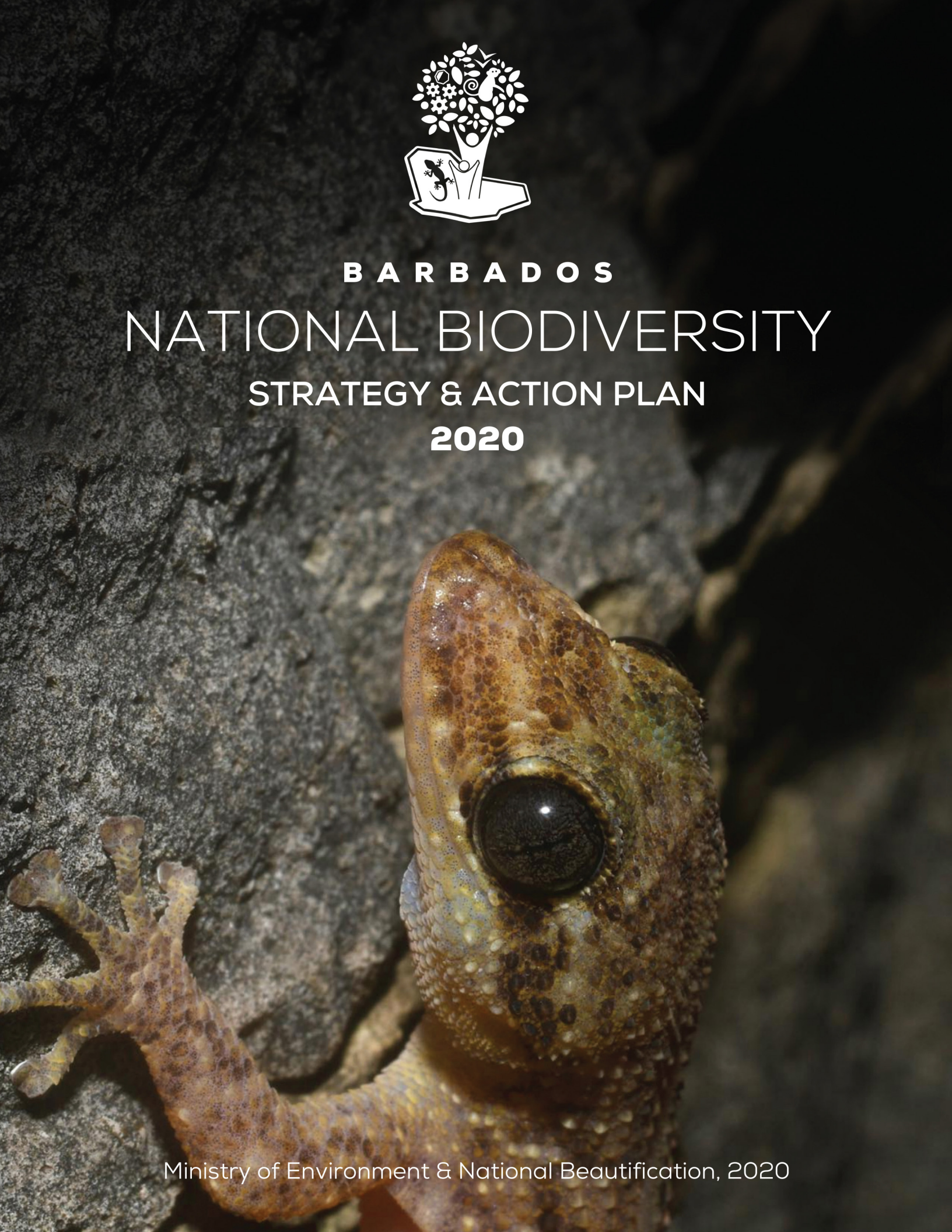

BARBADOS

NATIONAL BIODIVERSITY STRATEGY & ACTION PLAN 2020

Ministry of Environment & National Beautification, 2020

ACKNOWLEDGEMENTS

The Ministry of Environment and National Beautification, Green and Blue Economy is grateful to the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF) for the technical and finical assistance provided to produce this document.

This report was the product of a cooperative effort between Policy Networks International, Droiterre Inc, and the Ministry of Environment and National Beautification, Green and Blue Economy. The efforts of the drafting team are acknowledged along with the contributions of the persons who participated in the preparation of this NBSAP.

The members of the National Working Group on Biodiversity are also acknowledged for their tremendous contributions to the consultative process and delivery of this document, in addition to other technical and administrative officers of the Ministry of Environment and National Beautification, Green and Blue Economy for their invaluable assistance with respect to editing the first draft and preparing the final document.

MINISTER'S FOREWORD

"Life on earth starts with biodiversity and it will end abruptly without it"

The Hon. Adrian Forde, M.P.
Minister of Environment and National Beautification, Green and Blue Economy
December 2020

As the Minister with responsibility for Environment and National Beautification, Green and Blue Economy, it is my honour and privilege to present Barbados' second National Biodiversity Strategy and Action Plan (NBSAP) to my fellow Barbadians. This important document serves as an update to previous work done to fulfill Barbados' commitments under the Convention on Biological Diversity (CBD), while further implementing initiatives that have been identified as national priorities.

This document builds on two decades of work towards the conservation, management and sustainable utilisation of Barbados' precious biological and genetic resources, taking into account the achievements afforded to the country under the guidance of the previous NBSAP, while identifying the gaps of that framework in tackling new and emerging issues. Like it's 2002 predecessor, the 2020 NBSAP sets out strategic objectives and priority actions that have been identified as necessary for the effective conservation and management of biodiversity at the national level. However, through alignment with the Aichi Biodiversity Targets and the Zero Draft of the Global Biodiversity Framework, the new NBSAP collates its objectives and priority actions into twelve (12) strategic targets to guide national efforts.

It is impossible to know where one is going, without understanding where they have come from. As such, the 2020 NBSAP provides a comprehensive baseline on the status of Barbados' biodiversity, the associated trends in its ecosystems and the identified threats to their conservation. This allows the NBSAP to serve as a reference document for all Barbadians, providing an up-to-date benchmark on the condition of our natural ecosystems and key biodiversity areas. With this standard established, the NBSAP then sets out the management framework for various governmental, private sector and civil society entities – along with individuals – to ensure that these resources are managed in a way that is sustainable, and which ensures that they will continue to provide value for future generations.

As a small island developing state, Barbados, like much of the Caribbean, is a well-known hotspot for biodiversity. As a result, it is home to a disproportionately high level of species diversity. The country is home to unique and endemic species, as well as genetically-significant populations of species which cannot be found elsewhere. Consequently, the conservation of such species is of vital importance. To achieve this goal, the NBSAP highlights key species such as the critically endangered, endemic, Barbados leaf-toed gecko and provides a framework for their conservation to ensure their recovery.

This new Strategy and Action Plan, along with its supporting documents, demonstrates further commitment by the Government of Barbados towards the mainstreaming of biodiversity conservation, the allocation and mobilisation of appropriate resources to such ends and the clear and effective communication of the importance of and methodology for its continued conservation and sustainable management. It is presented with the knowledge that is it only through the effective management of biological and land resources, that Barbados can achieve true sustainable development.

I am therefore grateful to the Biodiversity Conservation and Management Section, Working Group on Biodiversity, staff of the Ministry of Environment and National Beautification and all of the various stakeholders in the public and private sectors, whose efforts have made this document possible.

