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Ministry of Environment & Housing

Jamaica National Environmental Action Plan

JANEAP 1999-2002



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APPENDIX A - List of Participating Organizations

APPENDIX B - List of Conventions to which Jamaica is a party.

LIST OF ACRONYMS

BJCMNP	Blue and John Crow Mountains National Park
BOD	Biological Oxygen Demand
CARICOMP	Caribbean Coral Reef Monitoring Programme
CARICOM	Caribbean Common Market
CBO	Community Based Organization
CESTO	Caribbean Environmental Sustainable Tourism Organization
CFCs	Chlorofluorocarbons
CFRAMP	CARICOM Fisheries Resource Assessment and Management Project
CMS	Centre for Marine Sciences
CPACC	Caribbean Planning and Adaptation to Climate Change
CIDA	Canadian International Development Agency
CITES	Convention on International Trade in Endangered Species (of Wild Fauna and Flora)
CPC	Chief Parliamentary Council
CWIP	Coastal Water Quality Improvement Project
DEMO	Development of Environmental Management Organizations
EAST	Environmental Audits for Sustainable Tourism
ECD	Environmental Control Division (of the Ministry of Health)
EEPI	Environmental Economic Policy Instruments
EEZ	Exclusive Economic Zone
EFJ	Environmental Foundation of Jamaica
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
ENACT	Environmental Action Programme
EPA	Environmental Planning Agency (USA) or Environmental Protection Area (Jamaica)
ENGO	Environmental Non-Governmental Organization
FAO	Food & Agriculture Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GOJ	Government of Jamaica
GMRC	Greater Montego Bay Redevelopment Company
GTZ	German Agency for Technical Cooperation
IAIGCR	Inter-American Institute for Global Change Research
ICENS	International Centre for Environmental & Nuclear Sciences
ICRI	International Coral Reef Initiative
IDB	Inter-American Development Bank
ILO	International Labour Organization
ISO	International Organization for Standardization
ISP	Inter-American Strategy for the Promotion of Public Participation in Decision Making for
	Sustainable Development.
JaNEAP	Jamaica National Environmental Action Plan
JBI	Jamaica Bauxite Institute
JCDT	Jamaica Conservation Development Trust
JCRAP	Jamaica Coral Reef Action Plan
JNPTF	Jamaica National Park Trust Fund
JPSCo	Jamaica Public Service Company Limited
JSDNP	Jamaica Sustainable Development Network Programme
KMA	Kingston Metropolitan Area
KMR	Kingston Metropolitan Region
LAMP	Land Administration and Management Project
LDUC	Land Development and Utilization Commission
LIS	Land Information System
LTIS	Land Titling Information System

MAC	Mobile Air Conditioning
MARPOL	International Convention on the Protection of Pollution from Ships
MBMP	Montego Bay Marine Park
MBMPT	Montego Bay Marine Park Trust
MEH	Ministry of Environment and Housing
MIND	Management Institute for National Development
MPM	Metropolitan Parks & Markets
NBSAP	National Biodiversity Strategy & Action Plan
NCST	National Commission on Science and Technology
NCRPS	Negril Coral Reef Preservation Society
NEEAPSD	National Environmental Education Action Plan for Sustainable Development
NEPA	National Environment and Planning Agency
NEEC	National Environmental Education Committee
NEST	National Environmental Societies Trust
NEPT	Negril Environmental Protection Trust
NHDC	National Housing Development Corporation
NIBI	National Investment Bank of Jamaica
NIP	National Industrial Policy
NFAP	National Forestry Action Plan
NGOs	Non-Governmental Organizations
NPC	National Planning Council
NRCA	Natural Resources Conservation Authority
NRCAA	Natural Resources Conservation Authority Act
NR A	Natural Resource Accounting
NWC	National Water Commission
	Organization of American States
ODS	Ozona Danlating Substances
Operation PRIDE	E Programme for Resettlement and Integrated Development Enterprise
	Pan American Health Organization
DCI	Patroloum Corneration of Jamaica
DIOI	Planning Institute of Jamaica
PSOI	Private Sector Organization of Jamaica
	Pural Agricultural Development Authority
SAGE	Strategic Advisory Group on the Environment
SAUE	South Coast Sustainable Development Study
SCODO	Sustainable Development Study
SDC I	Sustainable Development Council of Jamaica
SDC-J	Sustam of Environmental and Economic Accounting
SDAW	Specially Protected Areas and Wildlife
SFAW	Statistical Institute of Jamaica
	Town Planning Department
	Town Finning Department
	I Jurban Davalanment Company
	United Nations Development Drogramme
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
UIECH	University of the West Indias
	University of the West Indies Conten for Environment and Development
UWICED	World Health Organization
WICHON	world Health Organization
WICHUN	West indies Home Contractors
WKA	Water Resources Authority (formerly Underground Water Authority)
WISYNCO	west Indies Synthetics Company Limited

PREFACE

This Jamaica National Environmental Action Plan (JaNEAP) 1999 – 2002 document represents the Government of Jamaica's 3-Year Action Plan addressing environmental issues for the period.

The first three-year JaNEAP was prepared in May 1995. The process for the design and monitoring of the JaNEAP involves a triennial update with annual status reports being done in between. Three annual status reports (JaNEAP Status Reports – 1996, 1997 and 1998) have been prepared as reports on progress in implementing the actions stated in the 1995 JaNEAP. The Status Reports included an update on the economy and also outlined significant new developments on the environmental scene in Jamaica.

This update of the 1995 JaNEAP entails a comprehensive overhauling of the original document with major emphasis on setting new directions and new actions. It is intended to continue the process of addressing the commitments undertaken by the Government of Jamaica towards AGENDA 21 - Conservation and Management of Resources for Development and the Small Island Developing States (SIDS) Programme of Action. This JaNEAP is arranged to cover all the broad thematic issues covered in these two documents.

Sustainable Development depends on the integrated tripod of social, environmental and economic sectors. JaNEAP presents a programme of action for the leg of the tripod which represents the environmental sector's contribution to sustainable development.

NRCA/NEPA has the overall mandate for environmental management but there are various other public agencies/organizations involved in environmental planning and management. In the past, the left hand did not necessarily know what the right hand was doing and this led to many duplications of effort and a lack of synergy among initiatives. The result has been a potential lessening of the impact that could have resulted from a more coordinated approach. The process for JaNEAP's development and review over the last four years has been consultative and has brought this matter of overlapping responsibilities and duplication of effort into sharp focus. JaNEAP 1999-2002 will seek to address this problem by identifying the organization with primary responsibility for implementing each action mentioned in the document.

Future JaNEAPs will be directed by both a sustainable development policy and an omnibus environmental policy (slated to be completed by 2002). In the absence of these policies, this plan is guided by various environmental and related policies such as the Policy for Jamaica's System of Protected Areas, the Land Policy, the National Industrial Policy and the Draft Watersheds Policy. It presents the practical actions to which the Government is committed and identifies the organizations responsible for implementing those actions.

The document briefly outlines the environmental issues facing Jamaica, gives an overview of the progress made over the last three years towards addressing these issues, gives a vision of the way forward and presents a plan for the main actions to be undertaken between April 1999 and March 2002.

JaNEAP and its Status Reports are intended to be used:

- 1. As an information tool to inform the wider public of the actions taken, and actions to be taken by the Government of Jamaica to address environmental issues.
- 2. As a planning tool by the public sector, funding agencies, private sector, NGOs and CBOs.
- 3. As a monitoring tool by NRCA/NEPA.

The success or impact of the JaNEAP Actions is to be evaluated by the State of the Environment (SOE) Report.

JaNEAP 1999 – **2002** will be reviewed each year with preparation of annual status reports in 2000, 2001, and 2002 and is due to be updated in 2002.

JaNEAP 1999-2002 is distributed in hard copy to public sector agencies and ministries and is posted at <u>http://www.nrca.org</u> It is also available at the NRCA/NEPA Documentation Centre for reference.

The development of this Plan was coordinated by the Policy, Corporate Planning & Projects Unit, NRCA in collaboration with the Ministry of Environment & Housing and the Planning Institute of Jamaica.

JAMAICA NATIONAL ENVIRONMENTAL ACTION PLAN 1999 - 2002

INTRODUCTION

Dependence of the Productive Sector & Economy on the Natural Resources

The Main Contributors to the Economy

The industries of tourism, agriculture, manufacturing and mining & quarrying industries are the four main contributors to the economy as indicated below.

<u>Tourism</u>

The tourism industry continued to be the major source of foreign exchange in the services sector and the economy in general. Between 1990 and 1997 net earnings from the industry averaged US\$835 million per year, representing some 70.0 per cent of total merchandise exports. The cruise passenger sub-category has more than doubled over the past ten years, while the foreign national stop-over category increased by over 40.0 per cent.

<u>Agriculture</u>

With a workforce of over 206,000 the sector now ranks as the country's second largest employer, behind the service sector and represents approximately two-fifth of the employed labour force. Foreign exchange earnings have increased steadily averaging US\$192.3 million, representing 16.0 per cent of the average of just over US\$1.2 billion per year from total exports. The sector's contribution to total GDP has risen steadily during 1990's moving from 6.2 per cent to 8.4 per cent in 1996. The PIOJ's Agricultural Production Index, which measures the volume of production of a selected number of crops, estimated that for 1997, the agriculture sector recorded its first decline in output since 1991, down by 17% compared with 1996. This performance is also reflected on the export side, where the Index estimated that production for exports declined by 11.5%. It has been suggested that these outcomes resulted from the effects of the country's worst drought in three decades. However, improved weather conditions resulted in an improvement in 1998 with export declining by only 1.7%.

Manufacturing

The sector remains a relatively large employer of labour at just under 89,000 persons in 1997 representing 9.4 per cent of the country's work force. Foreign Exchange earnings averaged US\$430.0 million per year over the 1990 to 1997 period, a quarter of total merchandise exports. The sector has remained a major contributor to GDP, of about 18.0 per cent. Consequently, Government has implemented specific strategies to increase its output. In 1997, most of Government's efforts were directed at assisting the sector through structuring preferential loan financing schemes and loans for debt restructuring, administered through the development banks and the National Investment Bank of Jamaica (NIBJ). Preliminary indications are that the size of the manufacturing sector in 1997 continued the annual average decrease of 1.0 per cent that has characterized it over the past five years. Nonetheless, the

upward trend in the annual average export earnings of 6.5 per cent also continued. The overall performance of the sector has been adversely affected by high financing and operating costs, linked partly to high interest rates; increased competition from imports in a liberalized domestic market; an appreciating exchange rate; high costs linked to low efficiency levels; and drought related cutbacks in agricultural inputs.

Mining and Quarrying

The Mining sector, as a capital intensive industry, provided jobs for approximately 6000 persons, less than 1.0 percent of the employed labour force. However, this sector, through the bauxite/alumina industry, contributed heavily to the Jamaican economy by providing just over one-half of total foreign exchange earnings, and an annual average of 9.0 per cent of GDP for the 1990 to 1996 period. The sub-sector recorded an average annual growth of 4.8 per cent. Increased capacity and high levels of utilization have been the source of this growth. Capacity utilization within the industry ranged between 80.0 per cent and 90.0 per cent since 1994. Alumina production peaked at 3.4 million tonnes in 1997.

Reliance of the Main Productive Sectors on the Natural Resources

The above four sectors are heavily dependent on our beaches, sea, land, mountains, fresh water and scenic beauty. However, these environmental and natural resources are deteriorating and if this trend is not halted, preferably reversed, then the industries and the population at large will be jeopardized.

Reflecting the Contribution of the Natural Resources to the Economy

At present our national accounts do not indicate the economic losses due to resource degradation related to soil (by erosion), watersheds (by deforestation), or coastal water quality (by nutrient and sewage pollution). As a result, environmental issues are not seen as being important and preservation/conservation of the natural resources is not viewed as a means of sustaining our economy. There is growing global interest in having the National Accounts recast to reflect the contribution of natural resources. Jamaica needs to put in place a system of Natural Resource Accounting in order to demonstrate the value of our natural resources and the seriousness of environmental degradation.

Strategic Environmental Management

Economic trends in overseas markets such as the United States are encouraging, and signal prospects for growth in Jamaica's trade sectors and the wider economy. To be sustainable, this growth cannot be at the expense of the country's environment. Comparatively recent external developments such as the North American Free Trade Agreement (NAFTA) and acceptance of the ISO 14000 Standards make it necessary for local goods and services including tourism to be produced in compliance with international environmental laws and regulations.

The heavy reliance of these major industries on our natural resources underscores the need to strategically manage the environment in order to ensure sustainability of these industries. The

National Industrial Policy (NIP) has "growth with stability" as its central objective and identifies the private sector as the engine for this growth. By extension, the required growth with stability needs healthy natural resources for its achievement. The sectors therefore need to factor in the use and/or pollution of the environment as economic costs. The new NRCA Permit and Licensing System is consistent with the "polluter pays" principle. Compliance planning, enforcement and public awareness will bring industrial and commercial activities in line with national standards for air and water emissions and make them at the same time more competitive on the international market.

A move towards strategic environmental management necessitates a paradigm shift from the "command and control" model with a focus on enforcement/compliance to a system where industry and civil society self-monitor and self-regulate their environmental practices. The promotion and application of environmental management systems across all sectors – government, private sector and civil society will be the linchpin of environmental activities over the next three years.

The Participatory Approach

The commitment of the Government to the participatory approach to planning and development is reflected in both the National Industrial Policy and the National Poverty Eradication Programme. The private sector, in partnership with government agencies, will provide the impetus to programmes to protect the environment and conserve natural resources. Communities, in partnership with non-government organizations will contribute to the country's efforts to reduce poverty and transform the economy. This is further evidenced by the involvement of the Government along with civil society groups in the work of the Organization of American States (OAS) in the formulation of the *Inter-American Strategy for the Promotion of Public Participation in Decision-Making for Sustainable Development (ISP)*. The environmental sector will work assiduously to finalize and implement this strategy and will continue its work on devolution of authority for environmental management to local groups.

From Policies and Frameworks to Actions

When compared to the developed countries Jamaica is fairly young in this area of environmental management. It is imperative to set up the legal framework and to establish policies to guide activities in the field of the environment. Over the past four years the focus has been on putting in place policies, frameworks, regulations, guidelines and standards. While this effort is by no means complete it has gone a far way in providing a solid base and direction for the activities to be undertaken over the next three years.

SECTION 1

The Way Forward

A. Environmental Management for Sustainable Development

Over the last decade, the broad goal of environmental policy in Jamaica has been sustainable development (SD), a path of environmental, economic and social development which will ensure that the quality of life for future generations is no worse compared to that which is enjoyed by the present generation. This requires the need for the quality of the environment to be sustained even as the economy continues to develop, and especially so in Jamaica which has a resource based economy.

The practice of SD in Jamaica is of particular importance within the unique context of the island where a close relationship exists between the ecological, economic and social systems. Attaining the goal of sustainable development requires that progress be made in linking the ecological, economic and social systems through a process of policy integration in a manner that reflects the unique socio-cultural characteristics of the island.

Environmental/ecological sub-systems such as forests, mangroves, marine, surface and ground water systems, mineral and soil resource systems, and integrated watershed systems are all critical to the development of the economic systems. Sustainable Development planning and policy should therefore focus on the micro and macro sustainability outcome of environmental/ ecological sub-systems on the one hand and the economic systems such as agriculture, industry, energy, transport, mining, tourism, and infrastructure on the other. However, sustainable development will not be achieved without the provision of basic social services to the entire population of Jamaica by investing in the prerequisites of better quality education, water supply, health care and related services, housing, skills training and population control. To be successful, this broad mix of policies will have to be complemented by appropriate government-enabling economic policies as well as comprehensive and efficient legal, regulatory, administrative and institutional systems for initiating sustainable development (Figure 1).

