

NATIONAL STRATEGY
AND ACTION PLAN ON
BIOLOGICAL DIVERSITY
IN JAMAICA

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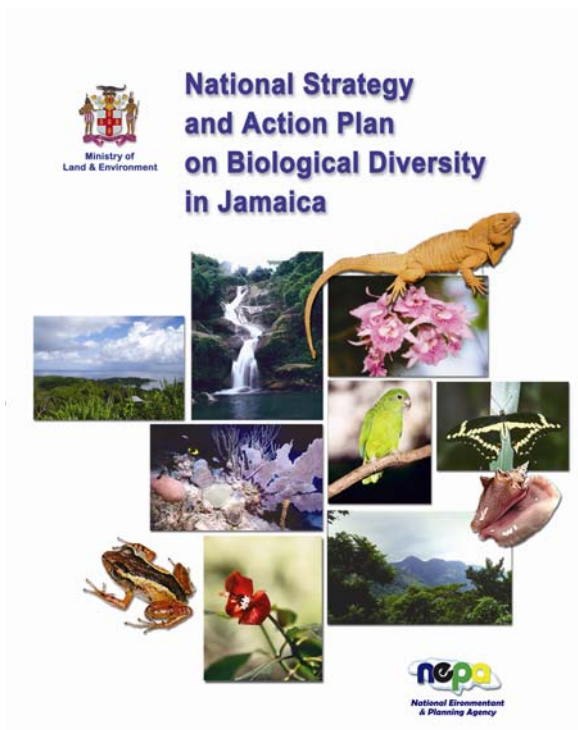
Telephone 1-876-754-7543
Fax 1-876-7547570
E-mail pubed@nepa.gov.jm
Website www.nepa.gov.jm

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Cover photographs (clockwise) are: A view of eastern Portland; Waterfalls in Cascade, Hanover; Jamaican Iguana, *Cyclura collie*; *Broughtonia negrilensis*; Jamaican Swallowtail, *Papilio thoas melonius*; Queen Conch, *Strombus gigas*; A view of the Blue Mountains; Hot lips, *Cephaelis elata*; *Eleutherodacylus mubicola*; A section of a coral reef in Jamaica; Black-billed Parrot, *Amazona agilis*. The photographs are courtesy of Andrew Smith, NEPA, Institute of Jamaica, Debra Chen.



Back Cover: The map of Jamaica showing the location of areas of important Biodiversity.

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FOREWORD

Jamaica is a small island developing state, faced with the constant challenge of balancing the needs of development and economic activity with sustainable use of its natural resources. This National Strategy and Action Plan for Biological Diversity is one of Jamaica's initiatives towards sustainable development, which focuses on knowledge of and sustainable use of biological resources.

The needs of humanity, depends as it always has, on essential goods and services being provided by the natural environment. Studies done globally however, have shown that the current, rapid decline in biological diversity and the resulting decline or loss of ecological services, is as a result of human activities. It is the loss of these resources and services that is the greatest threat to human health and development. The provision of good quality and sufficient quantity of water is one example of an ecological service.

Jamaica is rated fifth in the islands of the world in terms of the presence of endemic plants and many of these plants are found in our forests. Many of the modern medicines are made from extracts from plants found in places like Jamaican forests. One example of this is the Rosy Periwinkle, first identified in Jamaica. It is the source of a drug used to treat some forms of cancer. Loss of some kinds of forests in Jamaica could mean loss of this cancer-treating chemical for the world.

A number of critical activities are taking place and others are planned for to deal with Jamaica's biodiversity. These include rehabilitation programmes, public education programmes, and consistent and integrated efforts to understand the intrinsic and economic value of the country's biological resources. These activities must take place if we are to have the means to make informed choices about resource use.

We owe it to ourselves and the rest of humanity to conserve and sustainably use our biodiversity. In doing so the heritage and patrimony of Jamaica will be assured.