As the Minister responsible for the Environment, I look forward to our continued collaboration in effective environmental stewardship.

Minister of Environment and National Beautification, Green and Blue Economy, Government of Barbados.

Photo compliments: Connor Blades

EXECUTIVE SUMMARY

This report consists of two main components, the first of which provides background information to the development of the National Biodiversity Strategy and Action Plan (NBSAP) and consists of four (4) chapters. Chapter 1 presents an overview of the country while Chapter 2 expands on the status of the country regarding overall biodiversity and looks at the biodiversity status, trends and threats. Chapter 3 provides an analysis of the implementation of the existing NBSAP (2002) and specifically identifies implementation gaps which have been used in developing the new NBSAP. Chapter 4 examines the progress made in implementing the 2020 Aichi Biodiversity Targets and identifies thirteen (13) priority targets for the country. These targets were identified through a stakeholder consultation process of workshops and focus group meetings.

The second component of the report articulates the new revised NBSAP. The priority strategies for biodiversity conservation in Barbados to 2035 are aimed at improving the wellbeing of all Barbadians. These priority targets are as follows:

TARGET 1: By 2030, at the latest, Barbadians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

TARGET 2: By 2030, at the latest, the Barbados Government, businesses and stakeholders at all levels will have taken steps to achieve, or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

TARGET 3: By 2035, the rate of loss of all of Barbados' natural habitats, including forests, will be decreased.

TARGET 4: By 2030, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

TARGET 5: By 2030, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

TARGET 6: By 2030, invasive alien species and pathways are identified and prioritised, priority established species are managed and measures are in place to prevent the introduction and establishment of new invasive alien species.

TARGET 7: By 2030, sources of endogenous anthropogenic pressures on coral reefs (e.g., excess nutrients, anchor damage, overfishing inter alia) are identified and effects minimised to maintain the integrity and functioning of coral reefs.

TARGET 8: By 2030, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are designated within connected systems of protected areas, and plans for effective area-based conservation measures are being developed.

TARGET 9: By 2030, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.

TARGET 10: By 2030, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

TARGET 11: By 2030, document all traditional and scientific knowledge and technology relating to biodiversity so that it is improved, widely and equitably shared, transferred and applied.

TARGET 12: By 2025, at the latest, financial resources to conduct projects and research in the area of biodiversity should increase substantially.
Successful implementation of the NBSAP will rely on an appropriate framework being established to competently and effectively undertake the activities under the NBSAP. A recommendation is made for the Government of Barbados to establish a National Biodiversity Unit to deal with the implementation of the NBSAP and other matters related to biodiversity conservation, sustainable use, and overall management.

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LIST OF ACRONYMS

Acronym	Expanded Name
ABS	Access and Benefit Sharing
BCC	Barbados Community College
BCHM	Biodiversity Clearing House Mechanism
BIEP	Barbados Institute of Environmental Professionals
BNFN	Barbados Natural Fibres Network
BWFA	Barbados Wildfowlers Association
CBD	Convention on Biological Diversity
CBOs	Community-Based Organisations
CERMES	Centre for Resource Management and Environmental Studies
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSOs	Civil Society Organisations
CZMU	Coastal Zone Management Unit
EPD	Environmental Protection Department
GEF	Global Environment Facility
IAS	Invasive Alien Species
IBAs	Important Bird Areas
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
IUCN	International Union for the Conservation of Nature
MAFS	Ministry of Agriculture and Food Security
MEAs	Multilateral Environmental Agreements
MENB	Ministry of Environment and National Beautification
MHW	Ministry of Health and Wellness
MOU	Memorandum of Understanding
NBG	National Botanical Gardens
NBSAP	National Biodiversity Strategy and Action Plan
NCC	National Conservation Commission
NCCAP/AP	National Climate Change Adaptation Policy and Abatement Plan
NGOs	Non-Governmental Organisations
NHD	Natural Heritage Department
NSP	National Strategic Plan
PDP	National Physical Development Plan

Acronym	Expanded Name
PSAs	Public Service Announcements
SCU	Soil Conservation Unit
SGP	Small Grants Programme
SJPI	Samuel Jackman Prescod Institute of Technology
SMP	Species Management Plans
SSA	Sanitation Services Authority
TCDPO	Town and Country Development Planning Office
UNCCD	United Nations Convention to Combat Desertification and Drought
UNFCCC	United Nations Framework Convention on Climate Change
UWI	University of the West Indies

1. INTRODUCTION

The Government of Barbados has been a Party, by ratification, to the United Nations Convention on Biological Diversity (CBD) since March 10th, 1994 and is therefore committed to ensuring that the country maintains compliance with its obligations under the Convention. As part of this compliance, the first National Biodiversity Strategy and Action Plan (NBSAP) was submitted to the CBD Secretariat on December 6th, 2002, and five (5) National Reports have been submitted to date.

This second NBSAP was prepared following the guidance provided in Module 2 of the Training Package (Version 2.2): 'Using the Biodiversity Planning Process to Prepare or Update a National Biodiversity Strategy and Action Plan', published by the CBD Secretariat in 2011. The module provides guidance on updating NBSAPs in line with the guiding principles of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets. It draws on guidance provided by the Conference of the Parties Decision IX/8 on NBSAPs, which state that NBSAPs must:

a. Address all three objectives of the Convention. [1]

b. Highlight the contribution of biodiversity and ecosystem services to human wellbeing.

c. Be a strategic instrument for achieving concrete outcomes.

d. Be jointly developed, adopted, and owned by the full range of societal groups who may have interests, stakes or rights with regard to biodiversity.

e. Include measures to mainstream biodiversity into sectoral and cross-sectoral policies and programmes.

f. Biodiversity planning is a long-term, cyclical and adaptive process.

Two additional key aspects of the guidance were considered in preparing this second NBSAP. First is the caution that "the real 'products' of the NBSAP are the principles, priorities, policies, instruments and programmes that the country identifies as the way to achieve the three objectives of the Convention in the country" (CBD 2011, p.5). The second is the reminder that:

> *"What is important is not the form of the NBSAP, but rather that it serves the function of helping to mobilise and organise the relevant national stakeholders to identify, prioritise and materialise action to implement the Convention in their country and to mainstream biodiversity concerns into their sectoral and cross-sectoral planning" (CBD 2011, p.6).*

Finally, the guidance explains that biodiversity planning is an iterative process involving the steps displayed in Figure 1.

1 The three objectives of the Convention are: (i) Conservation of biodiversity, (ii) Sustainable use of the components of biodiversity and (iii) Fair and equitable sharing of the benefits deriving from the utilisation of genetic resources.