The UN Capacity 21 Project started in 1996 and subsequently there was the launch of the Sustainable Development Council of Jamaica (SDC-J) in June 1996. The role of this Council is to link all sectors of the society, stakeholders and players in national development in a multi-stakeholder approach to sustainable development. It also has the responsibility to advise the NPC about issues, positions and responses to major International Conferences/ and Treaties such as: Desertification, Montreal Protocol, Biological Diversity, Climate Change and the Small Islands Developing States (SIDS) Plan of Action

The Jamaica Sustainable Development Network Programme (JSDNP) was established in November, 1997 and is part of a global catalytic initiative launched by the United Nations Development Programme (UNDP) in response to Agenda 21, which articulates the need for improved information dissemination to support sustainable development. The programme is geared towards facilitating communication between users and suppliers of sustainable development information in developing countries. Essentially, the JSDNP provides a meeting place that services the sustainable development needs of all sectors of society.



Two initiatives that have been undertaken over the last three years with a view to sustainable development planning at both the regional and local levels are the South Coast Sustainable Development Study/Plan and the St. Catherine Environmental Parish Profile. The South Coast Sustainable Development Study area stretches from the Great Salt Pond in the Hellshire Hills, immediately to the south west of Kingston, to the eastern boundary of the Negril Green Island

Development Order area. This study aims to assess the development potential of the area and to produce a sustainable development plan. The plan should benefit local communities, and the country as a whole, whilst maintaining the integrity of natural resources and features of value. The St. Catherine Environmental Parish Profile is seen as a first step in the implementation of Sustainable Development island-wide. St. Catherine was selected because of its composition and diversity (urban/rural mix, mixed economy, diverse ecosystem). It is also the largest parish in Jamaica.

Positive and significant landmark actions towards environmental management for sustainable development have been embarked on over the last three years. The way forward is to build on and strengthen the institutions and systems to create an enabling environment.

B. Strategic Environmental Management

Effective integration of the environment and the economy requires that economic decision making takes into account the social costs and benefits of environmental issues. There are various ways of achieving this and no one strategy will be appropriate for all situations. The key is to find the right mix in the policy response. The application of environmental economic policy instruments (EEPI) represents one way of achieving environment-economy integration.

The main rationale behind the use of EEPI is that very little recognition has been given to the scarcity of environmental resources, with the resulting tendency for extensive price control of natural resources, particularly in developing countries. This situation can be corrected if environmental resources are priced to include the marginal cost of production as well as the external cost of pollution or resource degradation caused by the polluting good (marginal social cost). EEPI, then, exists to influence behaviour among users of environmental resources towards avoiding excessive or wasteful use of natural resources.

Three broad groupings of integrated Environmental Economic Policy tools can be identified based on the polluter pays principle, the user pays principle and incentive techniques (Figure 2).

Jamaica is geared towards developing and implementing an integrated environmental policy with an objective to determine how EEPI can be applied effectively as a catalytic policy instrument to integrate the environment and the economy and ultimately help to achieve sustainable development. One of the major advantages of EEPI is that it not only has an effect on identified and intended policy and development targets but also impacts on economic behaviour across entire sectors of the economic social system. Further, the application of EEPI will serve to complement the National Industrial Policy of the Government of Jamaica especially within the context of liberalisation of the Jamaican economy.



Figure 2: Integrated Environmental Economic Policy Tools

Some countries are already putting in place mechanisms, which restrict trade in environmentally damaging products or products whose production processes damage the environment. Companies, which are not certified to ISO 14001, will be more likely in the future to encounter these non-tariff trade barriers.

The major environmental management approach so far adopted in Jamaica was chiefly based on command and control measures. Its effectiveness was target and situation specific and was not a holistic one. The trend worldwide is to dispose of the command and control mechanism aimed at pollution control to a more self-regulatory mode directed towards pollution prevention and the elimination of waste. To date, no company in Jamaica is ISO 14001 certified. It is important that the country moves from the compliance/enforcement approach that is being employed at present to the level of strategic environmental management and ultimately to sustainable businesses. This will be achieved through the use of environmental management systems (EMS).

Development of a national EMS Policy and Strategy document is to begin shortly. This will be used to promote the use of EMS in the public sector, private sector and civil society and will include recommendations for the use of market based instruments. This should allow the scare resources that would otherwise be spent on enforcement to be redirected towards mitigating the already degraded ecological systems and creating the enabling environment for sustainable development.

C. The Over-Riding Strategy for JaNEAP 1999 -2002

The over-riding strategy for JaNEAP 1999 – 2002 is to:

- Consolidate on the gains achieved in environmental management by completing the activities started and not completed over the last fours years,
- Continuing to build capacity for managing the environment,
- Building on the relationships forged with non-Governmental organizations,
- Increasing the efforts at coordination and collaboration with public sector agencies,
- Developing a closer working relationship with the Private Sector focusing on the use of environmental management systems as a tool to achieving sustainable businesses and effective environmental management, and
- Effecting a more structured approach to environmental education and community outreach.

Many of the activities will be carried out under the Ministries' and Agencies' regular programmes while some will be implemented via projects.

D. Financing

The activities to be undertaken as outlined in JaNEAP 1999 - 2002 will be primarily financed through Government subvention to its Ministries and Agencies. This will be supplemented with bi-lateral and multi-lateral funding.

SECTION 2

<u>Environmental Issues, State of the Environment</u> <u>and Priority Environmental Actions</u>

1. CAPACITY BUILDING FOR SUSTAINABLE DEVELOPMENT

ISSUES

One definition of Sustainable Development is: Activities which improve the quality of life of the global and local community with minimal external support without depleting the resource base or Passing on to future generations an equal or enhanced stock of economic, natural and social capital.

The Copenhagen Declaration of 1995 states:

"We are deeply convinced that economic development, social development and environmental protection are interdependent and mutually reinforcing components of sustainable development, which is the framework for our efforts to achieve higher quality of life for all people. Equitable social development that recognizes empowering the poor to utilize environmental resources sustainably is a necessary foundation for sustainable development. We also recognize that broad-based and sustained economic growth in the context of sustainable development is necessary to sustain social development and social justice."

It is clear that ecological sustainability is not enough. Sound environmental management and sustained protection of the natural resources cannot be achieved if the social and economic issues are not taken into consideration and addressed. The above statement places empowerment of people as a prerequisite for sustainable development.

Principle 10 of the 1992 Rio Declaration states that environmental issues are best handled with the participation of all concerned citizens at the relevant level and that to advance such participation, emphasis should be placed on (1) access to information; (2) access to process; and (3) access to justice. In Agenda 21, the plan of action accompanying the Rio Declaration, governments pledged to pursue broader public participation in decision-making processes and policy formulation for sustainable development.

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The issue of gender equity must be addressed when considering participation of all citizens in the development process. In Jamaica, the Steering Committee of the Commission on Gender and Social Equity defines social equity as:

Fairness, justice and access in the creation of economic growth, income distribution and in more participatory democratic structures and opportunities for all Jamaicans regardless of gender, class, race, physical/mental ability, religion or geographic location.

The Steering Committee further ascertained that social and economic development cannot be secured in a sustainable way without the full participation of women. The Caribbean Community also recognises that gender equity requires a new approach to development based on *inter alia*, shared participation of men and women in households and in the public arena. Increasingly, therefore, it is being recognised both regionally and locally that gender considerations are vital in public participation and development.

The following quotation taken from the book "Putting People at the Center of Sustainable Development", supports the concept of participatory capacity building:

"The problem with "social capital" is that it is stubborn, it is embedded in the culture. It cannot be imported. It can only be created at the spot. Consequently, all efforts to develop or modernize the economy or the ways societies relate to nature require the existence of sound institutions and good governance. Participatory capacity-building should, therefore, be a core element in all development efforts."

It seems logical therefore, that Jamaica should begin to put in place the prerequisites to set in motion the climb onto the complex ladder of sustainable development. Efforts at capacity building for sustainable development should begin at creating an enabling environment by putting the institutional and legal frameworks in place, and using the participatory approach to decision making with an emphasis on gender equity.

PROGRESS TOWARDS ADDRESSING ISSUES

The UN Capacity 21 Project started in 1996 and subsequently there was the launch of the Sustainable Development Council of Jamaica (SDC-J) in June 1996. The role of this Council is to link all sectors of the society, stakeholders and players in national development in a multi-stakeholder approach to sustainable development.

The SDC-J should report to the National Planning Council (NPC) on the status of the following issues:

Jamaica National Environmental Action Plan (JaNEAP) Water Resources Management Tourism Taxes Disposal of Non-biodegradable Materials Use of Economic Instruments in Environmental Management Natural Resource Accounting and Sustainability Indicators SIDS (Small Islands Developing States) Plan of Action Agenda 21

- The SDC-J implemented a seminar in 1997 entitled "The Use of Economic Instruments in Sustainable Development, with Particular Reference to their Applicability in the Disposal of Non-Biodegradable Material."
- The GOJ and the Canadian International Development Agency (CIDA) initiated the Environmental Action (ENACT) Programme in June 1996. The goal of ENACT is to promote sustainable devlopment in Jamaica by supporting capacity development of key Jamaican organizations involved in decision-making, management and use of Jamaica's natural resources. The programme has so far engaged in a comprehensive participatory planning process and have developed projects to increase environmental awareness in key groups of Jamaican society, namely:
 - Public Sector (all government ministries and agencies excluding NRCA)
 - Local Communities
 - General Public (Environmental Education)
 - Private Sector
 - NRCA

The focus of the ENACT projects is to improve the capability of key strategic partners at the government policy, private sector, community and general public levels to identify and solve environmental problems sustainably and to link and coordinate the capacity development activities of the various levels and players involved.

- The Jamaica Sustainable Development Network Programme (JSDNP) was established in November 1997 and is part of a global catalytic initiative launched by the United Nations Development Programme (UNDP) in response to Agenda 21, which articulates the need for improved information dissemination to support sustainable development. The Programme's objectives are:
 - 1. To introduce and connect public, private and non-governmental sector agencies to local and international sources of information on sustainable development utilizing the Internet and other communication tools.
 - 2. To develop appropriate information services to support the implementation of local and national development plans.
 - 3. To provide information on Jamaica's environmental, social and economic development via the internet to the international community.

Focus is placed on the needs of community-based organizations (CBOs) in rural areas as well as farmers, women's groups, small businesses and entrepreneurs.

The NRCA is actively involved in the Local Government Reform Process. The organization sits on the Local Government Reform Council and has facilitated parish consultations on sustainable development.

Priority actions to build capacity for sustainable development will involve:

- a) Efforts at creating an enabling environment by putting the institutional and legal framework in place and the application of market based instruments;
- b) Educating our citizens for a sustainable future;
- c) Integrating gender into environmental management;
- d) Using the participatory approach to decision making;
- e) Building capacity for the integration of sustainable development in parish and community based planning processes:
- f) Using an enforcement/compliance flexibility model and

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g) Using sustainable development indicators as a monitoring tool. ACTIONS FOR 1999 - 2002

A. THE ENABLING ENVIRONMENT

A.1 INSTITUTIONS/POLICIES

Action #1.1

Government, through initiatives such as a Local Agenda 21 Project and GOJ/CIDA-ENACT Project # 2100 will reconfigure the Sustainable Development Council. A Plan of Action will be developed for implementation over the next three years.

Action #1.2

Through GOJ/CIDA-ENACT Project # 6130 the Private Sector will establish a Sustainable Development Forum to initiate sustainable development concepts within this sector.

Action #1.3

Through GOJ/CIDA-ENACT Programme a Local Sustainable Development Planning Framework will be developed. This will present consensus based principles and strategies for enabling and supporting the integration of sustainable development in parish and community planning processes.

Action # 1.4

The Ministry of Environment & Housing will work with the PIOJ and the NRCA/NEPA to develop and finalize a National Environmental Policy/Strategy.

Action #1.5

NRCA/NEPA will strengthen the Permits and Licence Secretariat in order to provide an efficient service to clients submitting environmental and planning applications.

Action #1.6

Government, through GOJ/CIDA-ENACT Project # 3110 will support the NRCA/NEPA EIA process and will build capacity for environmental planning in permit and licences.

Action # 1.7

NEPA will review its business processes and develop a Citizens' Charter.

A.2 THE LEGAL SYSTEM

Action #1.8

Government will strengthen the legal system in order to make it better able to enforce Jamaica's environmental statutes.

Action #1.9

Government, through GOJ/CIDA-ENACT Programme will increase the capacity to research and document environmental and sustainable development laws, statutes and regulations.

A.3 MARKET BASED INSTRUMENTS

Action #1.10

Government will develop and begin to implement market based instruments in order to encourage sustainable environmental practices.

B. EDUCATING CITIZENS FOR A SUSTAINABLE FUTURE /PUBLIC AWARENESS

Action #1.11

The National Environmental Education Action Plan for Sustainable Development (NEEAPSD:1998-2010) was launched in June, 1998. NRCA/NEPA, through the National Environmental Education Committee (NEEC) will implement and monitor the (NEEAPSD). This will be done through GOJ/CIDA-ENACT Project # 5110.

Action #1.12

The NEEC will develop environmental education training and resource materials for the formal and non-formal education sectors. These initiatives will be funded through GOJ/CIDA-ENACT Projects # 5220, # 5120 and #5310.

Action # 1.13

Through GOJ/CIDA-ENACT Project # 5230 the NEEC will develop and implement a National Environmental Communications Campaign to increase and coordinate communication around the issues of environment and sustainable development and to create public demand for environmentally responsible behaviour.

Action # 1.14

Through GOJ/CIDA-ENACT Projects #5310 and #5120 the NEEC will implement sustainable schools and colleges projects.

Action # 1.15

The NEEC will assist with the development of a Caribbean Environmental Education Framework.

Action #1.16

The Government will foster/maintain linkages with Regional and International organizations involved with Environmental Education.

Action # 1.17

GOJ/CIDA-ENACT Project # 4200 will provide information and training for sustainable community development.

Action #1.18

In compliance with to the freedom of Information Act NRCA/NEPA will ensure that all information on EIAs is made available to the general public.

Action # 1.19

NRCA/NEPA through GOJ/CIDA-ENACT Project # 3120 will build capacity for implementing educational programmes at the community level.

Action # 1.20

The MPM will seek to create awareness of the hazards of improper solid waste management and encourage the public to play an active role in the proper handling of waste via the media, public presentations, school competitions, seminars etc.

Action # 1.21

The WRA will embark on a Public Awareness/Education Project during the period 1999-2002 to *inter alia*, inform the public about those sections of the WRA Act which relate to user rights and pollution issues.

Action # 1.22

NRCA/NEPA will continue its routine programme of public education and outreach by publication of a monthly newsletter, maintaining an environmental calendar, staging various exhibitions and giving talks on the environment to schools, communities and groups.

C. INTEGRATING GENDER INTO ENVIRONMENTAL MANAGEMENT

Action #1.23

The Government will develop a Gender Equity Mechanism for analysis and assessment of all projects including those addressing environmental issues.

Action #1.24

The Government will ensure that all Cabinet Submissions have been analysed for gender considerations.

D. THE PARTICIPATORY APPROACH

Action # 1.25

The Government will complete and begin to implement a strategy for the promotion of public participation in decision making for sustainable development.

Action #1.26

Government, through GOJ/CIDA-ENACT Project # 4110 will develop at the national level a *Framework of Local Sustainable Development Planning* and will support selected communities in the area of sustainable community planning.

E. BUILDING CAPACITY FOR INTEGRATION OF SUSTAINABLE DEVELOPMENT IN PARISH AND COMMUNITY BASED PLANNING PROCESSES

Action #1.27

Government, through the GOJ/CIDA ENACT Programme will support the implementation of a Local Sustainable Development Parish Demonstration Project and training in local sustainable development planning.