Dean Peart, M.P.
Minister of Land and Environment

LIST OF ACRONYMS

AIA	Advance Informed Agreement
CARICOM	Caribbean Community
CASE	College of Agriculture Science and Education
CBD	Convention on Biological Diversity
CBO	Community Based Organisation
CDC	Conservation Data Centre
CHM	Clearing-House Mechanism
CIDA	Canadian International Development Agency
CITES	Convention on International Trade in Endangered Species
COP	Conference of Parties
CPACC	Caribbean Planning for Adaptation to Climatic Change
CWIP	Coastal Water Quality Improvement Project
EIA	Environmental Impact Assessment
ENACT	Environmental Action Programme
EAST	Environmental Audits for Sustainable Tourism
FOS	Friends of the Sea
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographical Information System
GOJ	Government of Jamaica
HFCS	High Fructose Corn Syrup
IABIN	Inter American Biodiversity Information Network
IOJ	Institute of Jamaica
IUCN	World Conservation Union
JANEAP	Jamaica National Environmental Action Plan
JBS	Jamaica Bureau of Standards
JCDT	Jamaica Conservation and Development Trust
JHTA	Jamaica Hotel and Tourist Association
JNPTF	Jamaica National Park Trust Fund
LDUC	Land Development and Utilisation Commission
LMO	Living Modified Organism
MLE	Ministry of Land and Environment
NBC	National Biosafety Committee
NBS	National Biodiversity Strategy
NBSAP	National Biodiversity Strategy and Action Plan
NCST	National Commission on Science and Technology
NCU	Northern Caribbean University
NEPA	National Environment and Planning Agency
NEST	National Environmental Societies Trust
NGO	Non-Government Organisation
NPEP	National Poverty Eradication Programme
NRCA	Natural Resources Conservation Authority
NWC	National Water Commission
OAS	Organisation of American States
PIOJ	Planning Institute of Jamaica
RAMSAR	Convention on Wetlands of International Importance Especially as Waterfowl Habitats
SPS	Agreement on the Application of Sanitary and Phytosanitary Measures
SRC	Scientific Research Council
TBT	Technical Barriers to Trade
TPD	Town Planning Department
TRIPS	Trade Related Intellectual Property Rights
UDC	Urban Development Corporation
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

USAID	United States Agency for International Development
UTECH	University of Technology
UWI	University of the West Indies
WECAN	Wildlife and Environment Conservation Action Now
WMC	Water Management Unit
WTO	World Trade Organisation

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The Ministry of Land and Environment thanks the members of the National Biodiversity Steering Committee under the Chairmanship of Dr. Elaine Fisher, the National Biodiversity Strategy and Action Plan Project Team, members of staff at the National Environment and Planning Agency and the members of the Natural Resources Conservation Authority for their assistance with the development of this document. The Ministry of Land and Environment is especially grateful for the support of members of civil society who attended the public consultations, the chairpersons for the various working groups and public consultations, and the Jamaica Printing Service for printing the Green Paper which was the precursor to this final version.

Special thanks are offered to the photographers who have given permission for the use of their work in this document. They have brought to light and life many of the indigenous and endemic species about which this document was written.

EXECUTIVE SUMMARY

Introduction to Jamaica

The earliest known inhabitants of Jamaica were the Tainos, who lived mainly in villages along the coast. Their main diet was fish, cassava, maize, fruits, birds, coney, iguanas and manatees. Later came the Spanish and the British who introduced crops such as citrus, banana, sugar cane, cocoa, tobacco, breadfruit and otaheite apple. They also introduced horses, goats, chickens, pigs and cattle, which were selected for their ability to adapt to the local climate. Natural resources have played an important role in Jamaica's economic development, however, agricultural development, along with urbanization, has contributed to the destruction of biological resources.