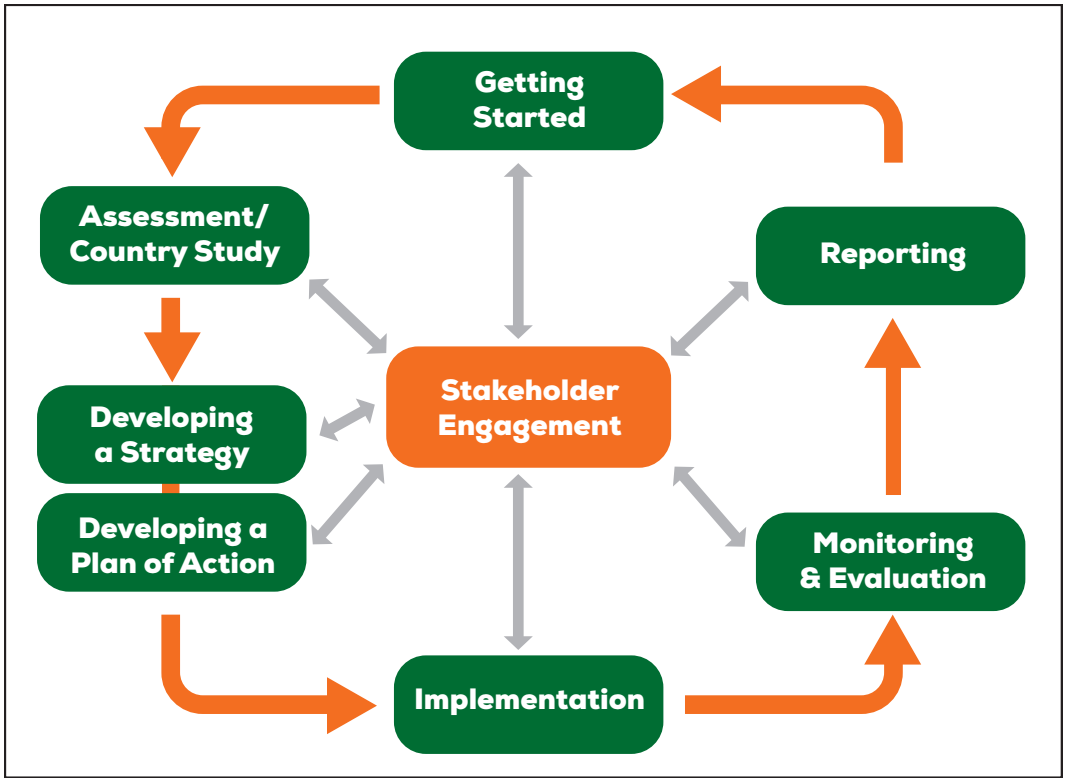


Figure 1: Basic Steps in Biodiversity Planning: A Cyclical & Adaptive Process (Source: CBD, 2011)

This document is structured in a way that systematically addresses this guidance to the extent possible. Consequently, following this introduction in Section 1 is Section 2, which provides an overview of biodiversity status, trends and threats and includes a subsection on the value of biodiversity and ecosystem services as well as on the status of biodiversity mainstreaming in Barbados. Section 3 presents an assessment of the status of implementation of the first NBSAP (2002), highlighting the progress made to date and identifying and gaps that need to be addressed in the future. Section 4 presents the nationally prioritised Aichi Biodiversity targets while Section 5 lays out the next NBSAP to guide the conservation of national biodiversity in the coming years.

Stakeholder involvement was central to the process of preparing this document and articulating the new NBSAP. During stakeholder consultations,participants identified national priorities from the Aichi Biodiversity Targets and amended these targets to address current national issues and chart realistic timelines for implementation. They also articulated the vision, goals and objectives for the revised NBSAP. Focus group stakeholder meetings were also held in which participants reviewed the first draft of the NBSAP, revisited the national priorities, vision, goals and objectives, and reviewed specific actions proposed to be undertaken to implement the strategy and action plan.

The participatory process concluded with a national consultation at which stakeholders were afforded another opportunity to comment on the revised draft NBSAP. The feedback provided was taken into account in finalising the strategy and action plan.

2. OVERVIEW OF BIODIVERSITY STATUS, TRENDS AND THREATS

Barbados' 4th National Report (4NR) to the CBD (2011) presented detailed information on the island's terrestrial and marine biodiversity, its status and trends. The 5th National Report (5NR) to the CBD (2016) provided an update of that report, using information obtained since the 4NR was prepared. This section of the NBSAP presents an overview of the current situation based on the information contained in the 4th and 5th National Reports and this information will be used to update the NBSAP since its original publication in 2002.

2.1 TERRESTRIAL BIODIVERSITY

2.1.1 FLORA

Approximately 700 species of native and naturalised flowering plants have been described for Barbados and approximately 100 of these are trees. Two (2) of these plant species are only found in wooded areas and are considered to be endemic[2]; 8 species as rare or endangered and 23 species have been identified as requiring protection in Barbados[3]. Fifteen (15) of these species are also known to be found at only one site. Further, recent research has resulted in 15 flowering plants being identified for possible inclusion in the island's flora, and eight of these species (*Philodendron lingulatum, Hymenocallis latifolia, Hymenocallis speciosa, Mimosa distachya, Macroptilium atropurpureum, Sapindus saponaria, Canella winterana* and *Psychotria microdon*) are new records for Barbados.

Research on lower plants remains limited; however, Carrington (1991) lists the fern ally (*Psilotum nudum*) and a tree fern (*Cyathea arborea*) as rare or endangered. In addition, some of the Bryophytes and Pteridophytes in Barbados have been inventoried but the status of these species remains unclear.

Over the years, 28 sedge species and 79 grass species have been described. In addition, 222 algal species; 37 species of Pteridophytes.; 9 macrofungi, 4 lichens, 22 species of mosses, 4 species of liverwort and 1 hornwort species have been documented on the island.

In 2015, the Barbados Natural Fibres Project (BMFP) identified 38 species of natural fibres and 11 seeds as having economic value for the national crafts sector. The distribution of these species on the island is shown in Figure 2.

2 Government of Barbados, 2002.National Biodiversity Strategy and Action Plan
3 Government of Barbados, 2002.National Biodiversity Strategy and Action Plan