F. ENFORCEMENT/COMPLIANCE FLEXIBILITY

Action #1.28

Government will provide the necessary resources to strengthen the enforcement of environmental laws and regulations by the use of an effectively functioning Environmental Wardens Service dispatched throughout the island. GOJ/CIDA-ENACT Project # 3210 will support the capacity of wardens to inspect and enforce laws and regulations.

Action #1.29

NRCA/NEPA will institute a system of enforcement/compliance flexibility in its monitoring and reporting requirements that will serve to reward "good environmental corporate citizens."

Action # 1.30

NRCA/NEPA through GOJ/CIDA-ENACT Project # 3130 will build capacity related standards and regulations including capability for Regulatory Impact Assessments (RIAs) and Compliance Laws.

G. DEVELOPING AND MONITORING SUSTAINABLE DEVELOPMENT INDICATORS

Action # 1.31

The Government will develop sustainable development indicators and will use these to monitor Jamaica's progress towards achieving sustainable development.

Action # 1.32

NRCA, in collaboration with its public and private sector partners and civil society, will establish environmental indicators and will report bi-annually on these in a State of the Environment (SOE) Report.

Action # 1.33

The Statistical Institute of Jamaica (STATIN) will develop a system of Natural Resource Accounting.

2. ENVIRONMENTAL MANAGEMENT SYSTEMS

ISSUES

The ability to achieve sustainable development through improvements in environmental protection and conservation of the natural resources requires all sectors of society to manage their impacts on the environment. Utilization of an "*Environmental Management Hierarchy*" approach will enable public and private organizations and to move away from costly, environmentally damaging practices and towards policies, practices and technologies that promote the 3Rs (Reduce, Reuse, Recycle), prevent pollution and build sustainable development. Environmental Management Systems (EMS) shift the mode of operation from being mainly reactive to becoming proactive and provide a systematic method for moving up the Environmental Management Hierarchy, achieving environmental objectives, and improved business competitiveness as shown in Figure 3.



Figure 3: An Environmental Management System involving Proactive Vision & Continual Improvement leading to competitive advantage and ultimately sustainable development

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Some features of EMS are:

- A written environmental policy
- An environmental management programme with clear objectives and targets
- Commitment to the system by top management
- Communicative management style
- Accounting for environmental inputs and outputs
- Compliance with legal requirements
- Training for all employees
- Monitoring and corrective and preventive action
- Regular environmental performance evaluation
- Documentation and control

The low level of awareness and knowledge of EMS for systematically improving environmental performance will require formal programmes that promote the application of the concepts across all sectors in Jamaica.

PROGRESS TOWARDS ADDRESSING ISSUES

- The Jamaica Bureau of Standards (JBS) has established an Environmental Management Systems Unit within its Standards Department.
- JBS staff has been receiving in-house training in environmental management standards and several public seminars and workshops have been held in Kingston and Montego Bay. These include training in Environmental Management Systems, Life Cycle Assessment and Environmental Performance Evaluation.
- Progress with the development of environmental management and environmental auditing standards has been speedy. Already five (5) standards have been adopted and were published by the ISO in October 1996. Jamaica adopted them in 1997. The five standards are:-
 - 1. JS ISO 14001 : 1996 Environmental Management Systems Specification with Guidance for Use
 - 2. JS ISO 14004 : 1996 Environmental Management Systems General Guidelines on Principles, Systems and Supporting Techniques
 - 3. JS ISO 14010: 1996 Guidelines For Environmental Auditing -General Principles
 - 4. JS ISO 14011 : 1996 Guidelines for Environmental Auditing Audit Procedures -Auditing of Environmental Management Systems
 - 5. JS ISO 14012 : 1996 Guidelines For Environmental Auditing Qualification Criteria for Environmental Auditors

These are now in place as Jamaican standards and are available from the Jamaica Bureau of Standards. Several other standards are at various stages of adoption as Jamaican standards

- The Bureau of Standards represents Jamaica as "p" member of ISO/TC207 and has consistently invited the participation of the NRCA.
- Six hotels achieved Green Globe Certification for sound environmental management practices in Negril and Portland.

Priority Actions will be:

- Development of an EMS Policy and Action Plan.
- Implementing pilot projects in selected sectors.
- Implementing a programme for the greening of the public sector, private sector and civil society.

ACTIONS FOR 1999 - 2002

A. THE GREENING OF GOVERNMENT/PUBLIC SECTOR

<u>Action # 2.1</u>

NRCA/NEPA with assistance from CWIP will develop a National Policy and Strategy to promote the adoption of Environmental Management Systems in the public sector. This Policy and Action Plan will be implemented in order to improve environmental practices and improve efficiencies in all ministries and public sector agencies.

<u>Action # 2.2</u>

NRCA/NEPA through the GOJ/CIDA-ENACT Project # 2300 will build the capacity of government ministries and agencies to incorporate environmental considerations into corporate plans.

Action # 2.3

NRCA/NEPA through the GOJ/CIDA-ENACT Project # 2200 will build the capacity of government wide environmental stewardship.

Action # 2.4

NRCA/NEPA through the GOJ/CIDA-ENACT Project # 2400 will provide environmental awareness training for public employees.

Action # 2.5

The Bureau of Standards will upgrade its internal Environmental Management Systems to conform to ISO 14000. This will be completed by March 2003.

B. THE GREENING OF PRIVATE SECTOR/ INDUSTRY

Action # 2.6

NRCA/NEPA with the assistance of CWIP will develop a national policy and strategy to promote the adoption of Environmental Management Systems in the private sector. This policy and strategy will be implemented in order to improve environmental practices in industrial and commercial establishments.

Action # 2.7

NRCA/NEPA through the GOJ/CIDA-ENACT Project # 6110 will provide EMS awareness and training for selected sectors.

Action # 2.8

The Jamaica Bureau of Standards will adopt the relevant standards in the ISO 14000 Series of Standards each within one year of publication by the International Organization for Standardization.

Action # 2.9

The Jamaica Bureau of Standards will strengthen, on a phased basis, its testing, measurement, standards development and certification capabilities.

Action # 2.10

The Bureau will develop and implement an ISO 14000 Certification Programme and aim for extensive implementation in both public and private sectors by 2003.

Action # 2.11

PetroJam will obtain ISO 14000 certification by 2002. The company will adopt a policy of sound environmental management to ensure the well-being of its employees, the public and the environment.

Action # 2.12

JPSCo will incorporate the most appropriate environmental protection technology for new projects and equipment and will comply with the requirements of national regulatory agencies and donor agencies for the rehabilitation of old units. The company will engage in environmental self examination through periodic reviews, assessments and audits.

Action # 2.13

NRCA/NEPA through CWIP will initiate support services for the promotion of environmental management systems at target sites (Negril, Ocho Rios, Port Antonio).

Action # 2.14

NRCA/NEPA through CWIP will support implementation of feasible recycling enterprises in target sites (Negril, Ocho Rios, Port Antonio).

Action # 2.15

NRCA/NEPA through CWIP will support the implementation of "Greening Programmes" for tourist destinations in target sites (Negril, Ocho Rios, Port Antonio).

Action # 2.16

NRCA/NEPA through GOJ/CIDA-ENACT Prject #6120 will establish selected codes of practise for industry sectors and codes of activities for selected professions.

C. GREEN CONSUMERISM AND DEMAND SIDE MANAGEMENT

Action # 2.17

JPSCo and NRCA/NEPA through initiatives such as the Demand Side Management Project will encourage all consumers to purchase and use energy efficient products and will promote energy management programmes.

Action # 2.18

NRCA/NEPA with the assistance of CWIP will develop a national policy and strategy that will include strategies to sensitize the public to the benefits of supporting environmentally sound products.

3. WASTE MANAGEMENT

ISSUES

The 1997 SOE Report stated that an estimated 2726 tonnes of domestic solid waste is generated per day and businesses and industry generate another 562 tonnes per day. 80% of household solid waste is collected by five parks and markets companies, the remainder being collected privately and often dumped in open areas. There are fifteen officially recognized disposal sites, none of which operates as a sanitary landfill. This means that there is no covering of the garbage and they are susceptible to fires and improper effluent discharge.

About 5040 kg. of garbage generated daily from cruise ships. The waste is usually improperly disposed of because the ports in Jamaica do not have port reception facilities to treat and dispose of ship generated waste. The International Convention on the Prevention of Pollution from Ships (MARPOL 73/78) requires that home ports must have port reception facilities to treat and dispose of these wastes. Jamaica is a signatory to this convention and will therefore need to, in the very near future equip our ports with these recetion facilities.

According to the data from the Statistical Institute of Jamaica, imports of plastic used for commercial conveyance or for packing goods have increased from approximately 99,392 kg in 1991 to 488,899 kg in 1997. A large percentage of plastic bottles are inadequately disposed of and end up at our dumpsites, in waterways and on our streets.

As stated in SOE Report 1997, over 455 million litres of sewage is generated daily, 50% of which is contributed by the major urban centres of Kingston & St. Andrew, Montego Bay, South East St. Catherine and Clarendon. Treatment facilities in these areas are inadequate, with evidence of this being the role of sewage in pollution of Kingston Harbour.

Special wastes such as medical waste, tyres and hazardous wastes pose particular problems in Jamaica. The present system of incinerators for medical waste appears plagued by poor design, poor operation and inadequate and irregular maintenance. The implications for waste handlers and scavengers are serious. Scrap tyres in landfills tend to deteriorate very slowly and provide for mosquito breeding grounds. Hazardous waste often ends up at dump sites with other solid waste material because of the absence of a hazardous waste disposal facility in the country.

Overall, there is far too much waste being generated in the island leading to an inefficient use of resources in its disposal. There is the realization that we must move from a level where the country's waste is considered as life-threatening to a level where we treat this waste as a resource and explore ways to convert it into useful products.

Jamaica is urgently in need of a solid waste management system that is technologically appropriate, socially sensitive and economically sustainable. As a nation, we need to realize that solid waste management is a lucrative business.

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PROGRESS TOWARDS ADDRESSING ISSUES

- A full feasibility study for comprehensive solid waste management was completed in 1997. To build on this initiative the government through, the Ministry of Local Government is implementing a Solid Waste Management Project through the establishment of a Project Executing Unit within the Ministry. A new National Solid Waste Management company is being proposed. The project is also working on upgrading the Riverton City dump to a sanitary landfill on a phased basis over five years.
- Under the IDB Solid Waste Management Project, a section of Riverton City Landfill has been ear marked for a hazardous waste disposal site.
- An outline of a Draft Policy Framework for Waste Management was developed by the NRCA in 1997 and is being reviewed by the Ministry of Environment & Housing. This is being developed for the implementation of a short-term strategy for the management of plastic packaging material. One main focus will be the management of polyethylene terephthalate (PET) bottles which are a major problem in the island
- ➤ Trade Effluent Standards were completed by the NRCA in 1997.
- Sewage Effluent Standards have been developed.
- Sewage Effluent Regulations and Trade Effluent Regulations governing operation, maintenance, personnel qualifications, and monitoring of discharges are now being developed.
- Portmore's Economic Wastewater Project is being undertaken by the National Commission on Science & Technology (NCST) in collaboration with several agencies including UWI, NRCA, SRC, West Indies Home Contractors (WICHON), RADA, Jamaica Broilers, Agricultural Credit Bank and the National Investment Bank of Jamaica. The project is expected to demonstrate the economic feasibility of using re-cycled water from sewage for agricultural purposes while conserving freshwater supplies for potable drinking water. Waste water has been successfully used for crop production in countries such as Africa, Kuwait, Australia and the United States of America.
- Draft Guidelines for Management of Medical Waste have been developed and are being reviewed by administrators of privately run hospitals. The Draft has already been reviewed by the Ministry of Health's Environmental Control Division.
- The work of the Ministry of Health's Environmental Control Division over 1997 resulted in the following:-
 - Improvements effected to 18 sewage treatment plants
 - Chlorinators installed in twelve (12) sewage treatment facilities
 - Eight (8) Public health inspectors, one (1) assistant engineer, two (2) water plant operators and one (1) laboratory technician trained in wastewater management
 - 408 subdivision applications for sewage treatment systems approved, representing 97% of all applications (428).
- NRCA/CWIP assisted the Ministry of Water with the preparation of a new National Water Policy which supports the potential use of public-private partnership models.
- NRCA/CWIP assisted the Ministry of Water and National Water Commission with the development of a Sewerage Connection Policy.
- NRCA/CWIP facilitated the formation and operation of a Wastewater Management Partnership Programme in Negril facilitating civil society participation in the monitoring and oversight of wastewater services.
- NRCA/CWIP assisted the Ministry of Water and the National Water Commission with the development and implementation of an internal training programme to strengthen the operation and maintenance of wastewater facilities.

- NRCA/CWIP is facilitating the development of a wastewater systems operator certification programme.
- NRCA/CWIP sponsored the participation of key government and civil society leaders in training and orientation programmes to enhance understanding of public-private partnership models.

The priority actions will be to:

- 1. Continue the implementation of the IDB Solid Waste Management Project
- 2. Develop a Waste Management Policy
- 3. Create incentives for recycling and reuse of materials
- 4. Establish a fee structure based on the quantity and quality of discharge of industrial effluents.
- 5. Develop public/private partnerships in the management of sewerage works.

ACTIONS FOR 1999 – 2002

A. GENERAL WASTE MANAGEMENT

Actions # 3.1

The Draft Policy Framework for Waste Management developed by NRCA in collaboration with the Ministry of Local Government (Min.LG) and other partners will be reviewed. The Policy, after being approved by Cabinet, will be implemented by the Min.LG and other relevant agencies.

Action # 3.2

Through GOJ/CIDA-ENACT Project # 6220 a waste exchange initiative will be carried out to enable waste reduction concepts and practices to be implemented.

Action # 3.3

Through the GOJ/CIDA-ENACT Project #6210 capacity for clean technologies resources will be developed, including feasibility for eco-efficiency.

Action # 3.4

Waste Discharge Fees Regulations will be developed by NRCA/NEPA.

Action # 3.5

Kingston Restoration Company Limited will work with downtown Kingston communities under a Sanitation & Neighbourhood Clean-up/Maintenance Programme to improve solid waste management, sanitation and beautification within these communities.

B. SOLID WASTES

Action # 3.6

Local Government, starting with Metropolitan Parks and Markets, will determine the feasibility of recovering costs from medical, commercial and industrial entities through charging fees for solid waste collection. Government will then develop a system of cost recovery for solid waste collection and disposal that covers the costs of these services through the use of household disposal fees and tipping fees for industrial refuse.

. <u>Action # 3.7</u>

MPM will develop and implement proper quality control procedures for refuse disposal and will strengthen its efforts to eliminate illegal dumping.

Action # 3.8

Government will address the problem of non-biodegradable waste such as plastic bottles and styrofoam containers by creating an incentive framework for manufacturers/distributors who employ creative strategies to get the public to return these containers to source.

Action # 3.9

The Riverton City Disposal Site is to become a fully functional landfill. 70% of the landfill requirements should be fulfilled by 2001.

C. INDUSTRIAL EFFLUENTS, HAZARDOUS WASTES AND TOXIC CHEMICALS

Action # 3.10 NRCA will establish a fee structure based on the quantity and quality of discharge of industrial effluents. Action # 3.11 NRCA/NEPA will establish guidelines and codes of practice for at least two industrial sectors each year. Industry will be asked to submit their action plans for compliance and these action plans will be monitored.

Action # 3.12

NRCA/NEPA will conduct verification monitoring visits to at least 70 industrial locations annually.

Action # 3.13

A Solid and Hazardous Waste Policy will be developed and finalized.

Action # 3.14

The Environmental Foundation of Jamaica (EFJ) will develop a project for the establishment of an inventory of hazardous wastes in the island.