The cultural attitudes and religious beliefs of the migrant people, which make up Jamaica's population, significantly influence the traditions and rituals involving the use of plants, animals, land and water. The majority of Jamaica's population is of African descent. These descendants, found mainly in rural communities, still practice their African traditions, which include the use of herbal medicines and the utilization of plants and animals in ceremonial events. This strong African traditional knowledge is also apparent in agricultural practices, for example, the use of moon phases in order to determine the time to plant certain crops, pest control, crop rotation, and in the use of economic plants as contour barriers. These practices have helped to promote conservation and the sustainable use of biodiversity over the years.

The majority of Jamaica's population lives on the coastal plains and consequently, this is where most economic activities occur. Natural resources have played a critical role in economic development throughout Jamaica's history, in both pre and post-colonial periods. The island's major economic sectors, agriculture, tourism and mining, are all based on the natural resources found in Jamaica. Much of the agricultural development was, and in some sectors, still is ecologically destructive, and has in many instances had detrimental effects on the products and services provided by the natural environment.

Jamaica's biodiversity and other natural resources

Jamaica has a tropical maritime climate, which is influenced by the northeast trade winds, and land

and sea breezes. Rainfall is marked by monthly, annual, and spatial variability, with the average annual rainfall for the country being approximately 200 cm.

The country's topography consists of a highland interior formed by a backbone of peaks, hills and plateaus running the length of the island, with over 60% of the island having an altitude of over 230m. The plateaus are dissected by faults and have been karstified to varying degrees. The most developed karst topography is the Cockpit Country. This is an important ecological area of the country, which is still relatively undisturbed.

Approximately 70% of the island's surface area is covered by limestone. The remaining 30% is covered by igneous and metamorphic rocks, shale and alluvial cover. The topography and land formations give rise to surface drainage through a network of streams and rivers.

Limestone aquifers provide the main source (84%) of Jamaica's freshwater resources, while the remaining 16% is provided by surface drainage. Several watershed/ecosystem rehabilitation programmes are being undertaken to increase and improve the quality and quantity of water for human consumption and to assist in the conservation of biodiversity.

The wide range in microclimates, soils, and physical features in the country give rise to a variety of forest types. These are: lower montane mist, montane mist, dry limestone, wet limestone, mangrove, woodland, herbaceous swamp and marsh forest. Jamaica's forests are the main repositories of biodiversity, especially endemic flora and fauna. As a result, conservation and sustainable use of forest resources is a crucial component of the overall biodiversity conservation strategy. The most recent assessment of forest cover was carried out in 1998. Nearly 30.1% of the total land area (approximately 336,000 ha) is classified as forest.

Jamaica has been rated fifth in the islands of the world in terms of endemic plants. There is also a high level of endemism for many species of animals' including snails, terrestrial grapsid crabs, amphibians, reptiles and land birds. At least six species of terrestrial vertebrates are thought to have become extinct in Jamaica in the last 150

years and many more are considered endangered, threatened, or rare.

Current estimates indicate that at least 3,304 species of vascular plants occur in Jamaica, of which 27.9% are endemic. Knowledge of Jamaica's flora is incomplete and the abundance of some species is unknown. The only published status of levels of threat to Jamaica's terrestrial plant species is based on the World Conservation Union (IUCN) data, which is now almost 12 years old.

Jamaica's freshwater resources are quite extensive and support several diverse faunal and floral communities. There are 10 hydrological basins throughout the island containing over 100 streams and rivers, in addition to a multitude of subterranean waterways, ponds, springs and blue holes. Jamaica depends on water from these sources for domestic, agricultural and industrial purposes. The flora and fauna of these waters also serve as a food source and as a commercial activity for rural and inland communities.

There are three endemic freshwater fish species found in Jamaica. However, little is known about the ecology of these species or Jamaica's freshwater ecosystems. One endemic freshwater turtle has been identified, the Slider Turtle, but the status of its population is unknown.

Wetlands were at one time estimated to cover 2% of Jamaica's total surface area. The total area has declined due to developmental pressures, including reclamation for road construction, port and harbour development etc. Wetlands are found mainly in low-lying coastal areas particularly along the south coast. There are 2 main classifications: swamps and marshes. Wetlands are habitats for some species of turtles, as well as fish, oysters, birds, crocodile and the endemic pond turtle.