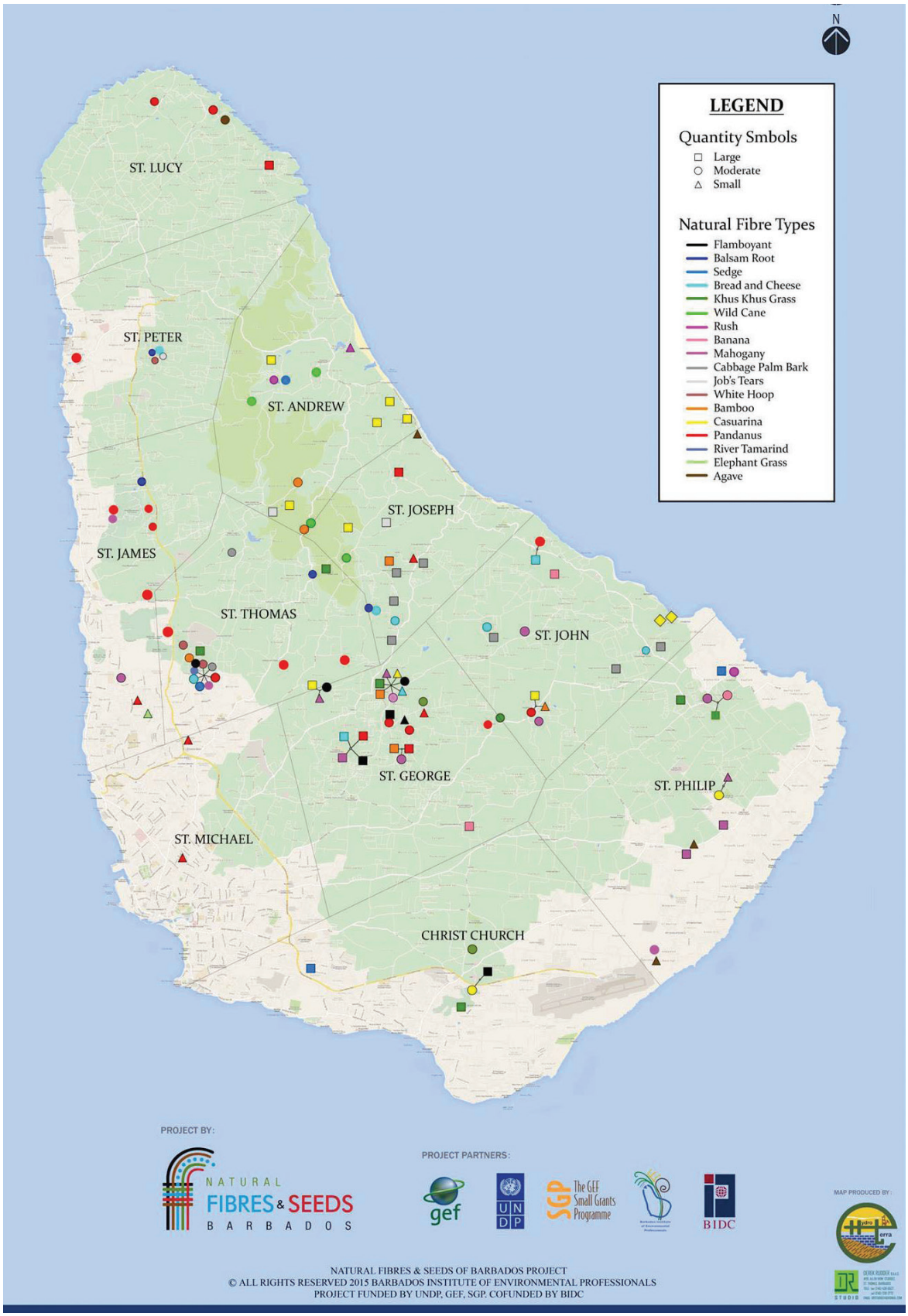


Figure 2: Natural Fibres of Barbados Location Map
(Source: Barbados Natural Fibres Network)

2.1.2 FAUNA

2.1.2.1 BIRDS

To date, two hundred and sixty-one (261) species of birds have been recorded in Barbados, representing an increase of about 150 over the 2002 NBSAP estimate. The current estimate comprises over 230 migratory species, 5 of which are of global importance (Burke, 2007)[4]. There are 34 species of birds breeding on the island, including some exotics (Watson, 2009)[5]. Of these, 31 have been identified as native breeding, one of which, the Barbados Bullfinch *(Loxigilla barbadensis)*, is endemic. There are six (6) endemic subspecies of birds on the island. Approximately 16 bird species have been categorised as exotics (8 of these species occur naturally due to an expanded range and 8 species have been deliberately introduced). Approximately 31 native and migratory species of birds are protected under the Wild Birds Protection Act (Cap 398).

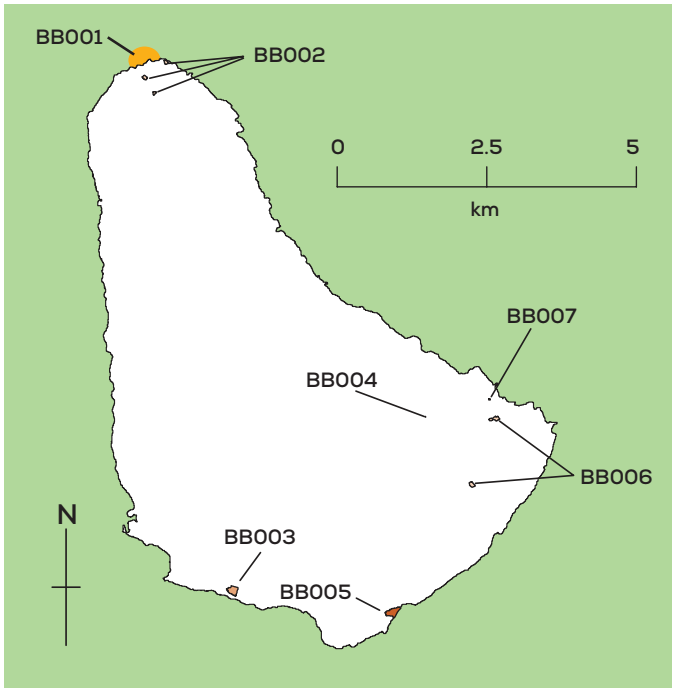


Figure 3: Location of Important Bird Areas of Barbados

Barbados has six (6) Important Bird Areas (IBAs) covering approximately 185 hectares of land and including marine areas. The IBAs are wetlands, which serve as a network of sites for native and migratory waterbirds. They have been identified based on 11 key bird species found on the island and which meet international IBA criteria[6] (Figure 3[7]).

4 Burke, Wayne, 2007
5 Watson, Karl, 2009
6 Wayne Burke. Important Bird Areas of the Caribbean – Barbados. www.birdlife.org (29/05/2016)
7 Wayne Burke. Important Bird Areas of the Caribbean – Barbados. www.birdlife.org

2.1.2.2 MAMMALS

The mammalian fauna of Barbados continues to be dominated by 6 species of bats (*Artibeus jamaicensis, Brachyphylla cavernum minor, Molussus molussus, Monophyllus plethodon, Myotis martiniquensis* and *Noctillo leporinus*), the African green monkey (*Chlorocebus sabaeus*), Indian mongoose (Herpestes auropunctatus) and the European hare (*Lepus capensis*). None of Barbados' mammals are endangered.

According to recent research, the hare population seems to be experiencing resurgence due to an increase in grass cover and less use of harmful pesticides. It also appears that the hare population may be differentiated from the ancestral European population and may have a reduced genetic diversity. Molecular DNA genetic diversity, morphological and physiological studies are currently being conducted in this regard.

Barbados Leaf-Toed Gecko *(Phyllodactylus pulcher)*

Photo compliments: Connor Blades

2.1.2.3 REPTILES

The terrestrial reptile population of Barbados is comprised of snakes, lizards and tortoise species. Four snake species (*Tetracheilostoma carlae, Ramphotyphlops braminus, Erythrolamprus perfuscus* and *Mastigodryas bruesi*) have been recorded for Barbados. Eight (8) species of lizards have been recorded. The Barbados Leaf-Toed Gecko (*Phyllodactylus pulcher*) is one of the few remaining endemic vertebrate species on the island. Previously thought extinct, the gecko was rediscovered on Culpepper Island in 2011. In 2013, other colonies were found in rocky coastal areas in the parish of St Philip. Surveys undertaken in both these locations estimate that fewer than 250 mature individuals remain. Further surveys are underway to locate other colonies and to ascertain the size of the population. Based on data collected and analysed to date, it is believed that the Barbados Leaf-toed Gecko qualifies as "globally threatened" on the IUCN (International Union for the Conservation of Nature) Red List of Threatened Species. It has been confirmed in 2015 that the species is now identified as 'Critically Endangered'.[8]

2.1.2.4 AMPHIBIANS

Two amphibian species, the cane toad (*Chaunus marinus linnaeus*) and the whistling frog, (*Eleutherodactylus johnstonei*) inhabit the island. These species are currently locally abundant wherever water is present.

