC) and the Rural Development Commission (RDC). Both of these agencies facilitate the improvement in physical conditions of target populations in the urban and rural areas. The programmes are aimed at providing improved amenities such as roads, electricity, water, sanitary facilities, etc.

There is tremendous pressure from other sectors, especially tourism and housing, for the change of use of agricultural land to other uses. Law to consult with the Chief Agricultural Officer concerning specific applications for change of use of agricultural land mandates the Chief Town Planner. Government through an Integrated Rural Development Programme (under the management of the Barbados Agricultural Development and Marketing Corporation, BADMC) offers an irrigation service and infrastructural development to farmers at subsidised rates. In addition Government has recently introduced a "Land for the landless programme", which seeks to make unused, arable land in private or public ownership, available for lease or rent to eligible persons who may be desirous of farming, but have no land. Much of the unused public land is in the Scotland district. The ADP Study estimated that 1 271 ha. of plantation land and some 2 551 ha. of small holdings land are permanently idle or uncropped. The "Land for the landless programme" hopes to bring most of this land back into production. Government also has a comprehensive package of incentives, aimed at stimulating agricultural production. These incentives were enhanced and expanded upon in the 2001 budget, to include incentives aimed at promoting sustainable development. For example: rebates for retooling dairy farms and fish processing operations in order to bring them up to required Hazard Analysis and Critical Control Point (HACCP) and International Standards Organisation (ISO) standards; a technical assistance fund to facilitate organic production; and grant assistance for design and construction of bio digesters on livestock farms, to promote the recycling of waste water, gas and organic slurry, to mention a few.

A draft Agricultural Strategic Plan has been developed by the MARD which addresses issues of sustainable development, such as, programmes/projects to: ensure food security; review land tenure and agricultural land use policy; review international trade relations; improve agricultural production and farm productivity; minimize ecosystem risks; enhance self-reliance of farmers and create farm employment opportunities; collect data and establish databases; strengthen land use and resource planning; establish agricultural national and local level planning bodies; establish land reclamation programmes for degraded land; collect and study plants useful for increased food production; share benefits and results of Research & Development in plant breeding; improve and implement plant protection and animal health services; make integrated pest-management (IPM) practices available to farmers and to create IPM networks involving farmers, researchers and extension services; make available all necessary know-how and technology regarding soil fertility management; improve and increase the capacity to monitor export and import crop and livestock products for nutrient quality, pest and disease infestation and the level of chemical residues.

Barbados promotes public participation for land resources planning and management. Public awareness campaigns are conducted. Improvements are planned to strengthen systems and procedures for the supply of information to the public and interested parties. Institutional strengthening (e.g., training of staff) is occurring.

Research and Development programmes and Farming Systems Research are active work programmes of the Agronomy Unit. In respect of Plant Genetic Resource (PGR) development, significant progress has been made in improving Sea Island cotton lines. Early warning and monitoring of food supply and those factors affecting household demand for food is carried out through collaborative action between the Government Statistical Department, the National Nutrition Centre and the Agricultural Economic Planning Unit. A National Indicators Programme is currently being developed as part of Barbados' participation in the UN Indicators for Sustainable Development Testing Programme. The initial composite list of potential national indicators still needs to undergo refinement by the national committee mandated to address this issue. For the Agricultural Sector, production information is collected bi-monthly.

The PDP guides the type of developments that are allowable in different parts of the island. In 1996 the Environmental Management for Land Use Planning and Sustainable Development Project (EMLUP) in 1998 the project delivered a revised PDP and T&CP Act intended to integrate the concepts of sustainable development into every aspect of land use planning and development in Barbados. One of the major outcomes of the EMLUP project is the Environmental and Natural Resources Management Plan, which provides the framework and policies within which the islands environmental and natural resources could be protected, regulated, used and monitored. The Ministry of Housing, Lands and the Environment is now actively involved in carrying forward specific recommendations for the institutional changes necessary for implementation of the outcomes of EMLUP. The EMLUP project has made specific recommendations for institutional strengthening and restructuring within the Ministry of Housing, Lands and the Environment and the Town and Country Development Planning Office (as described above), with a view to improving co-ordination mechanisms for land and land resources management in Barbados.