The largest wetland areas are the Negril Morass in Westmoreland, the Great Morass in St. Thomas, and the Black River Upper and Lower Morass in St. Elizabeth. The Black River Lower Morass was declared a 'Wetland of International Importance' under the Ramsar Convention in 1998.

The irregular coastline of Jamaica is 891 km long and has diverse ecosystems including sandy beaches, rocky shores, estuaries, wetlands, seagrass beds and coral reefs. The majority of living marine resources is found on the island shelf and on the nine oceanic banks that cover an area of 4,170 sq. km. The island shelf is much wider on the south coast, with a maximum width

of about 24 km, in comparison to the north coast, which is on average, 1.6 km wide.

Jamaica enjoys a rich diversity of marine species, which includes species of fish, sea anemones, black corals, stony corals, sea fans, molluscs, turtles, and marine mammals including whales, dolphins and manatees. The main fishery resources include: coral reef fish, Spiny lobsters, Queen Conch, small coastal pelagic finfish and large offshore pelagic fish. There is also recreational fishing for Marlin and other finfish. The dominant marine plant species are sea grasses, calcareous algae and mangroves. Sea grasses (also known as sea weeds) are found in shallow coastal waters and are important sources of food for turtles, manatee, and for Jamaican folk medicine.

Coral reefs are of major social, economic, and biophysical importance to Jamaica. Reefs act as natural barriers by protecting coastlines from erosion, are a source of food and income for local communities, support tourism, and recreational activities. In the late 1970's, nine reefs on the north coast had coral cover averaging 52% at a depth of 10m. However, by the late 1990's, this declined to 3%.

Wild species of flora and fauna make a significant contribution to the Jamaican economy. In agriculture, animals act as pollinators and seed dispersers to name a few. Genetic resources from wild animals and plants improve domestic breeds and varieties respectively. Most of Jamaica's agricultural crops come from imported genetic resources, however, there are a number of indigenous (e.g. pineapple) and endemic plants being used. Special breeds of cattle have been bred for local conditions, including the Jamaica Hope for milk production and the Jamaican Brahman for meat production. Efforts continue to improve the contribution of livestock to the local economy and to enhance food security.

Jamaica has been involved in biotechnology since the 16th Century, producing rum and vinegar from sugar cane by fermentation. Current research and developmental activities using modern biotechnology are ongoing at the Scientific Research Council and the University of the West Indies. There is a tissue culture unit at the Scientific Research Council, which houses the largest in-vitro germ plasm collection of banana in the Western Hemisphere. The unit also houses orchids, anthuriums, African violets and other ornamentals.

Legal and Policy Framework

Jamaica's current environmental legislation provides a basic framework for the conservation and sustainable use of biodiversity. Although there are approximately 52 pieces of legislation that impact on the environment, none of these comprehensively address the protection, conservation and sustainable use of biodiversity. A new and more comprehensive framework is needed that recognises the components of biodiversity and will ensure its sustainable use. In this regard, several pieces of legislation are being reviewed and others are being developed in order to address this deficiency. These include the amendments of the Wild Life Protection, Fisheries and Watershed Acts, regulations under the Endangered Species (Protection, Conservation and Regulation of Trade) Act (2000) and the development of legislation for Biosafety.

Many of the national policies impacting biodiversity are sectoral in nature. The Jamaica National Environmental Action Plan (JNEAP), which is updated triennially, outlines major environmental problems and emphasises the necessary corrective measures to be undertaken by ministries, agencies, private sector and civil society organisations. There are also species recovery plans developed by the National Environment and Planning Agency (NEPA) in collaboration with partners, for selected species such as the Giant Swallowtail butterfly (endemic), the Jamaican Iguana (endemic) and Crocodiles (indigenous).

There are gaps in the policy framework, including the areas of Biosafety, traditional knowledge, access and benefit sharing to name a few. However, ongoing projects and programmes, draft policies and plans will address some of these areas.