8 https://www.iucnredlist.org/species/48443321/115401286

2.1.2.5 INSECTS AND ALLIED ARTHROPODS

To date, approximately 1320 species of insects and allied arthropods have been described. Among the insects, odonates, hemipterans, coleopterans and dipterans have been found to be the most common.

2.2 AQUATIC BIODIVERSITY

2.2.1 FRESHWATER BIODIVERSITY

More than ninety (90) aquatic macro-invertebrate taxa have been identified for Barbados. Generally, the fauna population is sparse—due to the oceanic origin of Barbados and the disturbance of freshwater environments—and is dominated by snails, shrimps, and insects. The overall status and trends related to the taxa are unknown; however, work continues in this area, and it is estimated that more species will be discovered.

2.2.2 MARINE BIODIVERSITY

Three (3) species of marine turtles nest in Barbados: the endangered Green turtle (*Chelonia mydas*) and the critically endangered Hawksbill (*Eretmochelys imbricata*) and Leatherback (*Dermochelys coriacea*) turtles (IUCN, 2008). All three of these species are listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Four (4) species of seagrass, 10 species of soft coral and 31 species of hard coral have been recorded around the island. The seagrasses have been impacted by coastal and land-based sources of pollution while there has been little change in the coral populations.

2.3 DRIVERS OF BIODIVERSITY LOSS

The major threats to biodiversity in Barbados are habitat loss and fragmentation, invasive alien species (IAS), over-harvesting of species, pollution, shooting of birds[9], resource extraction and natural disasters. Since publication of the 4NR, notable developments have occurred in the areas discussed below.

2.3.1 HABITAT LOSS AND FRAGMENTATION

Habitat loss and fragmentation have resulted from the gradual urbanisation and sub-urbanisation of the island. Generally, Barbados has been able to control haphazard development and urban sprawl through the implementation of a National Physical Development Plan (PDP) 2003. This plan is currently being revised and research for its revision (using aerial photography for 2015 produced from the Coastal Risk Assessment and Management Programme) has confirmed the growth in urban sprawl due to the continued subdivision of land for building development since 1998. At the same time, similar photography shows that within the boundaries of the Barbados National Park and along the natural gully systems there has been a notable increase in vegetation cover. Studies are needed to assess the extent of habitat change due to both these factors, and the overall impact on local biodiversity.

9 Voluntary measures in the form of quotas and others, and now being used to control this sport in Barbados and to protect at-risk species

Giant African Snail *(Lissachatina fulica)*

Figure 4: Giant African Snail

Red Lionfish *(Pterois volitans)*

Figure 5: Lionfish

2.3.2 INVASIVE ALIEN SPECIES

Of the 48 IAS reported for Barbados, only seven have been reported on the island since the year 2000. Those of more recent concern are the giant African snail (*Achatina fulica*) (Figure 4), the red lionfish (*Pterois volitans*) (Figure 5), and the African green monkey (*Chlorocebus sabaeus*).

While the African green monkey has been on the island for approximately 350 years, today it is widely considered to be an agricultural pest. The specific size of the population appears to be unknown and such datais vital to its management and control. The Giant African snail is also considered a pest and programmes for its eradication are continuing under the guidance of the Ministry of Agriculture and Food Security. The study on IAS conducted for this NBSAP, notes that little is known about the ecological, economic and cultural impacts of the species reported for Barbados; the economic impacts, however, are considered to be significant. To date, none of the IAS has been completely eradicated.

2.3.3 SHOOTING OF BIRDS

The long-established practice of hunting migratory birds in shooting swamps has undergone significant change in recent years. Through the collaborative efforts of the Barbados Wildfowlers Association (BWFA), Birdlife International, Canadian Wildlife Services and the United States Fish and Wildlife Service, an initiative to ensure the sustainable harvesting and management of shorebirds was activated in 2008. Subsequently, the BWFA has passed several resolutions to limit the harvesting of some species and to control hunting methods. Annual quotas have been established nationally and per shooting venue, as well as on species such as the Lesser yellowlegs (*Tringa flavipes*) and the American golden plover (*Pluvialis dominica*). The system of data collection now in place should enable reliable monitoring of species visiting the wetlands and shooting swamps in Barbados. The Barbados model is being used in other jurisdictions.

2.4 THE VALUE OF BIODIVERSITY AND ECOSYSTEM SERVICES AND THEIR CONTRIBUTION TO HUMAN WELLBEING

Ecosystems are dynamic discontinuous systems, which interact and connect in a myriad of ways largely influenced by economic, social and cultural factors. Ecosystems can be said to represent ecological processes, which are value-neutral and the resources they provide can be expressed in terms of goods and services which can have a value assigned to them.[10] Ecosystem services can therefore be defined in terms of the benefits people obtain from ecosystems. All ecosystem services therefore have a direct relationship with human wellbeing. The Millennium Ecosystems Report, 2005[11] indicates that ecosystems provide several services to people in the following categories:

1. Provisioning Services: products obtained from ecosystems e.g., food, fuel, fibre, water and genetic resources.
2. Ornamental Services: ecosystems services which provide raw materials to support varied subsectors including the crafts sector.
3. Regulating services: benefits obtained from regulating ecosystem processes such as climate, air quality, erosion control, human disease.
4. Cultural services: non-material benefits e.g., spiritual, cognitive, recreation, aesthetics, tourism, experiences.
5. Supporting services: required for production of all ecosystem services e.g., oxygen, primary production, soil formation.

10 Figure 6: Illustration of linkages between ecosystem services and human wellbeing
11 Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.
Source: https://www.millenniumassessment.org/documents/document.356.aspx.pdf Accessed: December 15, 2018

The interrelationship among ecosystem services and human wellbeing is depicted in Figure 6.