D. SEWAGE AND RELATED ISSUES

Action # 3.15

NRCA/NEPA will complete development of sewage effluent regulations including a fee structure.

Action # 3.16

The National Water Commission will commission a study of the costs of sewerage services and review its tariff structure with a view to making cost recovery.

Action # 3.17

NRCA/NEPA through CWIP will assist the National Water Commission (NWC) to develop public/private partnerships in the management of sewerage works.

Action # 3.18

NRCA/NEPA through CWIP will assist the National Water Commission to finalize and disseminate the New Sewerage Connection Policy.

Action # 3.19

NRCA/NEPA through CWIP will facilitate formation of public participation models for improved wastewater system management in Ocho Rios.

Action # 3.20

NRCA/NEPA through CWIP will facilitate the analysis of tertiary wastewater treatment options for targeted sewerage systems.

Action # 3.21

NRCA/NEPA through CWIP will support the introduction of a wastewater operator certification programme.

Action # 3.22

The NWC will embark on a three year Sewage rehabilitation, operation & maintenance Programme to enable existing sewage treatment systems to function at the level to which they were originally designed.

4. **PROTECTION OF THE ATMOSPHERE**

ISSUES

The atmosphere is impacted negatively by industrial emissions, vehicle emissions, burning of waste including plastics and the use of ozone depleting substances.

According to the 1997 SOE Report air quality has been affected by increased emissions from industrial sources, vehicular traffic and open burning of household waste. The major contributors to air emissions include oil refining, bauxite-alumina processing, mining and quarrying, cement manufacturing, sugar processing and power plants.

Industrial Emissions

Emissions from fuel combustion, bauxite/alumina, cement, limes, waste treatment plants, a petroleum refinery, and a Sulphuric Acid plant have posed a serious threat to the atmosphere and to public health over recent years. Only a few of these industrial facilities are equipped with air pollution control equipment. Some of the major issues in the recent past are:

- Particulate pollution near bauxite/alumina and cement plants
- Complaints of nose and eye irritation in the vicinity of the Sulphuric Acid plant.
- Complaints of corrosion of roofs near bauxite/alumina plants.
- Heavy fuel oil (with high sulphur content) consumption doubled from 7.74 million barrels in 1988 to 13.67 million barrels in 1996 [Bover Environmental, 1997].

Vehicular Emissions

On-road transport has proven to be one of the most dangerous degraders of the urban environment. With increasing motor vehicle use and therefore increasing gasoline consumption, this has become a major issue for Jamaica. According to Bover Environmental, 1997 the motor vehicle fleet doubled from 171,000 in 1993 to 348,000 in 1999. It is therefore not surprising that gasoline consumption doubled from 2 to 4 million barrels between 1989 and 1996. This increased consumption of gasolene with the corresponding increase in vehicular emissions poses an increased threat to the atmosphere.

Montreal Protocol for the Phase Out of Ozone Depleting Substances (ODS)

The ozone layer will be particularly vulnerable over the next 20 years when atmospheric concentrations of ODS will be at or near their highest levels. Over the much longer terms, the health of the ozone layer will depend on the ability of parties to the Protocol to rid the atmosphere of existing ODS and prevent the release of new ones. The Montreal Protocol Programme is being implemented in Jamaica and the phase-out programmes must be continued for the desired end result to be achieved.
PROGRESS TOWARDS ADDRESSING ISSUES

- ➢ An Air Quality Subcommittee of the NRCA's Interagency Technical Committee has been established.
- Draft air quality standards and draft provisions for inclusion in air quality regulations have been prepared and are being reviewed through a series of consultations with various sectors and the public
- Ambient Air Quality Regulations have been developed.
- Stack Emission Standards have been developed under the NRCA/JPSCO Demand Side Management Demonstration Project.
- Draft National Noise Standards have been developed under the NRCA/JPSCO Demand Side Management Demonstration Project.
- > Vehicle Emission Standards and Regulations have been developed.
- In 1998 Jamaica began implementing the programme to phase out the use of leaded gasoline by 2003. PCJ is the implementing body and a National Action Plan has been prepared.
- Jamaica is a signatory to the Montreal Protocol on the Phase Out of Ozone-Depleting Substances. Consequently, the following are some achievements to date:- The establishment of two recovery/recycling centres; The appointment of a Freeze Committee in anticipation of the July 1999 freeze on the importation of CFCs.
- Legislation restricting importation of CFCs from July 1999 to December 2005 was effected in July 1999.
- A project to provide training and equipment for the Mobile Air Conditioning (MAC) Sector began implementation in March 1999.
- The development of a Refrigerant Management Plan commenced in June 1999 with a "Train the Trainers Workshop in Good Practices in Refrigeration"
- Jamaica is involved in the preparation of a Halon Bank Management Plan for the English Speaking Caribbean.

The priority actions will be to:

- 1. Improve monitoring of air emissions.
- 2. Ensure that new and existing facilities come into compliance with the Ambient Air Quality Standards (August, 1996) and Stack Emission Standards (February, 1997).
- 3. Continue implementation of the programme to phase-out leaded gasoline by year 2003.
- 4. Enforce the current restriction on the importation of chlorofluoro-carbons (CFCs) and improving public awareness with regard to alternatives to CFCs in the different sectors.
- 5. Complete the preparation of Air Quality Regulations and have them implemented.

ACTIONS FOR 1999 – 2002

Actions #4.1

Government will finalize air quality regulations under the NRCA Act and Ambient Air Quality monitoring will become a regular exercise. Training will be provided through GOJ/CIDA-ENACT Project # 3140.

Action # 4.2

Government will develop Stack Emission Standards for four source categories and will initiate a programme for licensing discharges of stack emissions from major sources.

<u> Action # 4.3</u>

The Ministry of Transport and Works will develop a policy on importation of motor vehicles which takes into consideration environmental issues.

Action 4.4

Petrojam will produce fuel according to new specifications to meet more environmentally benign standards

Action # 4.5

Government will continue phasing out the use of ozone depleting substances through fulfilling its obligations under the Montreal Protocol and will introduce an Ozone Act. The production, importation and sale of leaded gasoline will cease by the year 2003.

Action # 4.6

A module on "Good Practices in Refrigeration" is to be incorporated into the curriculum of those institutions which deal with training in principles of refrigeration.

Action # 4.7

Government will continue to educate industries on the use of alternatives to methyl bromide and halons.

5. ENVIRONMENTAL HEALTH

ISSUES

The field of Environmental Health seeks to ensure that people live, work and enjoy recreation without risk to their health, and that future generations may also do so. The connection between quality of the environment and human health is obvious and Environmental Health is therefore fast becoming a priority in Sustainable Development.

Pan American Health Organization (PAHO) has identified the following to be some of the major areas of concern for Environmental Health in Jamaica:

- Drinking Water Supplies from source through distribution;
- Waste water and excreta management;
- · Household solid waste management and Industrial waste management;
- Urban and rural land use, housing and human settlements;
- Ambient air quality;
- Quality of marine, surface, ground and recreational waters;
- Hazards in the work environment;
- Hazards and toxic materials in the environment;
- Natural disasters;
- Travel and Tourism and its effects on the environment;
- Transportation and its effects on the environment;
- Exposure to insects, rodents and other vectors of disease;
- Food quality and safety;

Environmental health is primarily concerned with minimizing the specific and cumulative effects of environmental degradation on the quality of life of a nation as well as health risks to visitors.

There is an urgent need to assemble resources to strengthen existing institutions capable of scientific monitoring, and establishing networks for measuring levels of pollution, and providing the technical evidence that will allow for successful action under existing environmental laws.

PROGRESS TOWARDS ADDRESSING ISSUES

- PAHO, in collaboration with the Ministry of Health (ECD), the National Water Commission (NWC) and the local Authorities have introduced a reliable water disinfecting system (SANILEC Disinfecting System) to be used in parish drinking water supplies. The SANILEC Disinfecting System is being piloted in three (3) parishes, namely St. Mary, St. Elizabeth and Manchester, prior to use in other parishes.
- The outputs of a recent study on Cesspool Waste which was completed by PAHO, have been sent to the Ministry of Health for review, comments and action. The draft document sets out data and

information regarding the collection, transport and alternative scenarios for cesspool (feacal waste) treatment and disposal.

- Food Quality and Safety PAHO and FAO are presently providing a core training course for both national and regional health personnel in Meat & Poultry Inspection, including fish hygiene. The course will emphasize the use of the HACCP methodology for food protection and how to respond to the requirements of CODEX and the ISO 9000 and 14000.
- Hazards in the Work Environment PAHO's recent intervention in this area provided support for the preparation of a draft National Workers Health/Occupational Plan which was presented at a joint PAHO/ILO regional conference. PAHO has also promoted local training courses at UWI and supported the engagement of a number of Consultants in executing workshops in Occupational Health at UWI and in the private sector.
- Ambient Air Quality PAHO supported and collaborated with EPA, NRCA and the Petroleum Corporation of Jamaica in hosting a National Workshop on the Removal of Lead from Gasolene in October 1997 in relation to the agreements arrived at during the Summit of the Americas in 1994.
- Over 1997, the Environmental Control Division of the Ministry of Health collected 149 air samples at twenty (20) different sites in Kingston, St. Andrew and St. Catherine. Samples were analyzed for Sulphur Dioxide (SO_x), Nitrogen Dioxide (NO_x), Carbon Monoixde (CO) and Particulate Matter (PM10).
- Travel & Tourism and Its Effects on the Environment Regional Workshops were held in Trinidad (CAREC) and CPC Barbados in Facilitating the Development and Execution of Projects in Environmental Health and Sustainable Tourism. In addition, PAHO is giving support to the Traveler's Diarrhoea Study that is now being completed in the Western Region.
- Legislation PAHO has engaged the services of both a Legal and Human Resource Consultant to provide ongoing support to the Ministry of Health in both the revision of the Public Health Act and restructuring of their four (4) Environmental Health Departments.

The priority actions will be:

- Promoting access to potable water, safe disposal of domestic/industrial wastes and clean air. This will be done by, *inter alia*, (i) lobbying relevant agencies and/or enforcing legislation and (ii) surveillance of the generation, collection and disposal of liquid, solid, toxic/hazardous, infectious /medical wastes and excreta.
- The use of EIAs by the Ministry of Health and the Mining and Construction Industries.

ACTIONS FOR 1999 - 2002

Action # 5.1

The Ministry of Health will pursue strategies (such as conducting EIAs) to protect the environment and promote health for sustainable development.

Action # 5.2

The Ministry of Health will lobby relevant agencies, enforce legislation and inspect the generation, collection and disposal of liquid, solid, toxic/hazardous, infectious /medical wastes and excreta.

Action # 5.3

The Ministry of Health will collaborate with specific agencies supplying utilities to ensure that health standards are included in their plans.

Action # 5.4

The Ministry of Health will control vectors through promoting the use of biological agents or the judicious use of chemicals in communities.

Action # 5.5

The Ministry of Health will develop an environmental information system.

Action # 5.6

The Mining sector will promote environmentally friendly practices and will seek to minimize disturbances and dislocation of communities in which mining takes place. A Complaints Desk will also be established.

6. LAND RESOURCES: AN INTEGRATED APPROACH TO PLANNING AND MANAGEMENT

ISSUES

Land has not been allocated to its optimum use in Jamaica. Less than optimum land use management has been manifested in rural/urban drift and a plethora of environmental and socio-economic problems in the human settlements of urban areas; deforestation and the destruction of watersheds; and inefficient, unsustainable agriculture. Forestry, agriculture and human settlements are at present the three most widespread uses of land in Jamaica.

Population growth, coupled with industrial and commercial expansion has resulted in intense competition for land. As a result human settlements are plagued with persistent problems due to intense competition for land. The population of the island is expected to increase to 3 million by the year 2000 and sixty percent (60%) of this population is projected to be urban. Current problems in settlement development include: high incidence of rural/urban drift, insufficient integration of urban and rural development, disparity in the provision of facilities and amenities, housing shortages, scattered and linear development, and lack of employment opportunities.

The unsatisfactory land use situation has been exacerbated by such factors as:

- An inadequate land information data-base
- Duplication of effort and inefficient use of resources with too many agencies in Government having responsibility for land management.
- The goals enunciated by the National Physical Plan have not been achieved primarily due to the lack of co-ordination between economic and physical planning, resulting in a tendency for land use planning to be isolated at the national, regional and local levels.
- A low level of participation by local communities, parish and community-based organizations, the private sector and NGOs in the land use planning and monitoring process, resulting in a lack of commitment at the implementation stage.

The 1997 SOE Report cites the 1996 National Land Policy document which states that 50%-75% of all development takes place outside the formal regulatory or economic sector. The report also indicates that there has been an increase in squatting on marginal lands such as wetlands, steep slopes, gully banks and even in gullies. Undoubtedly, a contributor to this is the high incidence of rural to urban drift caused by a lower level of investments, facilities, and amenities in rural areas. This insufficient integration of urban and rural development needs to be urgently addressed. Improved coordination of development planning and land management with the involvement of communities in decision making and monitoring is critical.

PROGRESS TOWARDS ADDRESSING ISSUES

- The National Land Policy was completed in 1996.
- > The Policy for Jamaica's System of Protected Areas was completed in 1997.
- The Watershed Management Green Paper was finalized in 1999 and is currently the subject of public consultation.
- The Land Information Council of Jamaica was established in 1991 and is continuing its activities as stated in the Land Policy so as to harmonize current efforts at Geographical Information System development in support of the environment and physical planning.
- Government has reviewed the roles and functions of all the agencies involved in land management with a view to promoting more coordinated decision-making and eliminating inefficiencies. This has resulted in the decision to merge the Office of Titles, The Survey Department, The Lands Department and The Land Valuation Department into a National Land Agency.
- In terms of the planning approval process, Government has been focusing on harmonizing the work of the Town Planning Department and the NRCA with particular reference to the administration of the country's Environmental Impact Assessment. This process should become even more streamlined with the merger of the three entities to form the National Environment and Planning Agency (NEPA).
- > The Town and Country Planning Act has been amended to control the non-conforming use of land
- > A Draft National Physical Plan has been prepared.
- > The St. Ann Parish (Provisional) Development Order was promulgated.
- > The preparation of the South Coast Sustainable Development Plan
- The International Centre for Environmental and Nuclear Sciences (ICENS) has developed some geochemical maps of Jamaica under its geochemical mapping programme. The data has potential to impact significantly in the area of agricultural land use, hydrology, mining and industry, geological mapping, and physical planning and it is presently providing assistance in the development and exploration of marginal lands for agricultural purposes.
- > The Registration (Strata Titles) Act has been amended
- ▶ In the Office of Titles all caveats and 49,172 titles have now been scanned and indexed.
- > The Survey Department and the Office of Titles and the Lands Department have all been networked.
- A Document Imaging System has been implemented and tested.
- ➤ The Dealings Tracking System (DTIS) and the New Land Titling Information Systems (LTIS) applications have been modified and are being tested for proper functioning and year 2000 compliance.
- To support the creation of the cadastral index all 1:12,500 topographic map sheets covering the island have been digitally converted and quality checked. Work on the cadastral index is continuing with the digital conversion of Land Valuation enclosure maps. 7,123 of the 20,000 enclosure maps have been converted accounting for a total of 225,953 out of the 600,000 parcels.
- Under the Land Administration & Management Project (LAMP), technical work plans have been developed and are being funded by IDB.
- Revision of the Real Estate Dealers and Developers Act
- > A Land Divestment Committee is in place and four regional Secretariats have been established
- Establishment of a National Shelter Committee
- A Secretariat has been appointed to implement the Emancipation Lands Project
- > A National Resettlement Policy has been prepared and is being finalized.
- Draft Policy on Squatting prepared.
- The Programme for Resettlement and Integrated Development Enterprises (Operation PRIDE) has been merged with the National Housing Corporation and the Caribbean Housing Finance Corporation to form a new organization called the National Housing Development Corporation (NHDC). The programme should benefit from the administrative strength of these organizations.