The revised institutional structure, policies, regulations and legislative instruments allow for objections to planning applications to be considered in the approval process. Town Hall meetings and public consultations are convened with a view to extracting public opinions on land use proposals. The overriding objective is the achievement of sustainable national development including: conservation of environmental and natural resources; efficient use of resources; improved quality of life; inter- and intra-generational equity with regard to resource allocation; and full stakeholder participation in the development and implementation of national policies. The strategy/policy reflects an integrated approach addressing: rural development; viability of rural areas; environmental aspects (e.g. minimisation of negative environmental impacts of human-induced activities such as unsustainable agriculture practices on marginal lands, regulation of productive lands and urban land use zoning and enhancement of positive impacts on the environment through better land use and management practices); and social aspects. Best possible land use and sustainable management of land resources in Barbados is to be encouraged through the use of various market based instruments as proposed in the revised Physical Development Plan (1998) and Town and Country Planning Development Act (1998). Legislation and guidelines stipulated within these documents would be the dominant measures in use. Performance bonds have been recommended for the management of quarry sites and coral reefs.

Research and development in solar technology is ongoing at the University of the West Indies, Centre for Environmental Resources Management Studies (CERMES). Solar ovens and driers for food preservation have also been produced. The latter are used commercially while the ovens are still used for demonstrations only. Photovoltaic technology has been developed by CERMES and is currently in use at a number of sites. A demonstration project has been initiated at one secondary school for the use of photovoltaic power for the computer lab. It is expected that the pilot project will be expanded for the specific school, and eventually replicated by other schools. Another project currently awaiting funding, aims to use photovoltaic power to make ice at fish markets. A unit is already in operation at the new fish market at Skeetes Bay.

Data on biological diversity in Barbados were collected and catalogued by the recently completed National Biodiversity Strategy and Action Plan Project. Information on soil and land is available and is utilised by the Town and Country Planning Office in order to make sound decisions on an integrated approach and sustainable use of land resources. Some information is available in the form of Ordinance Survey Maps, which are available from the TCDPO. Data on soil and slope characteristics are available (Vernon and Carrol Study) however the data is very old and should be updated. The recent Agricultural Development Plan (1999) is intended to assist in providing more up-to-date data. Barbados is the only Small Island Developing State involved in the United Nations sustainable development indicators Testing Programme since 1997. In December Barbados hosted the third international workshop on UN Indicators of Sustainable Development and is in the process of finalising a national list of indicators. National Indicators for Human Settlement were developed for Habitat II, Istanbul 1996. These indicators are currently being reviewed for Habitat III. Information on integrated land management and sustainable use of land resources can be accessed from the TCDPO.

D. Promoting the Integrated Provision of Environmental Infrastructure: water, sanitation, drainage and solid waste management: See under Freshwater and Sanitation Profiles.

E. Promoting Sustainable Energy and Transport Systems in Human Settlements: Major Programmes in the field of energy and sustainable development include: Wind Farm Study; CERMES Solar Drying Project – University of the West Indies (UWI); Solar Photovoltaic Project for Cooling; Development of Renewable Energy Park; Demand Side Management Programme; Energy Awareness Programmes in Schools and for the general public. Major projects and activities in this area include the following: Schools' Solar Stills; Schools' Renewable Energy Projects; CERMES - Solar Drying Project - (UWI); Solar Photovoltaic Project for Cooling Development of Renewable Energy Project; Oil and Gas Onshore exploration and development and Offshore Oil and Gas development.

Issues related to the development, transfer and use of environmentally sound technologies in this programme area include: Cost to the consumer of renewable energy; Policy initiatives not in place; Education of persons in the field; Phase out of leaded gasoline. Some technologies have a very high capital cost. e.g. solar photovoltaic, which makes the development less feasible. Solar thermal technologies (Solar heating) results in a shorter payback to the consumer. The cost of energy needs would not be reduced significantly. Decisions related to the choice of technologies are based on the following: the environment benefits; the cost of the technology; sustainability of technology; the benefit of technology to the less advantaged members of society; the number of persons who will benefit from the technology. The Renewable Energy Centre of UWI is also involved in research and technologies by harnessing the expertise of our scientists in an applied manner.

The Renewable Energy Centre will be set up to facilitate further development in these areas, and to overcome barriers to technology implementation, the Government proposes to establish a Centre for Renewable Energy. The Centre will offer international scientists and technologists the opportunity to do research into renewable energy, and will also address institutional and policy issues which have played a major part in preventing the implementation of renewable energy projects.

The University of the West Indies has been in the forefront of research into renewable energy through their CERMES programme; however the proposed centre will continue and expand the work on renewables. The centre will engage in training, research, development and demonstration in the area of Renewable Energy, as well as Energy Conservation. The centre will also include working exhibits of renewable energy technologies. An officer will also be responsible for organising tours of the facility and short courses for school children and the general public. It is expected that this institution will also play a role in developing capacity in the region and eventually become a node in the international renewable energy network. The projects already in existence will be sustained under the umbrella of the centre.