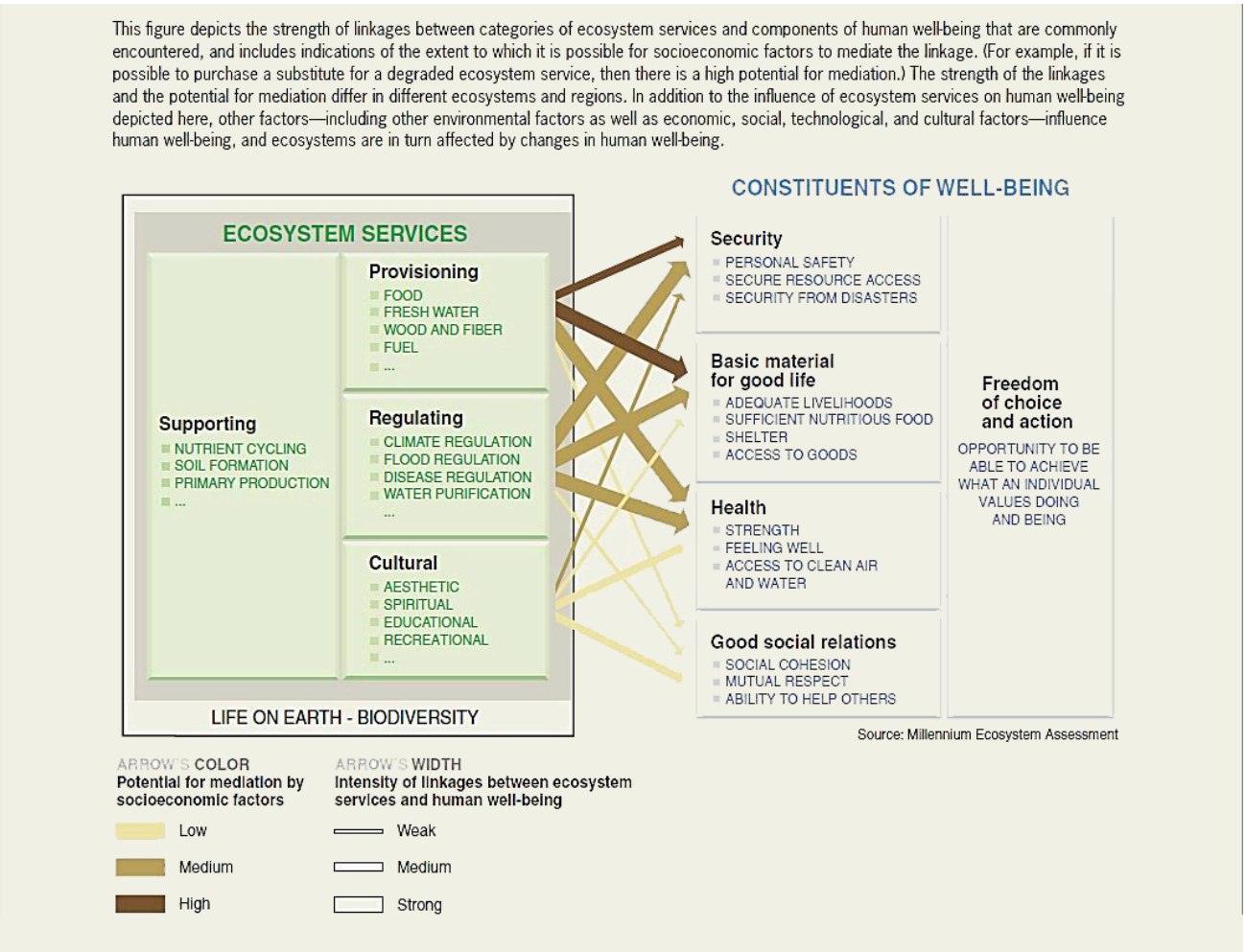


Figure 6: Illustration of linkages between ecosystem services and human wellbeing

The economic, social and cultural viability of Barbados depend on the continued capacity of its marine and terrestrial ecosystems to support viable ecosystem services. For Barbados, critical ecosystem services fall within the four categories listed in the Millennium Ecosystem Assessment report of 2005. In Barbados' Green Scoping Study[12] these services have been identified as:

> "Ecosystem services [….] take many forms: provisioning from natural systems (seafood, wood and plants from gully ecosystems) and altered agro-ecosystems; seashore protection services of reefs and coastal vegetation; sand generation by reefs; non-extractive use services that support income generating activities such as snorkelling, SCUBA diving, hiking and sightseeing; and, finally, the creation of opportunities for recreation, a critical component of human wellbeing, that is afforded Barbadians through healthy terrestrial and marine ecosystems".

12 Moore, W., Alleyne ,F., Alleyne, Y., Blackman, K., Blenman, C., Carter, S., Cashman, A., Cumberbatch, J., Downes, A., Hoyte, H., Mahon, R., Mamingi, N., McConney, P., Pena, M., Roberts, S., Rogers, T., Sealy, S., Sinckler, T. and A. Singh. 2014. Barbados' Green Economy Scoping Study. Government of Barbados, University of West Indies - Cave Hill Campus, United Nations Environment Programme, 244p.

2.4.1 THE VALUE OF BIODIVERSITY AND ECOSYSTEM SERVICES TO BARBADOS

The following section will present information on the value of ecosystem services to Barbados under the categories listed above. In some cases, actual values are presented as environmental goods and services associated with these ecosystems are part of major economic activity in Barbados. In other cases, the values, while acknowledged as important, have not been quantified individually but may form part of aggregated statistics collected nationally and therefore no disaggregated data is available for them.

2.4.1.1 PROVISIONING SERVICES

These services are inclusive of products that are obtained from ecosystems, such as: food, fibre, fuel, genetic resources, biochemicals, natural medicines, pharmaceuticals, water, and building materials.

2.4.1.1.1 FISHERIES

Coastal Ecosystems such as coral reefs, mangroves, beaches and seagrasses provide great value to numerous economic sectors including tourism, fisheries and shoreline protection.[13] These systems are under threat due to overfishing, pollution and climate change threats such as coral bleaching and ocean acidification. For Barbados, coastal ecosystems are of economic importance to the tourism, fisheries and recreational sectors. The fisheries sector is of major economic and social importance to Barbados and the sector's value has been quantified in many different forms. In 2016, an estimated 1,652 tonnes of fish landed in Barbados at two main fishing complexes in Bridgetown and Berinda Cox complexes. The main species of importance and their relative values in terms of fish catch are provided in (Table 1)[14] .

13 Richard Waite; P.J.H.VanBeukering, L. Burke, L. Brander. Coastal Capital: ecosystem valuation for decision making in the Caribbean. Pecharcal Report 2014

14 Barbados Economic and Social Report 2016

Table 1: Fish Landing by Species Type (Tonnes) (Source: Fisheries Division, Ministry of Agriculture)

Year	2010	2011	2012	2013	2014	2015	2016P
Flying Fish	2424	908	354	1909	1314	378	469
Dolphin	465	505	459	514	278	373	405
Kingfish	29	27	26	22	21	12	13
Billfish	27	44	46	46	55	83	76
Tuna	117	114	184	178	211	247	307
Snapper	28	10	19	14	11	21	31
Reef Fish (Carangids)	20	10	39	9	16	43	43
Shark	8	9	12	8	11	19	13
Swordfish	10	19	16	12	16	22	16
Any Other Variety	98	127	145	23	19	48	63
Total	**3226**	**1773**	**1300**	**2735**	**1952**	**1246**	**1436**

In a paper presented at the 58th Gulf and Caribbean Fisheries Institute[15] the value added of different fisheries in USD was estimated to be US$19 Million and about 2.6 times the landed value of the fisheries (Table 2).

Table 2: Value Added in the Fisheries Sector (Source: Fisheries Division)

Fish Type	Ex-vessel value	Value added (% of total)		Overall Value
Flying Fish	1,794,249	13,324,338	(88)	15,118,587
Dolphinfish	2,502,692	3,001,173	(55)	5,503,865
Tuna	701,425	1,217,695	(63)	1,919,119
Billfishes	307,805	327,302	(52)	635,107
Swordfish	96,522	61,518	(39)	158,040
Kingfish	133,459	92,141	(41)	225,600
Subtotal - offshore	**5,536,151**	**18,024,168**	**(77)**	**23,560,319**
Snappers	82,150	122,964	(60)	205,115
Shark and Barracuda	44,721	42,317	(49)	87,037
Lobster	3,934	3,888	(50)	7,821
Jacks	29,626	16,898	(36)	46,524
Bonito	4,885	4,684	(49)	9,570
Reef Fishes	44,657	28,028	(39)	72,685
Sea eggs	1,387,500	0	(0)	1,387,500
All others	201,048	28,890	(13)	229,938
Subtotal - coastal	**1,798,520**	**247,669**	**(12)**	**2,046,189**
Total	**7,334,672**	**18,271,837**	**(71)**	**25,606,508**

Other fisheries activities include sea egg fishing which had a total value of BBD 500,000.00 in 2016 and lionfish catch of less than 1 tonne. These types of fisheries activities are generally supported by a varied fishing fleet as indicated in Table 3.