- The ICENS has surveyed twenty-three sites across Jamaica for total suspended particulates (TSP). The results indicate that vehicle emissions are the major source of lead in the particulate matter.
- The ICENS has completed a survey of the levels of the usual parameters (pH, hardness, sodium, chloride, nitrate, phosphate etc.) and of heavy metals in water and sediments in Jamaica.
- The ICENS has analysed the peat in the Negril Morass for 25 elements including arsenic, the rare earths and radioactive elements.

The priority actions will be:

- 1. The continued implementation of the 1996 National Land Policy which has as its major objective the establishment of a comprehensive geographical information system in support of environment and physical planning.
- 2. The revised National Physical Plan will be implemented.
- 3. The establishment of the National Land Agency
- 4. The finalization and implementation of a National Resettlement Policy.
- 5. Finalization of Policy on Squatting.

ACTIONS FOR 1999 - 2002

A. Land Administration

Action # 6.1

A National Land Agency and a National Estate Management Agency will be established.

Action # 6.2

Government will increase coordination between economic and physical planning as part of the strategies and plans under the "Agenda 21 Project".

Action # 6.3

A Land Inventory will be prepared to aid the decision making process on land issues and accessibility of land-related information to all segments of the society.

Action # 6.4

The National Physical Plan will be finalized and implemented.

Action # 6.5

Development Orders will continue to be prepared to ensure that land development conforms with established standards and a Development Plan will be prepared for each parish. Work will continue on the drafting of Development Orders for Kingston and St. Andrew, Manchester and Negril.

Action # 6.6

A Local Planning Authority will be established for Portmore to encourage more integrated planning of activities in the various schemes, increased conformity to zoning regulations and a reduction in planning infringements.

Action # 6.7

Government will work with selected communities to develop and maintain Green Spaces with a view to improving on the aesthetic appeal of these communities.

Action # 6.8

The Land Information Council of Jamaica will continue its activities so as to harmonize efforts of GIS development in support of the environment and physical planning.

Action # 6.9

The Mines & Geology Division will prepare a Mining Policy to promote the development of this sector.

<u> Action # 6.10</u>

The Mines & Geology Division of the Ministry of Mining & Energy will enforce the terms of the Quarries Control Act by:- (i) Establishing Quarry Zones, (ii) Establishing Monitoring Committees and (iii) Initiating Sediment Budgets. More quarrying zones will be delineated in order to monitor more easily and encourage safe quarrying and preservation of the environment.

Action # 6.11

The Mines and Geology Division will assure the restoration of mined-out lands by enforcing the mining regulations guiding the restoration of mined-out lands

Action # 6.12

The Mines & Geology Division will develop a database on the country's nonmetallic resources and establish a programme of investment promotion in this subsector.

Action # 6.13

The survey department will continue its cadastral mapping exercise.

Action # 6.14

The ICENS will continue geochemical mapping in Jamaica and will construct a high precision regional geochemical database of Jamaica.

B. Human Settlements

Action # 6.15

The draft Housing / Human Settlements Policy for Jamaica will be revised and submitted to Parliament as a Green Paper.

Action # 6.16

Government will continue the process of providing land to accommodate a range of shelter solutions.

7. FORESTRY AND WATERSHED MANAGEMENT and SUSTAINABLE MOUNTAIN DEVELOPMENT: COMBATTING DEFORESTRATION AND DROUGHT

ISSUES

Forests cover approximately 32 percent of the country, mostly in areas of rugged terrain such as the Blue Mountains and the Cockpit Country and dry, hilly uplands of poor soils in the southern, western and northwestern parts of Jamaica. Another 30% of Jamaica is covered with a mixture of forest and cultivation. Few large areas of virgin forest exist in Jamaica, and most of the forest or other woodlands are comprised of ruinate or secondary growth.

Of the 26 Watershed Management Units, 17 have been declared critical, i.e. they have been found to be very degraded and in need of urgent remedial work to return them to an acceptable state of health. This is critical to improving the availability and quality of water.

Much of the forestland is on steep or rugged terrain with little access. Because of inaccessibility, only about twenty-six percent (26%) of the natural forests is used for timber production. However, the use of mangroves and other species from both coastal and highland forest for fuelwood and charcoal manufacture, production of yam sticks, and fenceposts has resulted in considerable environmental damage, particularly as it relates to watershed degradation.

One of the most serious aspects of deforestation is the clearing of steep, unstable slopes for cultivation and illegal settlements. Land that should have remained under forest cover has been cleared for other uses (e.g. coffee production) that are not compatible with soil and water conservation. This is particularly risky when clear stripping and slash and burn methods are employed, as they sometimes lead to exposure to the elements and subsequently loss of the topsoil.

The 1997 SOE Report states that in 1995, deforestation was estimated to be occurring at a rate of 10,000 hectares per year and that this, coupled with poor agricultural practice results in loss of over 80 million tons of topsoil each year. Less than 6% of Jamaica's forest is relatively undisturbed with the remainder listed as badly disturbed (ruinate) secondary forest. Also, there has been a trend towards both reductions in the flow of many rivers as well as an increase in flooding. The document also reports that each of Jamaica's 26 watersheds management units have portions that are considered to be degraded. Improved management of the island's forest and better watershed management are expected to result from the passage of the 1996 Forest Act. and the 1995 Water Resources Act.

There is considerable scope for the expansion of agroforestry among hillside farmers since these practices could reduce the rate of erosion and increase overall productivity through the inter-cropping of agricultural crops and woody perennials on the same holding. The Jamaica

National Forestry Action Plan (NFAP) of 1990 listed as priority projects, the introduction of agroforestry systems in the Blue Mountains and land use control in upper watersheds.

PROGRESS TOWARDS ADDRESSING ISSUES

- UNDP Watershed Management Project Development of Institutional Capabilities of the Watershed Management Branch of NRCA completed its first phase in 1998 and Phase 2 is now being implemented.
- ▶ IDB Integrated Watershed Management Project commenced in 1998.
- ▶ UNDP National Forestry Action Plan (Bridging Project) began in 1998.
- Northeast Jamaica Watershed/Agro-forestry Project that seeks to ensure proper land use, soil conservation practices and use of local forest products in the Rio Grande Valley is being implemented.
- CIDA-Trees For Tomorrow Project that is aimed at ensuring the sustainable use of land and forest resources in Jamaica is being implemented.
- > The Forestry Act and the Forest Land Use Policy were finalized and promulgated in 1996.
- > The Forestry Department has established stumpage rates for a wide range of tree species.
- > Jamaica's National Integrated Watershed Management Programme is being developed.
- Under the PCJ Demonstration Fuelwood Project in Font Hill 33,700 trees have been planted. There has been a survival rate of 90%. 70,000 leucaena seedlings have been produced and the cost of seedlings have been reduced
- The PCJ presently maintains a fuelwood facade on either side of the main road from Crawford to Scotts Cove. Plans are afoot to expand it.
- The Morant/Yallahs Agricultural Development Project is being implemented by RADA and its main objective is to manage and protect the Morant/Yallahs watersheds to facilitate sustainable agricultural production within the area.

The priority actions will be:

- 1. To strengthen the Forestry Department. The Forestry Department's highest priority will be to protect, from further encroachment by cultivators, livestock owners and timber cutters, what is left of Jamaica's rich and unique forest diversity. The intent is to preserve these forests intact for biodiversity, watershed protection and eco-tourism.
- 2. To complete and implement the National Forest Management and Conservation Plan.
- 3. To complete and implement the Watershed Management Policy and the National Integrated Watershed Management Programme. Both documents call for the development and implementation of projects to rehabilitate forests and watersheds across the island.

ACTIONS FOR 1999 - 2002

Action # 7.1

The National Forest Management and Conservation Plan will be completed. The Forestry Department will implement this plan.

Action # 7.2

The Forestry Department will implement more effective patrolling and policing of transported timber and enforcement laws, backed by environmental education and through co-operation of those living on the forest fringes.

Action # 7.3

The Forestry Department will be strengthened as an institution to undertake its changed role to: Educate the public about trees, forests and the environment; Create a database of potential tree growers; Organize tree grower groups; Distribute of free seedlings; Document case studies.

Action # 7.4

The Forestry Department will develop appropriate indicators of achievement and will develop and implement a monitoring and evaluation system.

Action # 7.5

The Forestry Department will develop local Forest Management Plans.

Action # 7.6

The Forestry Department will produce 2,250,000 seedlings by year 2004.

Action # 7.7

The Forestry Department will review stumpage fees to reflect true market values.

Action # 7.8

The Forestry Department will conduct a survey and analysis of the trend and pattern of household fuel usage over the past fifteen years.

Action # 7.9

The Forestry Department will develop and maintain recreational sites at suitable locations in the forest reserves to provide forest recreation in the form of camping, hiking and general appreciation for the forest environment

<u>Action # 7.10</u>

The Draft Watershed Policy will be finalized and implemented by NRCA/NEPA.

Action # 7.11

Under the GOJ-USAID "Ridge-to-Reef" Project various activities aimed at improving environmental practices in selected watersheds will be carried out.

Actions # 7.12

NRCA/NEPA will coordinate planning, development and management of watersheds by being the executing agency for the National Integrated Watershed Management Programme (NIWMP) and by providing the Secretariat for the National Watershed Steering Committee. Government will provide the resources for the strengthening of the Watershed Branch in order for it to carryout its proposed mandate.

Action # 7.13

Under its "Tree-mendous 2000 & Beyond " programme, the NWC will plant 5000 trees per year for the next five years.

Action # 7.14

The Morant/Yallahs Agricultural Development Project will continue in the Morant/Yallahs watersheds.

8. FRESHWATER RESOURCES: DEVELOPMENT/ MANAGEMENT / USE

ISSUES

In Jamaica, groundwater (i.e. water in wells) accounts for 92% of the water supplied to all sectors (agriculture, domestic, industrial and tourism). Of the total supply of fresh water, agriculture is the sector that uses most (75%) followed by Domestic (17%), Industrial (7%) and Tourism (1%).

Unfortunately, Jamaica's groundwater resources have, over the years, shown a gradual deterioration in quality. The main types of contamination identified are :

- 1. Saline Contamination of coastal aquifers resulting from (a) prolonged withdrawal of quantities of groundwater in excess of the safe yield, (overdevelopment) and (b) poor well field designs.
- 2. *Caustic Soda Contamination* resulting from the ponding of caustic "red mud" wastes from the bauxite/alumina industry in karstic depressions, from where it infiltrates to the groundwater table.
- 3. *Nitrate Contamination* resulting from seepages from soakaway pits built for sewage disposal.
- 4. Organic & Bacteriological Contamination resulting from the disposal of dunder and other effluent from the sugar/rum industry into sinkholes in karstic aquifers

Several of Jamaica's rivers are severely polluted by seepage from pit latrines, coffee wastes, agricultural runoff including pesticides, fertilizers and dunder from the sugar factories and rum distilleries. The Black River is a noted example of a river polluted by dunder, this coming from the Appleton Distillery.

Watershed protection and rehabilitation is of paramount importance in securing the source of our fresh water. Surface and groundwater must be protected from pollution sources and the necessary action taken to reduce the pollution risk. Farmers such as coffee growers must be encouraged to adopt organic/eco-friendly agricultural production practices where crops are produced without the use of chemicals and the absolute minimum amount of chemicals is used in animal husbandry. The introduction of national standards that prescribe the acceptable quality of industrial and sewage effluents to be discharged into the environment and the use of Environmental Impact Assessments where applicable should go a far way in mitigating the negative impacts of agricultural production on fresh water resources.

The 1997 SOE Report states that deforestation, poor land use and inappropriate construction practices in the watersheds have reduced the flows of rivers, accelerated soil erosion, and caused siltation of reservoirs and damage to water and treatment works. The document also notes that generally the chemical quality of water sources is good, meeting World Health Organization and

Jamaica Interim Standards. Groundwater quality varies depending on the geology and landuse. Groundwater in the limestone areas is more prone to bacteriological contamination than in the alluvial deposits. However, in some alluvial areas such as the Liguanea Plains groundwater shows elevated nitrate levels contaminated by sewage seepage from soak-away pits. Also, the bacteriological quality of surface water is generally poor where people live and keep animals in the vicinity of water sources. The quality of piped water is not always acceptable with samples often testing positive for feacal coliform. Approximately 60% of the water produced is unaccounted for by the National Water Commission, that is, it is lost through illegal connections, leaks, or incorrect billing.

PROGRESS TOWARDS ADDRESSING ISSUES

- Trade effluent standards and Sewage effluent standards, developed in 1995 and 1996 respectively, seek to address the issue of fresh water contamination by sewage. The corresponding regulations now being developed should further contribute to a reduction of contamination.
- Draft ambient and recreational water quality standards have been developed by the Water Quality Standards Committee and are being reviewed by associated agencies.
- The NRCA Permits and License System which also covers effluents/discharges from agriculture production began operating in 1997.
- The Pesticide Control Authority has added additional dangerous agricultural chemicals to the list of banned imports.

The priority actions will be:

- 1. Routine water quality monitoring of freshwater sources and channels especially in at risk areas such as Portland, St. Mary, Trelawny and Rural St. Andrew.
- 2. The promotion of a reduction on the reliance of chemical use in agriculture and a public awareness programme on the acceptable environmental practices at or near water sources.
- 3. Development of system of volume based water extraction charges to encourage the more efficient use of water, particularly among major users.
- 4. Curtailment of the present practice of releasing dunder and coffee wastes in neighbouring waterways.

ACTIONS FOR 1999 - 2002

<u>Action # 8.1</u>

Through the routine water quality monitoring by the NRCA/NEPA, the number of parameters tested will be expanded to include heavy metals, pesticides residue and other organic chemicals. Quarterly and annual freshwater quality reports will be prepared. The NRCANEPA Laboratory will be upgraded to undertake these tasks.

Action # 8.2

The ICENS will expand studies on surface and groundwater quality in Jamaica

Action # 8.3

Government will finalize standards for ambient water quality, irrigation water and recreational water.

Action # 8.4

The Water Resources Authority will introduce a system of volume based water extraction charges to encourage more efficient use of water, particularly among major users. The revenue gained from this will be used to improve the monitoring of water quality and availability.

Action # 8.5

The National Water Commission will transfer the service of provision of potable water through management contracts to the Private Sector.

Action # 8.6

NRCA/NEPA will collaborate with the Pest Control Authority (PCA) and RADA to promote an Integrated Pest Management Programme which will result in a reduction of reliance on chemical pesticides in agriculture.

Action # 8.7

Government will establish the feasibility of levying specific taxes on environmentally damaging products as well as the banning of some from use. These taxes would be aimed at limiting the use of such products to their most essential applications and at preventing the pollution of rivers, streams and other water bodies.

9. SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT

ISSUES

Other contributors to the lack of growth in the agriculture sector are: inadequate technology, marketing and transportation; praedial larceny, insecurity of tenure, and lack of credit.

The 1997 SOE Report indicates that Agriculture (including fisheries, forestry and pasture) continues to play a major role in the economy employing 36% of the population and that the sector reported positive growth for the seventh consecutive year. Agriculture continues to be the primary user of water, representing 75% of demand and water use is particularly heavy in the Rio Cobre and Rio Minho basins. Projected demand by the year 2015 indicates shortages in both basins as well as in the Kingston and St. Andrew basin. Use of chemicals for agriculture continues to rise as indicated by import increases of 95% for 1996 over 1995 levels. Despite the above-mentioned positive signs agriculture is not achieving its full potential in providing a comfortable way of life for the majority of farmers nor has it developed to the point where the sector meets local consumption and export demands. Some reasons for this are:

- Under-utilization of large acreages of arable lands
- Small, inefficient farms located on low productivity lands
- Over-intensive cultivation and misuse of steep slopes
- Inadequate distribution of land, lack of security of tenure and inadequate funding to develop model productive farming operations.