Government is willing to provide some initial financing to set up the centre and to procure the necessary equipment; but there is a need of further funding. Institutional arrangements are still to be finalised but it is expected that the centre will be established as an extension of the currently existing UWI (CERMES) solar project. The centre will enlist the expertise of qualified professionals in all of the Renewable Energy specialty areas.

National information available to assist both decision-makers and planners working in sustainable development and energy resources is being provided through the development of a Reference Energy System for Governments (energy models) by the Caribbean Energy Information System (CEIS). The data captured relates to petroleum production, supply, import, transformation, consumption, economic/financial, social/demographic and technical activities. The information is made available through publications. There is no website at the moment. With respect to indicators, the Percentage of Renewable Energy of total energy used and Energy produced per GDP is being calculated as data are obtained. Through the Steering Committee so designated under the NCSD, significant work is being undertaken to develop Sustainable Development Indicators. Under the umbrella of the National Indicators Programme (NIP), indicators for energy resources and their sustainable management will be addressed.

Capacity-Building: Energy: Government training and attendance at many international seminars and courses are currently being utilized. Government is currently setting up a Renewable Energy Center, which one of its mandates is to provide training in wide areas of renewable energy. However, media such as workshops and national consultations serve to educate both policy makers and the general public. Energy Audit Training is provided to assist planners and industries in managing sustainable development and energy. Campaigns and other efforts to raise awareness of issues related to sustainable development and energy include Outreach Programmes and Schools Programmes: Quiz Competition, Poster Competition, Schools' Lecture Series Development of jingle, Mascot and Posters with tips on energy conservation.

Capacity-Building: Transportation: The Bridgetown Roads and Safety Improvement project included two technical assistance components to address the need for sustainable development in the transport sector. These were Traffic Management and Control and National Traffic Education. As a result various proposals have been implemented and others continue to be submitted to the Planning and Priorities Committee for long-term management, control and education in the sector.

Technology has not usually been a problem in the area of transportation.

National information available to assist both decision-makers and planners working in transportation includes: For National Transport - Revenue from the licensing of vehicles by category, through the Licensing Authority; Fuel prices by category from the Energy Division; Annual Economic report and budget Speech, from the Ministry of Finance and Economic Affairs; Economic reports, from the Central Bank of Barbados; Accident statistics from the Police Department; the road inventory and condition surveys, and traffic volume data from the Ministry of Public Works and Transport. For International Transport- this Ministry produces origin and destinations statistics as well as airport flow statistics; the Air Transport Licensing Authority undertakes load factor calculations; the Barbados Port Authority has an extensive statistical programme in relation to its activities. Most of the information is in report form and available from the respective agencies. There is no web site address. All statistics are available in hard copy only and some are restricted in their circulation.

F. Promoting Human Settlement Planning and Management in Disaster-Prone Areas: The Emergency Drought Management Plan: A drought and emergency Plan was approved by the Planning and Priorities Committee in 1997. This is a plan of action with respect to drought. It identifies parameters that would be used to monitor, forecast and predict the impact of drought. Such parameters include - rainfall

measurements, groundwater measurements, and salinity and weather data from the Meteorological Office as well as reservoir levels. As a result of this, the BWA has now started looking at establishing a rainfall-gauging network to supplement the existing network so that estimation could be made on the impact and variation of rainfall.

G. Promoting Sustainable Construction Activities: See under Providing Adequate Shelter for All.

H. Promoting Human Resource Development and Capacity-Building for Human Settlement Development: See under Programmes and Projects.

Status: *Human settlement*: The indicators developed by the United Nations to assess a nation's housing conditions, when applied to Barbados, invariably lead to the conclusions that Barbadians are well housed. A range of housing programmes implemented or facilitated by Government, with notable contribution from the private sector, should have attributed to the significant national growth in housing standards over the years. Yet the various initiatives undertaken have not alleviated the existence of poor housing conditions or eliminated the absence or need to upgrade infrastructure and utility services within existing communities. Furthermore, as new construction falls behind required production levels by some 20%, the need to develop programmes to embrace a wider scale of beneficiaries is necessary. Issues which still present a challenge to the upgrading of substandard housing conditions include: the inability of the poor to afford housing and its related services; the insecurity of tenure for land renters who are not eligible to purchase their lots; the existence of vacant serviced lots which are too high-priced for low income earners; addressing the needs of special groups e.g. a growing population of elderly persons; and the homeless, disabled.