15 Mahon, R. C. Parker, T. Sinckler, S. Willoughby and J. Johnson. 2007. The Value of Barbados' Fisheries: A Preliminary Assessment. 58th Gulf and Caribbean Fisheries Institute. Pp 88-92.

Table 3: Fishing Fleet by Type (2011-2016) (Source: Fisheries Division, Ministry of Agriculture)

Year	2011	2012	2013	2014	2015	2016
Moses	587	615	622	588	607	672
Day-boats	249	235	237	230	230	234
Ice boats	187	191	191	175	179	193
Long-liners	39	42	40	41	43	47
Total	1,062	1,083	1,090	1,034	1,059	1,146

2.4.1.1.2 AGRICULTURE

The agricultural sector derives its value from the contribution of activities in the sugar and non-sugar sub-sectors and fisheries (value of fisheries sector was discussed above). In terms of valuing the ecosystem services relevant to sustaining land-based agriculture, the main activities are reported in the categories of vegetable, root crops, cotton and livestock and diary production. The production volume of these commodities during the period 2009 – 2016 is provided below (Table 4).

Table 4: Production of select agricultural commodities of economic importance

Commodities	2009	2010	2011	2012	2013	2014	2015	2016P	Change over 2015
Export Crops									
Sugar ('000 tonnes)	30.3	24.5	22.6	23.6	17.4	15.7	10.8	7.0	(34.7)
Cotton ('000 kgs)	3.9	n.a.	n.a.	34.2	25.7	12.0	17.7	13.7	(22.6)
Root Crop Production ('000 kgs)									
Cassava	690.5	399.5	308.4	184.9	1,037.6	552.9	379.1	490.5	29.4
Eddoes	23.5	228.3	19.5	65.3	173.3	74.6	156.6	250.3	59.8
Sweet Potatoes	888.1	1,176.4	506.5	1,211.1	1,218.1	1,231.9	1,334.6	2,897.5	117.1
Yams	824.3	806.6	243.1	346.8	751.8	567.1	578.1	378.4	(34.5)
Onions	626.0	497.9	392.5	550.1	503.8	315.3	757.8	428.7	(43.4)
Peanuts	50.4	15.5	4.6	18.5	87.3	4.6	7.9	11.2	40.8
Vegetable Production ('000kgs)									
Beans (string)	170.3	222.1	270.0	226.4	112.3	109.2	149.9	137.0	(8.6)
Beets	52.0	30.5	48.5	28.9	31.5	23.7	43.4	83.6	92.5
Cabbage	254.3	60.4	261.7	311.2	181.6	322.7	360.6	337.5	(6.4)
Carrots	198.1	263.7	145.7	244.5	295.5	310.2	271.0	134.6	(50.3)
Cucumbers	1,119.7	1,148.1	1,144.8	813.9	823.9	994.3	810.9	250.3	(69.1)
Lettuce	572.1	339.1	499.0	170.7	213.3	312.7	459.9	439.7	(4.4)
Melon	243.1	240.8	156.3	194.6	381.6	318.9	401.2	197.6	(50.7)
Okra	244.6	302.8	311.8	263.6	215.5	263.6	290.0	261.0	(10.0)
Pepper (Hot)	178.1	76.1	82.8	64.8	48.2	92.8	88.5	37.5	(57.7)
Pepper (Sweet)	293.9	317.5	314.4	175.1	487.8	396.3	329.9	137.2	(58.4)
Pumpkins	191.2	179.7	166.4	188.0	528.9	508.2	308.2	249.3	(19.1)
Tomatoes	718.5	717.5	813.0	1,033.3	977.0	781.0	733.6	336.9	(54.1)

Other values of biodiversity relate to the use of genetic resources for germplasm conservation and for use in breeding programmes. Additionally, the value as it relates to landscaping, soil and beach erosion mitigation, as well as to produce herbal medicinal and spa products, must also be considered although the value of these activities is more difficult to quantify.

2.4.1.1.3 WATER

Groundwater is the only source of potable water on the land in the island and is found mainly in natural reservoirs within aquifers, serviced by natural underground streams. It is estimated that the average water demand is about 89.4 Mm^3 of which public services provide 64.5Mm^3 the rest being serviced by private wells[16].

2.4.1.1.4 ENERGY

Barbados extracts oil and gas to a limited extent. The Barbados National Oil Company Ltd. (BNOCL) reported that the total production available at the end of 2016, obtained from existing wells, to be approximately 1.91 million barrels of crude oil and 3,292,000 thousand cubic feet (mcf) of gas. Gas sales by the NPC in 2016 had a value of BBD 17,312,200.00. Royalties earned nationally through the sale of oil and gas by BNOCL in 2016 amounted to BBD 4 million[17].

2.4.1.1.5 GENETIC RESOURCES OF ECONOMIC IMPORTANCE

Germplasm conservation is critical for ensuring sustainable food security; developing food crops and forestry species adapted to environmental and climate changes and pest and disease resistance or tolerance. While some of Barbados' genetic resources used in the agricultural sector were discussed previously, this section focuses on other benefits from local ecosystems.

2.4.1.1.5.1 Plant Breeding and Production of New Plant Varieties

Currently, the only intensive, coordinated and sustained breeding programme in Barbados is for sugarcane at the West Indies Central Sugar Cane Breeding Station Inc. (WICSCBS Inc.), which undertakes research and breeding to produce new sugarcane varieties. WICSCBS Inc. is internationally recognised as a leader in sugar cane breeding operations. It provides fuzz (true seed) or varieties to both regional and international clients.[18] Its bespoke breeding programme allows it to tailor breeding programmes to meet the special needs of its clientele.

In the past, other plant breeding programmes were focussed on commodities such as cotton, pigeon peas and cut flowers. Informal breeding programmes are still in practice by small-scaled farmers who grow, as examples, peanuts, 'Bajan' cucumber, corn, guinea corn and okra. These breeding programmes rely on farmers collecting the best seeds of the current year for planting the next crop season and has greatly facilitated germplasm conservation and improvement in Barbados.

16 Moore, W., Alleyne ,F., Alleyne, Y., Blackman, K., Blenman, C., Carter, S., Cashman, A., Cumberbatch, J., Downes, A., Hoyte, H., Mahon, R., Mamingi, N., McConney, P., Pena, M., Roberts, S., Rogers, T., Sealy, S., Sinckler, T. and A. Singh. 2014. Barbados' Green Economy Scoping Study. Government of Barbados, University of West Indies - Cave Hill Campus, United Nations Environment Programme, 244p.

17 Barbados Economic and Social Report 2016

18 Source: http://www.canebreedingstation.com/#

2.4.1.1.5.2 Animal Breeding

While there are no coordinated breeding programmes for livestock in Barbados, such activity occurs at the small-scale level. Key species include: blackbelly sheep, goats, rabbits and pet fish.