The Government needs to put measures in place to improve on the positive trend in Agriculture while decreasing its negative impact on the environment.

PROGRESS TOWARDS ADDRESSING ISSUES

- The Hillside Farmer Support Project which ended in 1998 provided financing in the form of loans to ???? small farmers with a aim of improving their income levels, creating employment and reducing migration from the project area.
- > The Morant /Yallahs Agricultural Development Project is being implemented by RADA.

The priority actions will be:

1. Reviewing the Land Development and Utilization (LDUC) Act in order to rationalize the process of preserving arable lands for agricultural purposes.

- 2. Improve the agricultural mapping system to identify the most suitable lands for various types of crops.
- 3. Training hillside farmers to adopt agro-forestry systems that are environmentally friendly.
- 4. Improving security of tenure on agricultural lands.

ACTIONS FOR 1999 - 2002

Action # 9.1

The Land Development & Utilization Commission (LDUC) Act will be reviewed with a view to rationalizing the process of preserving arable lands for agriculture purposes.

Action # 9.2

The agricultural mapping system will be reviewed to identify land suitability for various types of crops and Land Use and Land Capability Maps will be prepared. Government will also endeavor to bring about a significant reduction in the amount of under utilized arable land.

Action # 9.3

Government will continue to train hillside farmers to adopt agro-forestry systems that are environmentally friendly and will provide support by ensuring that the necessary facilities for agricultural production such as credit facilities and security of tenure are readily available.

Action # 9.4

RADA will seek to improve the capabilities of extension officers to carry out practical on-farm demonstrations by equipping them with extension kits.

Action # 9.5

RADA will identify soil conservation treatments such as contour barriers, grassed waterways, check dams, tree orchards, intercropping and minimum tillage suitable for given areas and encourage and assist farmers to effect same in support of sustainable agriculture

Action # 9.6

RADA will encourage the production of organically produced crops to satisfy the growing demand for health foods by demonstrating organic farming to farmers.

10. TOURISM AND THE ENVIRONMENT

ISSUES

Jamaica's natural environment is its most appealing asset. The island's diverse and unique terrestrial, marine, and coastal features have constituted a decisive prerequisite for the island's attractiveness as a tourist destination hence the arrival of 1.2 million visitors to the island in 1998. The marine and coastal habitats have been the most preferred location for our six resort areas and their physical landscape comprises the tourism product which provides the sun, sea and sand experience. For the past 30 years, Jamaica has benefited from the recreational value of the resort areas' physical and cultural attributes as the country, in 1998, earned US \$1,297 million in foreign exchange.

Undoubtedly, the tourism sector over the years has become the largest and most important sector of the Jamaican economy. Besides making a sizable economic contribution in terms of wealth creation (GDP), it employs over 80,000 people with 30,131 directly employed in the accommodation sector. Further as a vehicle for community and national development, the tourism industry's ability to cultivate strong linkages with other sectors of the formal economy such as agriculture, manufacturing, and construction is manifested in ways which few other sectors could.

However, the growth/success of the Jamaican tourism industry over the past 30 years was achieved to the detriment of the environment. The industry makes strong demands on the environment, such as the use of resources for craft items, use of wetlands for facilities and waste disposal, removal of sea grass beds at swimming beaches and blocking of visual and public access to the coast. Irreversible ecological and geomorphological damage to strips of coast, in particularly the beaches, caused by the construction of heavy tourism facilities in inappropriate locations has destabilized fragile sand dunes.

While Jamaica's tourism industry has over the years made its share of mistakes with regard to the proper care of the environment, the industry has taken bold steps not only to correct previous errors but also to grow in harmony with the environment. For some stakeholders in the industry, protecting the environment has become both a moral obligation and a business imperative.

Jamaica is committed to the challenge of putting tourism on the path of sustainable development. The Government is in the process of developing a Master Plan for Sustainable Tourism Development. This plan, will provide *inter alia* ways in which the sector can achieve a balance between the built, natural, cultural and human environment. Through this enlightened approach to tourism development, emphasis is being placed on environmental protection; environmental management and carrying capacity assessments of the resorts which will indicate limits of acceptable change. The preparation of a locational strategy for future tourism development is a major component of this initiative which will be determined by the carrying capacity assessments to be done. So far environmental impact assessment studies

have been carried out on the impact of tourism activities on the Rio Grande and the Black River. Also seen as another priority objective, is the development of mechanisms which would enhance social-cultural and economic integration of the industry with local communities.

In looking at other alternatives from sun, sea and sand, and in moving the pressure away from the coastal areas, other forms of tourism such as nature based, cultural heritage and health tourism are being considered. The current policy directions outlined in the National Industrial Policy speak to this new approach.

The private sector has followed suite and spearheaded the "*Greening*" of the tourism industry. The operations of the accommodation and attraction sub-sector should therefore reflect energy efficiency, water conservation and solid waste management practices.

The future planning of the tourism sector must ensure that tourism development takes into account the demands from other sectors and vice versa to ensure that tourism development grows in parallel with other needs of the locality and country.

PROGRESS TOWARDS ADDRESSING ISSUES

- The preparation of environmental manuals/tool kits by the private sector. These guidelines comply fully with national and international environmental standards and legislation as they provide a framework for ethical environmental behaviour.
- Negril and Port Antonio became the first destinations in the world to have hotels selected, audited and registered for GREEN GLOBE certification programme. To date six Jamaica hotels became the first hotels in the world to attain certification by GREEN GLOBE as green hotels.
- Three of the audited and certified hotels have been selected finalists for this year's Caribbean Hotel Association (CHA) Environmental Award. Mockingbird Hill, Sandals Negril and Negril Cabins.
- The initiatives of the Half Moon Hotel in Montego Bay are to be commended. For instance, they reuse treated effluent from their own sewage treatment plant to water their golf course and lawns. The philosophy of environmental protection is ingrained at every level of operation at the hotel, and, as a result of their effective environmental management plan the hotel has been awarded numerous environmental awards on an annual basis since 1995.
- Carrying Capacity Assessments of three major resort areas: Negril, Ocho Rios and Montego Bay.
- Carrying Capacity Assessment of tourism activities on the rivers: Black River and Rio Grande have been carried out.

The priority actions will be:

- Completion and implementation of the Master Plan for Sustainable Tourism Development.
- Development of a comprehensive set of standards/ regulations and
- A public awareness programme.

ACTIONS FOR 1999 - 2002

Action # 10.1

The Office of the Prime Minister – Tourism Division will formulate integrated, coherent policies and plans that take into account the overall impact of tourism on the economy, the environment and society, paying close attention to the long-term perspectives of various development sectors. The Master Plan for Sustainable Tourism Development will be finalized and implemented.

Action # 10.2

The Office of the Prime Minister – Tourism Division in collaboration with the Tourism Product Development Company (TPDCo) will develop a framework for standards, regulations and legislation for the long-term sustainable development of tourism. This will take into account the fragility of eco-systems, and the increased impact of tourism on the population, especially in urban settlements and infrastructure.

Action # 10.3

The Government will develop environmental rewards and incentives to encourage hotels and other Tourism related entities to adopt environmental management systems and to operate within international standards for example, ISO 14000 and the Green Globe Award.

Action # 10.4

The Jamaica Tourist Board and the Tourism Product Development Company will improve public awareness and understanding of the potential positive impacts of eco-tourism.

<u> Action # 10.5</u>

Under the GOJ-USAID "Ridge-to-Reef" Project various activities aimed at promoting sustainable tourism in selected sites will be carried out.

11. CONSERVATION OF BIOLOGICAL RESOURCES

ISSUES

Jamaica's species diversity shows characteristics typical of islands as compared to mainland. Jamaica has an unusually high level of endemism and has been ranked fifth among islands of the world in terms of endemic species. Approximately 3,304 vascular plants are found in Jamaica, and of these 923 are found nowhere else in the world. Of the over 600 species of ferns found in Jamaica, over fourteen percent (14%) of them are found nowhere else in the world. There are 514 species of snails, 133 species of butterflies, 59 species of ants, over 211 species of rotifers and 9 species of grapsid crabs.

According to Jamaica's Conservation Data Centre, 221 endemic species are classified as 'critically imperiled' and 'especially vulnerable to extinction. This has been due mainly to habitat deforestation or conversion and unsustainable wild life harvest. This results from the heavy reliance of the population on ecosystems such as reefs, wetlands and forests for economic survival. Lack of public awareness as to the vulnerability of these biological systems is also a major contributor to the problem.

The 1997 SOE Report noted that reliable baseline data is needed for effective management of our biological resources is often not available and therefore estimates of the rate and extent of destruction of habitats, and the loss of species are generally sketchy and incomplete. Also, degradation of ecosystems continues because of an overall lack of public awareness, economic pressures to use biological resources at unsustainable levels, and inadequate enforcement of the laws and regulations.

Jamaica has acceded to and ratified a number of international treaties and conventions related to the conservation of biological resources and sustainable use. This, in addition to the amendment of the Wild Life Protection Act will go a far way in providing the framework for the development and implementation of programmes for sustainable use of our biological resources.

PROGRESS TOWARDS ADDRESSING ISSUES

- Amendments have been made to the Wild Life Protection Act. The amendments have served to reduce ambiguity thereby making the amended Act more easily interpreted. In addition penalties have been increased.
- Species management /recovery action plans have been developed and are being implemented by NRCA species network for Sooty Terns, Jamaican Iguanas, West Indian Manatee, Crocodiles and Sea Turtles.
- A Policy on Protected Animals in Captivity Exemption of Section 22 of the Wild Life Protection Act was completed in 1997.
- A Giant Swallowtail Butterfly Recovery Plan was developed in 1998.
- Under the Jamaica Iguana Conservation Strategy a captive breeding programme is being implemented at the Hope Botanical Gardens. There has also been an analysis of the present pattern of charcoal burning in the Hellshire Hills and a mongoose eradication programme has been implemented. Since

1996, twenty captive-bred iguanas were released in the Hellshire Hills and eighty six mongooses have been eradicated from this area.

- The activities of the Sea Turtle Recovery Network were funded by the Canadian Green Fund. Nesting Beach surveys of the North and South Coasts were undertaken, workshops were held and there are plans to mount a Wild Life display at the Norman Manley and Donald Sangster International Airports.
- Seventeen schools in manatee range parishes were involved in a manatee awareness competition.
- Work on the development of an Orchid Policy is well advanced.
- A survey has been conducted on the Mustached Bat, which is in great demand for export, to determine their population in the island's cave system.
- A total of 490 persons received appointment as Honorary Game Wardens under Section 13 of the Wild Life Protection Act.
- A project, funded by the UNDP, to develop a National Biodiversity Strategy and Action Plan, is now being implemented.

The priority actions will be to:

- 1. Develop and implement a National Biodiversity Strategy and Action Plan. This plan is expected to give a more coordinated and structured approach to the management of our biodiversity.
- 2. Develop and maintain a biodiversity database.
- 3. Develop and implement species management/recovery plans as necessary in conjunction with protection of habitats.
- 4. Increase public awareness as to the importance of biodiversity.
- 5. Amend the Wild Life Protection Act to include protection of plants.
- 6. Prepare guidelines for the establishment and operation of butterfly houses.

ACTIONS FOR 1999 - 2002

Action # 11.1

The National Biodiversity Strategy and Action Plan, being developed under the UNDP/GEF funded project, will be completed and implemented by the Biological Resources Branch of NRCA/NEPA.

<u>Action # 11.2</u>

NRCA/NEPA will conduct a biodiversity assessment of Jamaica and will develop a database.

Action # 11.3

The Ministry of Environment and Housing will seek to ensure the enactment of the Endangered Species (Conservation, Protection and Trade) Bill of 1999.

Action # 11.4

NRCA/NEPA in collaboration with ENGOs will prepare drafting instructions for further amendments to the Wild Life Protection Act to include protection of plants ecosystems and habitats.

Action # 11.5

Species Management/Recovery Plans will be implemented by the relevant organizations. NRCA/NEPA will prepare and periodically revise species management/recovery plans.

Action # 11.6

NRCA/NEPA will monitor for and eradicate, where necessary, invasive species (both flora and fauna) which are impacting the natural environment.

Action # 11.7

NRCA/NEPA will arrange for relevant staff members and staff of other agencies such as the Institute of Jamaica to be trained in taxonomy and rapid ecological assessment.

Action # 11.8

The Department of Life Sciences, UWI and NRCA/NEPA will conduct a game birds survey. NRCA/NEPA in collaboration with ENGOs will prepare and implement a Game Bird Management Plan. NRCA/NEPA, ENGOs and UWI will conduct a survey on the bald-pate bird.

Action # 11.9

NRCA/NEPA along with the Crocodile Research and Rescue Operation Committee will implement short, medium and long term objectives of the Crocodile Action Plan.

Action # 11.10

NRCA/NEPA will prepare material transfer agreement and collection permits for the use and removal from the wild of Jamaica's flora and fauna.

Action # 11.11

NRCA/NEPA will prepare guidelines for the establishment and operation of butterfly houses.

12. PROTECTED AREAS

ISSUES

Jamaica boasts a rich natural heritage that combines scenic beauty with a variety of ecosystems that includes wet and dry forests, rivers, caves, mineral springs, sandy beaches, rocky shores, mangroves, herbaceous swamps, swamp forests, salinas, mountain and plains. In addition the island has a very high level of endemic plant species that rely on these ecosystems for survival. Over one hundred and fifty (150) areas across the island have been identified as requiring conservation. The resources required for the planning, declaration and management of these proposed protected areas will be mammoth and this cannot be achieved without the full cooperation and partnership among the Government, Non-governmental Organizations, community groups and land owners.

The 1997 SOE Report noted that at the end of 1997 the Jamaica National Park Trust Fund, established in 1991, had financial resources of thirty eight million Jamaican dollars (J\$38 M). This is currently being used to meet costs associated with the Blue & John Crow Mountains National Park and the Montego Bay Marine Park.

Major challenges are:

- Inadequate financing to support operations in protected areas. Funding from both the Government and the National Parks Trust Fund is insufficient, particularly given the expansion of the protected area system since the declaration of the first protected area, Montego Bay Marine Park, in 1992 under the natural Resources Conservation Authority (NRCA) Act.
- User fee regulations are required to allow for the collection and retention of revenue generated in protected areas. These fees will assist in the management of protected areas, recover the cost of services provided and regulate access to and the use of these areas.
- The NRCA Act needs to be amended to incorporate additional categories of protected areas proposed in the Policy for Jamaica's System of Protected Areas. Regulations are also needed for these categories.
- There is inadequate understanding of the concept and benefits of protected areas. More training/experience in managing protected areas is needed.

PROGRESS TOWARDS ADDRESSING ISSUES

- The Development of Environmental Management Organizations (DEMO) Project funded by USAID/GOJ which ended in March 1999 has played a major role in the strengthening of the system of protected areas as well as the NRCA and various environmental non-governmental organizations.
 - Jamaica's Policy for the National System of Protected Areas was completed in 1997.

- A Series of Guidelines for Protected Areas Planning and Management were developed during 1997 and 1998.
- Drafting instructions have been prepared for amending the relevant sections of the NRCA Act to reflect the Policy for the National System of P`rotected Areas.
- Local professionals involved in protected areas planning and management have been exposed, through study tours, to a wide variety of relevant issues in New Hampshire and Florida in the United States of America, Belize and Costa Rica.
- A total of seven (7) protected areas have been declared and are under various stages of management. These are the Blue & John Crow Mountains National Park (BJCMNP), Montego Bay Marine Park (MBMP), Negril Marine Park, Negril Environmental Protection Area, Palisadoes/Port Royal Protected Area.
- Coral/Mountain Spring Protected Area, Portland Bight Protected Area and Ocho Rios Marine Park have also been declared.
- Two Environmental Non-government Organizations have been delegated management authority for two of the protected areas so far and discussions are continuing for such delegation in the other protected areas.
- The Jamaica National Parks Trust Fund (JNPTF) continues to provide partial support for the BJCMNP and the MBMP. The NRCA continues to provide supplemented financing for these two protected areas.
- Draft Environmental Policy Frameworks have been prepared for Black River and the Port Royal/Palisadoes Area.