As a small island developing state, Jamaica's biodiversity is vulnerable to pressures from many areas. Factors which contribute to the loss of biodiversity in Jamaica includes poverty; over-consumption by some sectors of society; lack of public awareness and education; habitat/ecosystem conversion and degradation; unsustainable harvesting of some species; pollution; and the spread of alien invasive species. Successful implementation of the NBSAP and therefore the CBD will depend on the country overcoming several gaps and challenges, which are highlighted.

National Biodiversity Strategy and Action Plan

Jamaica's exceptional biodiversity and rich biological resources are major contributors to its economic growth and stability and support agriculture, tourism and several other industries. Conservation and sustainable use of Jamaica's biodiversity will require the commitment and collaboration of the Government, civil society, including local communities, environmental organisations and the private sector. The Vision Statement, principles, goals and strategic directions of this document, provide a framework to achieve and fulfil Article 6(a) of the Convention.

The biodiversity vision for the people of Jamaica includes the idea of the importance of biodiversity for past, present and future generations, the need to secure the resources for their intrinsic as well as other more well-known values, and to ensure the fair and equitable sharing of the benefits derived from biodiversity.

The Principles guiding the implementation of the Strategy and Action Plan are critical to the successful implementation of the Strategy. The Principles show commitment to:

- I. Transparency in decision-making processes and opportunities for participation;
- II. Behavioural change towards sustainable practices and use;
- III. Respect for local and traditional knowledge;
- IV. Protection of habitats, ecosystems, species and genetic resources;
- V. Encouragement of local management in implementation;
- VI. Ensuring that the precautionary approach is widely applied;
- VII. Use of environmental economic tools and technology; and
- VIII. Sectoral integration.

The broad goals of the Strategy, under which there are many areas of strategic directions, are to:

- I. Conserve Jamaica's biodiversity;
- II. Promote sustainable use of biological resources;
- III. Facilitate access to biological resources to promote developments in biotechnology and to ensure benefit sharing;
- IV. Ensure safe handling and use of Living Modified Organisms;
- V. Enhance resource management capacity;
- VI. Promote public awareness and education, and community empowerment; and

VII. Promote regional and international cooperation and collaboration in support of the implementation of the CBD.

The strategic directions enunciated under each goal are the basis for the actions identified as being necessary to fill the gaps, deal with the challenges and meet the goals, thereby achieving the implementation of the biodiversity strategy and the CBD.

In an effort to ensure that the strategic directions are taken and the goals achieved, the Action Plan

proposes 37 projects, of which 17 have been identified as priority projects, for implementation over the next five to seven years. Eight of these have been designated highest priority for implementation over the next two years. The projects have been categorised under the seven goals in the NBSAP. Several other projects are also being proposed, many resulting from the various consultative workshops. It is expected that the National Biodiversity Secretariat will be responsible to assist with identifying and accessing funds for implementing these projects.

PREFACE

A Global Call for Action: Conserving Biodiversity and Achieving the Sustainable Use of Biological Resources

Jamaica acknowledged the importance of biodiversity and made a commitment to the conservation and sustainable use of its biodiversity by ratifying the Convention on Biological Diversity (CBD) on January 6, 1995.

The Convention's objectives are:

- Conservation of biological diversity;
- Sustainable use of its components; and
- Fair and equitable sharing of the benefits arising out of utilisation of genetic resources.

Article 6 of the Convention requires that each contracting party:

- (a) Develop or adapt national strategies, plans or programmes for the conservation and sustainable use of biological diversity; and
- (b) Integrate as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

Biological Diversity or biodiversity is a collective term, which embraces "Life on Earth" and encompasses the variety of all plants, animals and micro-organisms.

Biological resources are those components of biodiversity that are either used by humans, or have potential for use, in the production of food, medicines, manufactured goods, and other essential products.