Population: In Barbados, the main issues include the lack of a clear defined national population policy, the need to sustain current levels of the population growth, and the need to have more complete, accurate and timely demographic and socio-economic data to inform research and policy decision-making. The demographic transition occurring in Barbados underscores the need for a policy on ageing, poverty eradication, secure and safe livelihoods and improvements in social services and economic development to enhance the achievement of sustainable development. The National Commission on Sustainable Development is looking at these issues as it prepares itself for publishing the first National Sustainable Development Policy for Barbados.

Energy: The Ministry of International Trade is presently undertaking with Barbados Investment Development Corporation and BNSI, to promote ISO 9000 and 14000. Additionally, the Ministry of Housing, Lands and the Environment will seek to promote more sustainable practices in manufacturing and industry. Further, a selected group of hotels are to be part of a pilot project to promote Environmental Management Systems in the hotel sector. Many activities have been undertaken to change unsustainable consumption and production patterns such as energy efficiency awareness, waste management public awareness and water conservation activities and public awareness and education campaigns. However it is difficult to gauge the impact of such activities on public behaviour at this time.

The resources in the area of solar and wind are plentiful and once the technology is available they could meet a large part of the energy needs. There is a high potential for increase in the areas of wind energy, solar energy and bio-fuels. However, all the technology needed is not presently available. The proportion of commercial energy needs that is met from imports: Jan-Nov. 1998 - Total imports (Refined Products) - 1,921,611 (barrels); Jan-Nov. 1998 - Total Crude Production - 494,981 (barrels). Priority constraints to implementing effective programmes to address the issues raised in this programmes area are programmes involving oil exploration to increase oil and gas reserves to meet the country's energy needs beyond the year 2000.

Land use planning: The main issues of concern relating to land use in Barbados have to do with the following: Competing demand from numerous sectors – residential, tourism, agricultural and industrial; The need to restrict activities/land use above protected underground water reserves; Potential for contamination of ground water due to the pervious nature of coral rock; Management of land resources to meet aspirations of citizens and to provide sustainable economic development for current and future generations. Very little research has been dedicated to the anticipated impacts of El Nino Southern Oscillation (ENSO) on Barbados' land resources. However, preliminary investigations suggest that the island is likely to be subject to increased intensities and total quantities of rainfall. These views have not been reflected in integrated land management planning. As a small island state, land, as well as other natural and environmental resources in Barbados, is in very limited supply. There are many competing demands for the use of land and other resources. Full cost valuations of the use of natural and environmental resources including land have not been developed or used to any great extent for land use planning and policy development. Core concepts and principles of sustainable development are still to be integrated into land use planning and policy development. There exist implications of "smallness" on the island's vulnerability to natural and man-made disasters. Coastal Zone Management issues are magnified due to the smallness of the island and the pressure exerted on the limited natural resources.

Thus, rural settlement areas such as Boscobelle (traditional village setting) will become subdivided areas to consolidate rural settlement for small farmers. The Area Development Plan will form part of the PDP (section 3.13). This detailed study reviewed the use of agricultural land between 1976 and 1998. The census was conducted between 1997 and 1999 to gather the necessary information. The findings were that originally an approximate figure of 5764 hectares was available for use of which approximately 14000 acres (15%) of agricultural land was lost to urban development. Out of these areas approved only 28% of those were actually used for agriculture and the others remained vacant. Agricultural land is classified under categories 1, 2, 3 and 4 of the study. The study indicated that approximately 43, 176 hectares (of land) were available for use; for which 22000 hectares and 19200 hectares are classified as class 1, 2 and a further 7200 hectares are in class 3 and 5600 hectares are classified as 4, and 5 (only suited for trees and pastures). The agricultural study also recommends ways to better utilise the land with respect to land use policy. This Area Development Plan is an agricultural policy prepared to be incorporated into the PDP.

Agriculture: Agricultural development policy has focused heavily on initiatives to increase local productions of agricultural commodities. Critical success factors include: expansion of the agricultural incentive programme; the establishment of the Agricultural Development Fund; and establishment of the "Land for the landless" programme; and expansion of the use of drip irrigation systems, in recognition of the fact that Barbados is a water scarce country and hence the need to better manage the use of its water resources. In the area of alternative energy, biomass energy is utilised in the sugar cane industry. Cane trash from fields and crushed cane fibres from the sugar production process, are used for fuel generation. The fuel generated contributes to powering the sugar cane factories themselves and any excess are channeled to the national grid. Quantities for the latter are unknown. Major problems faced in implementing conservation and rehabilitation of degraded lands includes lack of personnel and small budget allocation.