The priority actions will be:

- 1. Strengthening the Protected Areas Unit of NRCA/NEPA.
- 2. Implementation of a User Fee System.
- 3. Developing and implementing a monitoring and evaluation programme for the system.
- 4. NRCA/NEPA will continue to work in collaboration with non-governmental organizations to plan for protected areas declaration and management.

ACTIONS FOR 1999 - 2002

Action # 12.1

Government will provide adequate institutional capacity and human resources within the Protected Areas Unit of the NRCA/NEPA to adequately monitor the management of protected areas.

Action # 12.2

The Protected Areas Unit of NRCA/NEPA will implement the Policy for the National System of Protected Areas. Priority sites will be declared and managed.

<u>Action # 12.3</u>

NRCA/NEPA will recommend protected areas user fee regulations to be developed.

Action # 12.4

The Protected Areas Unit of NRCA/NEPA will continue to consult with communities and other stakeholders in the development of management, operations and financial plans for declared protected areas.

Action # 12.5

The Protected Areas Unit of NRCA/NEPA will continue to develop cooperative agreements/delegation instruments with interested entities/individuals.

Action # 12.6

The Protected Areas Unit of NRCA/NEPA will develop and implement a monitoring and evaluation system for Jamaica's Protected Areas System.

Action # 12.7

The Protected Areas Unit in conjunction with the Coastal Zone Management Branch of NRCA/NEPA will recommend wetland sites for inclusion in the Ramsar Convention's List of Wetlands of International Importance.

Action # 12.8

Public education material on protected areas will be developed.

13. OCEAN, SEA AND COASTAL RESOURCES

ISSUES

Jamaica possesses a varied and irregular coastline that gives rise to a unique ecosystem formed by the integration of coastal features that include harbours, bays, beaches, rocky shores, estuaries, mangrove swamps, cays, and coral reefs. Most of the Jamaican population lives in coastal plains, therefore the majority of the economic activities within the country occur there. This makes coastal zone management a necessity for the country.

Numerous sandy beaches around Jamaica's coastline and on several inshore cays are invaluable to the tourism industry and for the enjoyment of locals. This resource is under threat from pollution, erosion and illegal sand mining. Both recreational and fishing beaches have been fouled by the pileup of refuse, debris and fish offal, as well as by occasional offshore and nearshore oil spills.

The area of Jamaica's wetlands (mangrove forests and salt marshes) has been steadily decreasing, with a corresponding decrease in fish and wildlife and an increase in coastal erosion as wetlands play an important role as breeding/spawning areas for a range of aquatic life.

Jamaica's coral reefs are commercially important for two main reasons: most of Jamaica's artisanal fishers use traps aimed at capturing reef fish; and the reefs are important dive sites for water sports operators in the tourism industry. Recent years have seen extensive degradation of Jamaica's coral reefs, leading to a decrease in fish catches and an increase in visitor dissatisfaction. Jamaica's marine environment is notoriously over-fished. Indeed the CARICOM Fisheries Resource Assessment and Management Programme (CFRAMP) has declared Jamaican waters to be the most over-fished in the English-speaking Caribbean. Developments in fishing technology (including motorization and the introduction of SCUBA gear) have resulted in over-fishing on the inshore and offshore banks. Government initiatives have led to substantial increases in fishing efforts while there is inadequate institutional capacity to plan for, manage and monitor the fishing industry.

The 1997 SOE Report informs that development continues to show a preference for coastal areas and that the physical environment is being altered to provide facilities for tourism and related uses. As a consequence, beach and coastline erosion is accelerating and this is aggravated by the mining of sea sand. The document also states that fish catches are being reduced by increasing numbers of fishermen, poor fishing techniques such as the use of fine mesh nets to trap immature fish, as well as illegal dynamiting and poisoning. In addition coastal mangroves, wetland areas and seagrass beds which provide breeding, feeding and nursery grounds for fish and shrimp are being destroyed. Rivers and coastal areas are at the receiving end of chemicals, sediment, sewage and garbage released on the land and the management of these problems requires actions within the entire watershed. Because the coastal areas typically have complex land use and ownership

patterns which in turn give rise to overlapping responsibilities for regulation and management, there is a lack of coordination of both development and protection efforts.

PROGRESS TOWARDS ADDRESSING ISSUES

- Government of Jamaica/Government of Sweden Coastal Zone Planning/Management Project emphasizing an integrated approach to Coastal Zone Management was completed in December 1997.
- A Coastal Planning Atlas and a Manual for Integrated Coastal Planning and Management was prepared by the NRCA in collaboration with the Uppsala University in Sweden. This was sponsored by the GOJ and the Government of Sweden through the Swedish International Development Cooperation Agency (SIDA).
- A Council on Ocean and Coastal Zone Management, housed at the Ministry of Foreign Affairs, was established in April 1998.
- A draft Mangrove and Coastal Wetlands Protection Policy and Regulation was completed by NRCA in 1997. The Government will adopt this policy in order to promote the management of coastal wetlands to ensure that the many benefits they provide are sustained.
- The Centre For Marine Sciences, (CMS) UWI is at present involved in an ecosystem studies project which looks at the status and ecology of important coastal ecosystems, especially coral reefs.
- Jamaica has been actively associated with the International Coral Reef Initiative (ICRI), cosponsoring the resolution in 1994 establishing the Initiative. In support of this, NRCA prepared a draft Coral Reef Protection and Preservation Policy and Regulation. In addition, a draft National Coral Reef Action Plan was also prepared.
- The Jamaica Coral Reef Action Plan (JCRAP) Steering Committee was established in 1998 to oversee the implementation of the JCRAP.
- Two island-wide initiatives for coral reef monitoring were established in 1997 namely Caribbean Planning and Adaptation to Climate Change (CPACC) – Coral Reef Component and the Caribbean Coral Reef Monitoring Programme (CARICOMP).
- Under the CARICOM Fisheries Resource Assessment and Management Programme (CFRAMP) a fully functional catch and effort system for all major fisheries – reef, offshore pelagics, deep-slope, lobster, conch, shrimp and coastal pelagics- is being implemented by the Fisheries Division. A database capable of storing and retrieving information on fisheries for example, on fish landings in Jamaica is now in place.
- > The Fisheries Division has developed a database of fishers and vessels licenced in Jamaica.
- A draft Fisheries Bill has been produced which reflects both local and international legislative needs of fisheries. The Bill also reflects the need for greater emphasis on sustaining, managing and conserving the fishing industry.
- The Fisheries Improvement Programme is being implemented. Under this programme, the Centre for Marine Sciences works with and on behalf of fishing communities in St. Ann and Trelawny.
- A Draft Mariculture Policy was developed by the NRCA in 1997. The aim of the policy is to support and encourage the managed use of Jamaica's marine resources to raise output of marine food products for domestic consumption and for export, and to generate local employment in communities that have traditionally relied upon the sea for a livelihood.
- During 1997 a reformulated conch quota system was put in place by the Fisheries Division. The objective of this system is to facilitate accounting for the quantities being taken out of the fishery by artisanal fishers, to ensure that the quality of the exported product is in keeping with international standards, and to spread profits from the industry to a wider cross section of the population.

- ▶ In 1997 NRCA prepared Green Paper #2 Towards a Beach Policy for Jamaica.
- > Rehabilitation of Orange Bay Beach is well advanced.
- Since its establishment, the Kingston Harbour Steering Committee has overseen the development of an integrated investment action plan for the management and rehabilitation of Kingston Harbour and is now in the process of guiding the process of identifying funding for implementation.
- > The following guidelines have been prepared in relation to NRCA's Permit and Licence System:
 - Guidelines for the Construction, Maintenance and Monitoring of Underwater Pipelines and Cables in the Coastal Zone
 - Guidelines for Planning and Execution of Coastal and Estuarine Dredging Works and Disposal of the Dredged Materials
 - Guidelines for the Deployment of Benthic Structures
 - Gudelines Pertaining to Marinas and Small Craft Harbours
 - Guidelines for Planning, Construction and Maintenance of Facilities for Enhancement and Protection of Shorelines.
- In January 1998 a joint bilateral initiative between NRCA and the United States Agency for International Development commenced to address critical coastal zone management issues in economic and environmentally sensitive areas of the country. The Coastal Water Quality Improvement Project (CWIP) is a six-year effort to improve and sustain coastal water quality in key tourist areas located on the north coast of the island. CWIP supports interventions at the national policy and strategic planning level as well as provides technical and financial assistance in support of community-based environmental activities within the targeted sites. The activities supported through CWIP are related to five broad objectives:
 - Community-based initiatives to identify, prioritize, and address environmental concerns supported;
 - Operation and maintenance of municipal wastewater systems developed and improved;
 - Environmental practices of industries and commercial establishments improved;
 - NGO-Government partnerships to expand and regularize coastal water quality monitoring developed; and
 - Coordination of coastal zone management activities improved
- NRCA/CWIP supported two national level coastal resources management consultations with broad stakeholder participation hosted by the National Council on Ocean and Coastal Zone Management:
 - National Consultation on Ocean and Coastal Zone Management, September 22, 1998; and
 - National Coastal Conference '99, March 16 18, 1999.
- NRCA/CWIP supported formulation of a Draft National Policy on Rationalized Government and Civil Society Roles for Coastal and Ocean Zone Management.
- NRCA/CWIP developed a "Special Studies Programme" to address critical coastal zone management issues. To date, two studies have been completed or are underway:
 - Negril Wetland Modification Assessment, and
 - Negril Beach Erosion Study.
- NRCA/CWIP is at present supporting eight community-based projects in the Negril target area focused on improving coastal water quality:
 - Sub-grant to Strengthen Community-based Environmental Initiatives,
 - Sub-grant to Strengthen Private Sector Environmental Initiatives,
 - Environmental Public Awareness and Education Program,
 - Compost for Organic Farming and Trees,
 - Coral Reef and Biodiversity Monitoring,

- Negril Public Beach Grey-water Recycling Demonstration and Aloe Vera Project,
- Towards Organic Farming and Marketing, and
- Strengthening Negril Wastewater Management.
- NRCA/CWIP supported the training and certification of twenty community animators to promote sustainable environmental management initiatives in the Negril target area.
- NRCA/CWIP developed a community-based water quality monitoring partnership programme in Negril with four sampling exercises completed and findings disseminated back to community stakeholders for environmental interventions.

The priority actions will be:

- 1. Development of the regulations and guidelines enunciated in the Fisheries Management Plan.
- 2. Completion and implementation of the Beach Policy.
- 3. Preparation of an Ocean and Coastal Zone Policy.
- 4. Rehabilitating areas of severe degradation such as Kingston Harbour.
- 5. The monitoring of coastal water quality.
- 6. The development of an Integrated Coastal Zone Management Plan and
- 7. Completion of the various draft policies, regulations etc. that have been worked on over the past four years.

ACTIONS FOR 1999 - 2002

Action # 13.1

NRCA/NEPA will Develop a comprehensive coastal zone management plan incorporating all the necessary measures, to facilitate more effective management of the natural resource base in coastal areas.

Action # 13.2

NRCA/NEPA will continue the consultative process for the Beach Policy (Green Paper) to be reviewed and finalized in the form of a White Paper for approval by Parliament. The Policy will then be implemented.

Action # 13.3

NRCA/NEPA through CWIP will complete a National Ocean and Coastal Zone Policy in order to rationalize Government and Civil Society Roles for sustainable management of coastal and ocean resources.

Actions # 13.4

Regulations and Guidelines proposed in the Fisheries Management Plan will be developed.

Action # 13.5

NRCA/NEPA will continue to monitor the quality of coastal waters and will prepare annual Coastal Water Quality Reports. NRCA/NEPA through CWIP will initiate coastal water quality monitoring programmes involving civil society and the private sector in Negril, Ocho Rios and Port Antonio.

Action # 13.6

The Ministry of Environment & Housing and its agencies will focus on the Rehabilitation of Areas of Severe Degradation, such as the Kingston Harbour.

Action # 13.7

Revenue generated from Beach licences and fees will be used for coastal rehabilitation projects. Five beaches will be rehabilitated by NRCA/NEPA, viz.: Orange Bay, Portland; Silver Sands, Trelawny; Fort Charles, St. Elizabeth; Long Bay Beach, Negril and Boston Beach, Portland.

Actions # 13.8

NRCA/NEPA will undertake the consultative process in reviewing and finalising the draft "Mangrove and Coastal Wetlands Protection Policy and Regulations" and prepare a White Paper for approval by Parliament.

Action # 13.9

NRCA/NEPA will finalize and implement the Jamaica Coral Reef Action Plan.

Action # 13.10

The Fisheries Division and other agencies will continue to develop and implement research programs in Fisheries Management.

Action # 13.11

The Fisheries Division will develop and implement a pilot project on the use of casitas and condominiums as a means of enhancing lobster populations.

Action # 13.12

Community-based environmental initiatives that promote improved coastal water quality will be supported by NRCA/NEPA through CWIP in Negril, Ocho Rios and Port Antonio.

water quality.

Action # 13.13

NRCA/NEPA through CWIP will conduct Studies addressing critical coastal resources management issues and promoting improved coastal water quality.

Action # 13.14

The NWC through the NRCA/NEPA CWIP will ensure the new sewage systems in Negril, Ocho Rios and Montego Bay are operational and effectively managed thereby improving coastal water quality.

Action # 13.15

The NWC will develop a communication support programme addressing sewerage and its impact on our coastal waters.

Action # 13.16

The Centre For Marine Sciences (CMS) will continue its work on the following projects:- (i) Ecosystem Studies; (ii) Pollution & Mitigation and (iii) Fisheries, Mariculture

14. ENERGY RESOURCES / ALTERNATIVE ENERGY

ISSUES

While Jamaica has an abundance of sunshine and the possibility exists of using wind and water power as a source of energy. According to the 1997 SOE Report, importation of petroleum which satisfies about 99% of commercial energy demand continues to rise. Although there has been some development in the use of alternative energy, a great deal more can be done. There are no incentives in place for the use of alternative energy and not enough practical examples of efficient and effective alternative energy sources that are relevant to Jamaica have been identified.