In recognition of the importance of biodiversity and to fulfil international obligations, the development of a National Biodiversity Strategy and Action Plan (NBSAP) was started in 1998, culminating in this final document in 2003. A number of workshops and meetings were held to ensure the widest possible input of the private sector, government agencies, environmental non-governmental organisations, community based organisations, and the general public, in the development of the strategy and action plan.

The Strategy and Action Plan will guide the national efforts for conservation and sustainable use of the island's resources. A blueprint for cooperation and collaboration among the stakeholders

has been created in the form of project concepts which seeks to chart the priority actions for monitoring, managing and sustainably using biological resources.

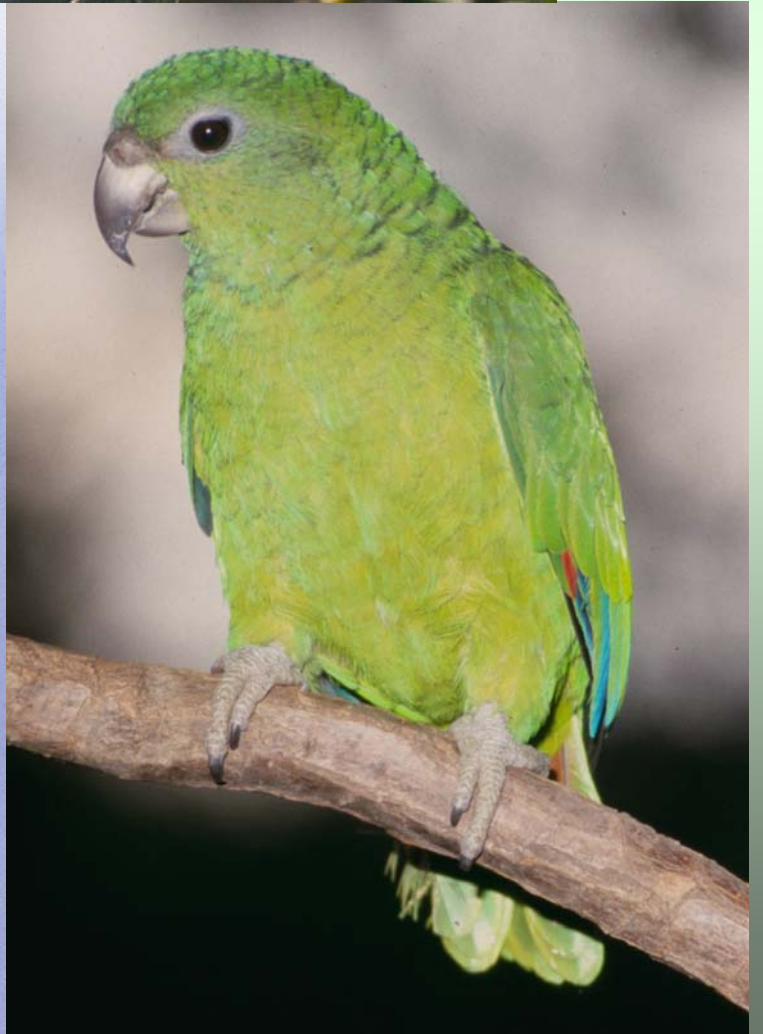
The document is in three major sections: Assessments, Strategy and Action Plan. The first section entails assessments of the characteristics of the Jamaican landscape and people, species diversity, abundance of biological and other natural resources and ecosystem health. These assessments include the legal and policy framework that exists, and that are necessary to support the strategy. They also include the major gaps and challenges affecting the conservation and sustainable use of biological diversity in Jamaica.

Section two of the document contains goals and strategic directions based on the findings of the assessments regarding the status of Jamaica's resources at this time. It includes also the challenges of implementing this strategy, including the challenge of integrated decision-making across organisations and sectors.

Action items from within the strategy were extracted and developed into the Action Plan which forms section three. The Action Plan speaks to the most important areas of action necessary for Jamaica in the form of project concept outlines. Priorities have been assigned to the project concepts to indicate areas of critical importance, foundation work, such as data collection, or greatest need. The project outlines include the lead and supporting agencies and entities, objectives, specific activities and outputs.