Capacity Building, Education, Training and Awareness-Raising: See under Programmes and Projects.

Information: See under Programmes and Projects

Research and Technologies: *Agriculture:* There is ongoing research in a number of food and non-food crops, carried out by Ministry of Agriculture and Rural Development or in collaboration with other research institutes/agencies, such as Caribbean Agricultural Research and Development Institute (CARDI), University of the West Indies (UWI), Agricultural Research and Variety Testing Unit (ARVTU) and Sugar Technology Research Unit (STRU). The main activities include; genetic

improvement in cotton; yield improvement in sugar cane; bio-control and IPM technologies for the control of pest and disease in priority economic crops, viz: hot peppers, onions, yams, sweet potatoes and sugar cane; mutation breeding techniques for the development of productive and marketable quality cut flowers and other ornamentals; development of protocols for mass propagation of tissue culture plantlets; variety selection for increased yield, quality, productivity and disease resistance in tomatoes, cut flowers, onions, carrots and cabbage. Drip irrigation is promoted over sprinkler systems and greater use of mulching is promoted to help reduce agricultural water use. Livestock research activities are geared towards solving livestock production problems, particularly those relating to nutrition, genetic improvement and management. In the area of genetic improvement special emphasis is placed on improving the Barbados Blackbelly Sheep. This local breed of sheep is probably best known for high fecundity and prolificacy, but it also produces good quality of meat. Selection effort is emphasizing high growth rate to exploit the potential of the breed for commercial rearing.

See also under Programmes and Projects.

Financing: *Poverty:* The government has provided an annual budget of approximately BDS \$10 million since 1997/1998 to finance a poverty alleviation exercise through various government agencies, which addresses education, jobless and the homelessness.

Energy: This sector is financed through the National Budget and Private Sector Partnership. Assistance is also provided by the following: GEF - Global Environment Facility; Regional project to reduce barriers to Renewable Energy Technologies; CSC - Commonwealth Science Council; Caricom Secretariat; CDB - Caribbean Development Bank; RES - Renewable Energy Systems; OLADE - Latin American Energy Organization; CEIS - Caribbean Energy Information Systems.

Transportation: The International Maritime Organisation and the International Civil Aviation Organization have technical co-operation programmes. From time to time Barbados has accessed technical assistance under these programmes. The Barbados Port Authority, which is responsible for all of the port and harbor facilities in Barbados, is self-financing. The Grantley Adams International Airport is part of the Ministry of International Transport and its operations are financed from the national budget. Major reform and expansion projects planned for both Ports will be financed from both national and external financing sources. Transport services are provided by the private sector, and no joint ventures with Government have been put in place.

Agriculture: National funding has been secured for most of the above activities.

Cooperation: *Population:* There are no bilateral or multilateral initiatives in the area of population and sustainable development in which the Government has been involved.

Human settlement: The Ministry of Housing and Lands works in conjunction and cooperates fully with UNCHS HABITAT and with MINURVI, which coordinates meetings of Ministers of Housing and Urban Development in Latin America and the Caribbean.

Poverty: Poverty alleviation/eradication programmes of individuals and communities are being developed and implemented in the context of consultation and co-operation between governmental, non-governmental and community based organizations.

Agriculture: The country cooperates in agriculture with FAO, UNDP, European Union and with the Inter-American Institute for Cooperation in Agriculture (IICA). These organizations have participated in the review of national strategies, and in some cases, have provided project specific financial support.

Energy: Barbados is a Member of the following international and regional agreements: CEIS - Caribbean Energy Information Systems; OLADE - Latin American Energy Organization; CARICOM - Caribbean Secretariat; CEAP - Caribbean Energy Action Programme; United Nations Framework Convention on Climate Change (UNFCCC); and the San Jose Agreement.

Land use: Barbados is party to the Convention on International Trade in Endangered Species as well as the UN Convention on Biological Diversity. Policies, programmes and action plans have been implemented to meet the obligations encompassed within these agreements. Barbados cooperates with UNDP (clearing house), UNCHS (Habitat II) and IADB (improvement of planning systems). These organisations have participated in the review of national strategies but have not provided additional financial or human resources after UNCED. Barbados has provided technical expertise in land resource planning and management to the islands of Montserrat and Anguilla.

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