PROGRESS TOWARDS ADDRESSING ISSUES

- Preparation of The Jamaica Energy Sector Policy & Strategy document.
- Formation of the Solar Energy Association of Jamaica (a PCJ initiative) in June 1999. This Association has among its aims: To increase the nationwide utilization of solar energy; To document, research, promote and coordinate the use of solar and other alternative sources of energy; To promote the economic use of solar energy in Jamaica and; To formulate suitable industry standards.
- The PCJ, through a demonstration Fuelwood project and two subsequent expansion projects, has planted over 35,000 trees on 13.7 ha since 1995. A fuelwood nursery has been created to supply fuelwood seedlings. In time, this nursery will be expanded and commercialized.
- The Petroleum Corporation of Jamaica (PCJ) has completed preliminary studies related to the establishment of a Wind Farm. Blenheim, Manchester has been selected as a suitable location and negotiations with the Jamaica Public Service are underway to arrive at a suitable power purchase price should commercial operations be established. This is a Clean Energy Project which will reduce CO₂ emissions to the atmosphere. The Project is slated to begin in the year 2000. Major project benefits are envisaged to be savings in fuel imports and the use of a Clean Energy source which does not produce carbon dioxide or other noxious emissions.
- The Organization of American States (OAS) Roundtable on Energy Efficiency Tourism Sector, was hosted by the Petroleum Corporation of Jamaica (PCJ) in December 1997 in which members of the tourism industry participated. Solar energy and boiler and air-conditioning heat utilization were components of the discussions.
- Munro College's Wind Turbine (Vestas 225kW model) was commissioned in December, 1995 and converts wind energy into electrical energy. The energy produced is continuously supplied to the grid (JPSCO's power line). This power is sold to the JPSCO and the monies received are channeled into running the school. To operate the turbine's control, power is used from the JPSCO. When the turbine is fully functional, it generates on average, over 40,000 kWh of electricity per month. All data concerning production is automatically recorded and stored and can be viewed at convenience from the control panel housed on the turbine site. The data may also be accessed remotely via Cable & Wireless' communication lines with the aid of a computer and modem. The local developer is Stockhaussen & Associates.
- The Mona Institute of Applied Sciences Photovoltaic Energy Supply System Feasibility Study Project was funded by the Green Fund of the Canadian Cooperation Office and began implementation in 1998. The objective is to develop a Photovoltaic Energy Supply System that

would, in the near future, supplement a percentage of the energy requirements of the Faculty of Pure and Applied Sciences. The Photovoltaic Energy Supply System is constructed on the roof of the teaching laboratory of the Department of Chemistry and consists of solar panels, batteries and battery charger and an inverter, which converts DC voltage of the battery to AC. This alternating current output is made available to provide power for a small computer lab.

The Scientific Research Council's Biogas Technology Project - Biodigester Technology has been in existence for over two decades in Jamaica. Since 1993, biogas technology has been promoted in Jamaica under the framework of the "Integrated Waste Management Project" at the Scientific Research Council as a joint venture between the Government of Jamaica (GOJ) and the Government of Germany (GOG) through their agency the German Agency for Technical Cooperation (GTZ). To date over 112 digesters have been constructed throughout all parishes in Jamaica. The construction of the biodigester is now done by a group of private technicians who were trained by the SRC. The technology has been shifted to treat other wastewater such as domestic sewage, slaughterhouse wasterwater and food and vegetable waste. This led to the development of the Sanitary Biogas Unit (SBU) and the Biodigester Septic Tank (BST).

Priority actions will be:

- 1. To research and identify feasible alternative energy sources in Jamaica.
- 2. To promote the use of solar energy.

ACTIONS FOR 1999 - 2002

Action 14.1

The Scientific Research Council will technically fine-tune the biogas technology of construction methods and the principle of performance and maintenance of biodigesters and will provide training to further promote its use in Jamaica.

Action 14.2

A pre-feasibility study will be conducted on the use of photo-voltaic panels in a large housing development in the Portmore area of St. Catherine to generate electricity. The Scientific Research Council of Jamaica (SRC), Ministry of Mining, University of Technology - Energy Centre and the University of the West Indies, Trinidad & Tobago will collaborate on this activity.

Action 14.3

Hydropower plants will be developed in an effort to reduce reliance on petroleum-generated electricity.

Action 14.4
Wind farms will be established in order to utilize Jamaica's wind resources for commercial purposes.

Action 14.5

The PCJ will show its support for a national fuelwood programme by its continued involvement in Fuelwood Projects islandwide. It will also provide technical information on fuelwood production and its environmental benefits to all interested parties. Two fuelwood plots will be harvested in 2000 and 2003 and yield data will be analysed.

Action 14.6

The Solar Energy Association of Jamaica will promote the use of solar energy in the island.

15. NATURAL AND ENVIRONMENTAL DISASTERS -MITIGATION & MANAGEMENT

ISSUES

Jamaica is prone to natural disasters such as earthquakes, hurricanes, tropical storms, flooding and landslides due to its geographical location (the island is situated both in an earthquake zone and a hurricane belt), geological history and physiography. Hurricanes are the most recurring hazard, representing 40% of the major incidents recorded over the period 1559-1996. This is followed by flooding, which represents 27% of recorded incidents over the same period.

While natural disasters cannot be controlled, man's use of the environment can reduce or increase the level of impact experienced. It follows therefore that land-use planning must incorporate accurate information on areas of high risk and activities and management practices in these areas must be carefully designed.

Land Use

Expanding urbanization of reclaimed land and construction on steep slopes increases risks from natural disasters and speaks to the urgent need for large-scale hazard mapping and improved site selection. Additionally, excessive soil erosion raises the level of stream beds, thereby contributing to flooding.

Climate Change and Sea Level Rise

According to the Information Sheet of the United Nations Framework Convention on Climate Change the global average sea level has risen by 10 to 25 cm over the past 100 years. Models project that sea levels will rise another 15 to 95 cm by the year 2100. This will occur due to the thermal expansion of ocean water and an influx of freshwater from melting glacier and ice. The projected rise is two to five times faster than the rise experienced over the past 100 years. The rate, magnitude and direction of sea-level change will vary locally and regionally in response to coastline features, changes in ocean currents, differences in tidal patterns, and sea water density. This rise in sea level could lead to more flooding and coastal erosion that in turn will reduce the quality and quantity of freshwater supplies and displace communities.

The displacement of flooded communities with limited resources may adversely affect human health by causing an increase in infectious, psychological and other illnesses. Insects and other transmitters of disease could spread to new areas, and the disruption of systems for sanitation, storm-water drainage, and sewage disposal would also have a negative impact on health. Human activities of all types have been releasing increasing quantities of gases such as carbon dioxide into the Earth's atmosphere. It is believed that these gases will cause the heating up of the Earth's atmosphere, the land and the sea, and produce a whole range of serious repercussions on all living creatures in the ecosystem they inhabit. Economic sectors such as fisheries, aquaculture and agriculture are particularly vulnerable. Other sectors most at risk are tourism, human settlements, and insurance.

Valuable coastal and ocean ecosystems such as mangroves, coral reefs and atolls, sea grasses, and low-lying deltas are particularly sensitive to changes in the frequency and intensity of rainfall and storms.

As a means of dealing with the issue of climate change the aim of the Convention on Climate Change is to bind the world's nations to a programme for stablising the so-called Greenhouse Gases in the atmosphere at levels, which will not upset the global climate.

Jamaica, along with countries such as Grenada, Barbados, Belize, and Bahamas belongs to the "Alliance/Association of Small Island States" which is an ad hoc coalition of low-lying and island countries. These countries are particularly vulnerable to sea-level rise and share a common position on climate change, including the proposed "AOSIS Protocol".

Climate Change and its effects on Sea Level Rise is a relatively new area of focus for Jamaica and the Caribbean. According to the Organisation of Eastern Caribbean States in its report on the progress achieved in the implementation of the SIDS Programme of Action (May 1995), "Little work has been done by the OECS in this field due to the generally low political priority on this issue."

Jamaica, as party to the Convention on Climate Change, will develop and submit "national communications" containing inventories of greenhouse-gas emissions by sources and greenhouse removals by "sinks". They will adopt national programmes for mitigating climate change and develop strategies for adapting to its impacts. Parties are also to take climate change into account in their relevant social, economic, and environmental policies; cooperate in scientific, technical and educational matters and promote education, public awareness and the exchange of information related to climate change. They are also to promote technology transfer and the sustainable management, conservation, and enhancement of greenhouse gas sinks and 'reservoirs" (such as forest and oceans). It was agreed that the richest countries should provide "new and additional financial resources" and facilitate technology transfer.

The national interest also requires that Jamaica supports research and monitoring of global warming and its effects such as sea level rise. The prospect of increasing sea level rise poses serious implications for the re-siting of important social, economic and other infrastructure.

PROGRESS TOWARDS ADDRESSING ISSUES

The Office of Disaster Preparedness and Emergency Management (ODPEM) is in the process of devloping a National Hazard Mitigation Policy.

- Phase I of an Earthquake Hazard Assessment Project for the Kingston Metropolitan Region is being implemented.
- In January 1995, Jamaica ratified the Framework Convention on Climate Change. This opens the way for Jamaica to participate in business development that promotes this Convention, including reduction in greenhouse gases through energy efficiency, developing renewable energy resources and cleaner production of energy and of ozone layer protection through the phasing out of Ozone Depleting Substances (ODSs) and choloroflorocarbons (CFCs). As a follow-up to the latter, consultation for the development of projects to phase out ODSs where held by the Government during 1994 and continue to be actively pushed.
- A project, Caribbean Planning for Adaptation to Global Climate Change (CPACC) has been established by CARICOM countries to share information and strategies to deal with Climate change. This project is designed to support the participating Caribbean countries in preparing to cope with the adverse effects of global climate change, particularly sea level rise in coastal and marine areas through: vulnerability assessment, adaptation planning, and capacity building linked to adaptation planning. Design and Establishment of Sea Level/Climate Monitoring Network (Regional) and establishment of Database & Information Systems (Regional).

It is being executed through the cooperative effort of twelve CARICOM countries and participating institutions over a period of four years by a combination of national pilot/demonstration components and regional components.

The project is financed by the Global Environment Facility (GEF) through The World Bank as implementing agency and is executed by the Organization of American States (OAS). The Participating Countries are: Antigua and Barbuda, Bahamas, Barbados, Belize, Commonwealth of Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago.

The JPSCo Demand Side Management Demonstration Project has been promoting Energy-Saving strategies to decrease the impact of Global Warming.

ACTIONS FOR 1999 - 2002

A. Land Management and Hazard Mitigation

Action # 15.1

The ODPEM will complete and implement the National Hazard Mitigation Policy.

<u>Action # 15.2</u>

The Mines & Geology Division will develop hazard risk/vulnerability maps to support the National Disaster Management Plan and the National Land Policy.

Action # 15.3

Government will develop Guidelines for the Design and Placement of Structures in Areas known to be Susceptible to Storm Surge.

Action # 15.4

The response capability to natural and man-made disasters will be improved with the establishment of a Disaster Management Programme.

B. Climate Change and Sea Level Rise

Action # 15.5

Government will create and/or strengthen the institutional network to monitor climate variability, climate change and sea level rise and impacts on Jamaica. Computer based information databases, covering the results of systematic and continuous research, assessments and observations will be developed.

Action # 15.6

Government will facilitate training, technology transfer, surveillance of climate change and the sharing of experiences to assist in preparedness responses to climate changes. Emphasis will be placed on human resource capability in fields such as remote sensing and mathematical modeling.

Action # 15.7

Government will participate actively in the work of the IPCC including work impacting on sea level rise, forecasting of tropical storms/hurricanes and change in rainfall intensity.

C. Oil Spills

Action # 15.8

The National Oil Spill Contingency Plan is to be reviewed and revised. This plan is particularly applicable to the marine environment. A similar plan for land-based spills is to be developed, especially in light of increased transportation of dangerous goods by road, in the absence of a functioning rail service. The APELL System of response to emergencies at the local level needs to be studied and be adopted by the Parish Councils.

Action # 15.9

The JPSCo will procure oil spill contingency equipment such as booms, skimmers, absorbent pads, pumps etc. and train staff and other agency personnel in the proper use and application of these equipment.

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APPENDIX A

List of Participating Agencies/Institutions

- Centre for Marine Sciences, UWI
- Environmental Foundation of Jamaica
- Forestry Department
- Inter-American Development Bank (IDB)
- International Centre for Environmental and Nuclear Science
- Jamaica Bureau of Standards
- Jamaica Public Service Company Demand Side Management Unit
- Kingston Restoration Corporation
- Land Development and Utilization Commission
- Metropolitan Parks and Marks
- Mines and Geology Division
- Ministry of Agriculture Fisheries Division
- Ministry of Environment and Housing
- Ministry of Health
- Ministry of Transport and Works
- Ministry of Water
- National Water Commission
- NRCA CIDA/ENACT Programme
 - Coastal Water Quality Improvement Project CWIP
 - Coastal Zone Management Branch
 - Laboratory Branch
 - National Environmental Education Committee
 - National Parks, Protected Areas and Wildlife Branch
 - Policy, Corporate Planning and Project Management Unit
 - Pollution Control and Waste Management Branch
 - Public Education and Information Branch
 - Watershed Management Branch
- Office of the Prime Minister (OPM) Tourism
- Petroleum Corporation of Jamaica (PCJ)
- PIOJ Planning Institute of Jamaica
- Rural Agricultural Development Authority
- Town Planning Department
- United States Agency for International Development (USAID)
- Water Resources Authority (WRA)
- World Bank

APPENDIX B

At present the treaties to which Jamaica is a party are:-

International Plant Convention, Rome, 1951 Accession: 24 November, 1969

Convention on the Territorial Sea and the Contiguous Zone, Geneva, 1958 Accession: 8 October, 1965

Convention on the Continental Shelf, Geneva, 1958 Accession: 8 October, 1965 Entry into Force: 30 September, 1962

Convention on the High Seas, Geneva, 1958 Succession: October, 1965 Entry into Force: 30 September, 1962

Convention on Fishing and Conservation on the Living Resources of the High Seas, Geneva,1958Succession: 16 April, 1964Entry into Force: 20 March, 1966

Treaty banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Underwater, Moscow, 1963 Ratification: 22 November, 1991

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space including the Moon and other Celestial Bodies, London, Moscow, Washington, 1967 **Ratification: 10 August, 1970**

Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other weapons of Mass Destruction on the Sea Bed and the Ocean Floor and the Subsoil thereof, Washington, 1971 **Ratification: 30 July, 1986**

Treaty on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, London, Moscow, Washington, 1972 **Ratification: 30 July, 1986**

Convention concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972 Acceptance: 14 June, 1983

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (as amended), London, Mexico City, Moscow, [Washington], 1972 Ratification: 22 March, 1991

International Convention on the Prevention of Pollution from Ships, London, 1973 Ratification: 13 June, 1991

Protocol of 1978 to the International Convention for the Prevention of Pollution from Ships, London, 1973 Ratification: 13 June, 1991

United Nations Convention on the Law of the Sea, Montego Bay, 1982

Ratification: 21 March, 1983

• Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, Cartegena de Indias, 1983

Ratification: 1 May, 1987

• Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region **Entry into Force: 1 May, 1987**

• Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985 Accession: 31 March 1993 Entry into Force: 29 June, 1993

• Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987 Accession: 31 March, 1993 Entry into Force: 29 June, 1993

 London amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London.

Ratification: 31 March, 1993

• The Copenhagen Amendment to the Montreal Protocol on Ozone Depleting Substances. Accession: 7 November, 1997 Entry into Force: 4 February, 1998

• United Nations Framework Convention on Climate Change, New York, 1992 Instrument of Accession Deposited: 6 January, 1995; Effective 5 April, 1995

• Convention on Biological Diversity, Rio de Janeiro, 1992

Instrument of Accession Deposited: 6 January, 1995; Effective 5 April, 1995

• Convention on International Trade in Endangered Species of Wild Flora & Fauna (CITES) Accession: April 23, 1997 Entry into Force: July 22, 1997

• Convention of Wetlands of International Importance especially as Waterfowl Habitats (RAMSAR Convention)

Accession; 7 October, 1997 Entry into Force: 7 February, 1998

• Convention to Combat Desertification

Accession: 12 November, 1997 Entry into Force: 16 March, 1998

• Convention on Trans-boundary Movement of Hazardous Wastes and their Disposal (Legislation to support accession has been drafted and is presently being reviewed)

• Inter-American Institute for Global Change Research Accession; 10 September, 1997

Jamaica is continuing its participation in the negotiation of the Protocol on Land-Based Sources and Activities in relation to the Convention on the Protection of the Marine Environment of the Wider Caribbean Region. It is expected that the Protocol will be finalized in 1999.

Jamaica will make preparations to accede to the Specially Protected Areas and Wildlife (SPAW) Protocol of the Cartegena Convention.