Within the document there is planned review and monitoring of the implementation of the strategy and action plan. Through the periodic reviews, assessments will be made about the effectiveness of the strategy and actions, and changes will be made where necessary to effect the goals outlined.

PART I: ASSESSMENTS



1. INTRODUCTION

1.1 The People of Jamaica - Land of Wood and Water

Jamaica is the third largest island in the Caribbean, with a land area of 10,981 sq. km¹. Located at 17° 22' North latitude and 77° 30' West longitude, the island lies 145 km south of Cuba and 161 km west of the island of Hispaniola (see Map 1).

1.1.1 People and Culture

The original inhabitants of Jamaica, the Tainos, arrived on the island around 600 AD. The Taino population was greatly decimated within 50 years of the arrival of Columbus in 1494 and by the beginning of the 17th century, fewer than 100 were left. Today, the people of Jamaica are descendants of several migrant cultures including African, Chinese, Indian, European, Jewish, and Middle Eastern. This diversity gave rise to the island's motto, "Out of Many, One People", which is inscribed on Jamaica's Coat of Arms.

Cultural attitudes to natural resources reflect the influence of the various migrant populations and the differences associated with rural and urban lifestyles. Religious beliefs also influence the island's diverse cultures, and its numerous traditions and rituals involving the use of plants, animals, land, and water. These religious beliefs include Christianity, Judaism, Rastafarianism, Islam and Hinduism.

The majority of Jamaica's population is of African descent. Most Jamaicans practise their African traditions in one form or another, for example, in speech, foods eaten, folklore, customs, music and dance, as well as in family and community life. The Maroons, who have been designated indigenous people by UNESCO, live in western and eastern Jamaica. They, along with other Jamaicans, possess traditional knowledge on the use of herbal medicines and utilise plants in ceremonial events. The Maroons of Accompong in St. Elizabeth are owners of land in the Cockpit Country, which is rich in biodiversity.

Many rural communities continue to use their traditional knowledge and cultural practices, for example, using phases of the moon to aid in determining optimal timing for planting of crops; implementing traditional agriculture practices

including pest control, crop rotation, mulching, mixed cropping; and using economic plants as live contour barriers. These practices have helped to promote soil fertility and conservation over the years.

1.1.2 History of Jamaica

Prior to 1494, Jamaica was occupied exclusively by Tainos who favoured living in coastal villages. The Tainos called the island "Xaymaca" - *Land of Wood and Water*. They enjoyed a varied diet including fish and shellfish, cassava, maize, fruits, birds, hutia (coney), iguanas, snakes and manatees.

The arrival of Christopher Columbus and his ships in 1494 marked the first recorded visit of Europeans to the island. Spanish settlers followed, introducing a variety of crops, which resulted in many changes to the physical landscape. They established plantations of exotic crops such as citrus, bananas, sugar cane, cotton, cocoa and tobacco and brought horses, goats, chickens, pigs and cattle, which, like the plantation crops, were selected for their ability to adapt to the local climate.

The British arrived in 1655 and fought Spain for control of Jamaica until the treaty of Madrid, which gave governance to the British in 1670. The British introduced other fruits including breadfruit (*Artocarpus altilis*) and otaheite apple (*Jambosa malaccensis*). Ackee (*Blighia sapida*) was introduced by slaves and mangoes (*Mangifera indica*) were probably initially introduced from fruits taken off a captured French ship.

The majority of Jamaica's population still lives on the coastal plains and consequently this is where most economic activities occur. This concentration of people and the resulting developments has impacted significantly on marine and coastal resources.

At the end of 1998, the population of Jamaica was estimated at 2,576,300. An increasing percentage of the population lives in urban areas (Map 2). Kingston, the capital, is situated on the seventh largest natural harbour in the world, and is the country's major trade centre.

The island is divided into three counties, and further sub-divided into fourteen parishes. Eleven of the

¹ The National Atlas of Jamaica, 1989