2.4.1.2 ORNAMENTAL SERVICES

Under this category are those ecosystems services which provide raw materials to support varied subsectors including the crafts sector. Those of relevance are:

- Natural fibres: use in basket-making, bags, placemats, paper and paper products;
- Fashion and accessories: relying on natural fibres and seeds for jewellery-making and leather products from blackbelly sheep and cow leather;
- Interior design: natural fibres, flowers for floral arrangements;
- Exterior landscaping and beautification: ornamental plants such as royal and cabbage palms, sage, khus khus grass and other local varieties used in landscaping;
- Manufacturing: use of local timber such as mahogany for production of trophies and other crafts items.

2.4.1.2.1 Medicinal Plants and Animals

Local plant varieties are often used to treat minor illnesses. These treatments are based on traditional knowledge and are known as "old folk remedies". Such use of these indigenous traditional plant remedies is increasing and several products such as soaps and other spa products have incorporated some of these plants.

The Barbados green monkey is exported to be used in biomedical research to test IPV and OPV polio vaccines internationally. Additionally, they are used to test molecules and pharmaceuticals.

African green monkey *(Chlorocebus sabaeus)*

2.4.1.3 REGULATING SERVICES

Services under this category provide benefits through the regulation of ecosystem processes such as air quality, climate regulation, erosion control, waste treatment, pollination and regulating human disease.

2.4.1.3.1 Carbon Sequestration

About 18% or approximately 8,000 ha of Barbados is under forest cover which translates to a million metric tonnes of carbon in living forests and biomass[19]. The value of vegetative carbon sequestration for Barbados is not known. Such figures would be beneficial to obtain as it could provide guidance as to potential management strategies to improve and preserve vegetable carbon sequestration especially in Barbados' national parks.

2.4.1.4 CULTURAL SERVICES

Non-physical benefits derived from ecosystems such as recreation, aesthetics and spiritual enhancement, education values, cultural heritage and tourism are examined under this category.

19 Source: www.fao.org

2.4.1.4.1 Tourism

The tourism sector, which relies heavily on Barbados' natural resources, supports approximately 14,000 jobs and accounts for 40% of employment opportunities, contributes 12% to GDP and more than 50% to foreign exchange. Seventy-five percent (75%) of tourists visiting Barbados do so for pleasure, participating in both land and marine-based activities closely-linked to both ecosystems.

Visitors to Barbados spend an average of about 1,400 USD, of this total an estimated 869 USD are spent on coastal and marine recreation per person. These activities included: laying on the beach, swimming, snorkelling, sailing, glass-bottom boating, power boating and diving[20]. An earlier study[21] also revealed that most visitors surveyed indicated their willingness to pay a nominal environmental fee of ≤ 5.00 USD to help fund the long-term protection of coastal and marine resources in Barbados. Table 5[22] shows the value of the tourism sector to Barbados' economy between 2006 and 2016.

Table 5: Value of Barbados' Tourism Sector (2006-2016) (Source: Barbados Statistical Service, Caribbean Tourism Organisation)

Year	Accommodation & Food Services			Arrivals		
	*Share in GDP (%)	Employment ('000 persons)	Stay-over Expenditure ($M)	Stay-over Visitors	Average Intended Length of Stay (days)	Cruise Passengers
2006	19.3	n.a.	1,418.6	562,541	n.a.	539,092
2007	21.9	n.a.	1,716.4	572,937	n.a.	616,354
2008	20.6	n.a.	1,712.2	567,667	n.a.	597,523
2009	19.2	n.a.	1,522.5	518,564	n.a.	635,212
2010	18.5	12.7	1,448.6	532,180	15.04	664,747
2011	16.5	13.2	1,314.1	567,724	12.18	609,844
2012	15.5	12.7	1,237.2	536,303	12.51	517,436
2013	17.5	13.3	1,406.2	508,520	11.82	570,263
2014	17.1	15.4	1,363.1	519,635	11.97	563,030
2015	21.4	15.8	1,719.5	591,872	11.19	586,615
2016P	18.3	16.4	1,443.4	631,513	11.01	729,645

*GDP at Basic Prices, Employment and Stay-over Expenditure relate to the industry of Accommodation and Food Services

20 The Economic Importance of Coastal and Marine Resources to Tourism in Barbados. 2017. Peter Schuhmann, Ryan Stoute and Richard Waite.
21 Peter W. Schuhmann. The Economic Value of Coastal Resources in Barbados: Vacation Tourists' Perceptions, Expenditures and Willingness to Pay. 2012. CERMES Technical Report No 50.
22 Barbados Social and Economic Report 2016.

2.4.1.4.2 Recreation

Recreation values of Barbados' ecosystems include those provided via national parks and protected areas for walks and hikes. Typically, hikes through Barbados involve trekking through cane fields, gullies, forested areas and coastal communities.[23] Hikes generally range in length from 6 to 12 miles and have become an integral part of recreational activities for both locals and visitors to the island.

2.4.1.5 SUPPORTING SERVICES

These services are those deemed essential for the production of all other ecosystem services and will have indirect impacts on human wellbeing, or may occur over a long period. Examples include production of atmospheric oxygen (through photosynthesis), primary production, soil formation and retention, nutrient cycling, water cycling and provisioning of habitats.

2.4.1.5.1 EROSION CONTROL

Plants with extensive fibrous root systems such as khus khus grass are used extensively to control soil erosion especially along the edge of plantation fields and sloping areas.

2.4.1.5.2 GERMPLASM CONSERVATION

Through formal and informal breeding programmes of plants species and animal breeds of economic importance, Barbados has engaged in germplasm conservation. Such efforts need to be urgently augmented by a national programme for germplasm conservation of genetic resources of economic importance.

2.5 FRAMEWORK FOR BIODIVERSITY MANAGEMENT AND INTEGRATION (MAINSTREAMING)

The underlying causes of biodiversity loss can be addressed by ensuring that biodiversity conservation is integrated into all national and sectoral development plans and across government and society, thereby reducing the direct pressures on biodiversity and promoting sustainable use. The CBD promotes such an approach by calling for the mainstreaming of biodiversity across government and society. This is expressed in Strategic Goal A of the Aichi Biodiversity Targets. Mainstreaming may be simply defined as "the process of embedding biodiversity considerations into policies, strategies and practices of key public and private actors that impact or rely on biodiversity, so that it is conserved and sustainably used both locally and globally" (Huntley and Redford, 2014, p. 7). The concept is further articulated in Aichi Targets 1 through 4.

2.5.1 STATUS OF BIODIVERSITY MAINSTREAMING

Barbados has already made considerable strides in mainstreaming, as biodiversity concerns are expressed in many of the key national and sectoral policies and plans. The 4NR to the CBD contains a comprehensive description of the policies, programmes and institutions that actively incorporate biodiversity conservation. These are summarised in Table 6 below.

23 Source: https://barbados.org/hike.htm

Table 6: Sectoral and Cross-sectoral Integration/ Mainstreaming of Biodiversity Considerations

National & Sectoral Policies and Plans	Institutional Arrangements	Legislation	International Treaties/ Conventions
• National Strategic Plan 2006-2025 • National Biodiversity Strategy and Action Plan 2002 • Barbados Sustainable Development Policy 2004 • Physical Development Plan (Amended) 2003 • The National Park Plan • Fisheries Sector Management and Development Policy • Medium Term Development Strategy 2010-2014 • Green Paper: Sustainable Development of Tourism in Barbados: A Policy Framework • Barbados Tourism Master Plan 2014-2023	• Ministry of Environment and Drainage (MED) - Natural Heritage Department - National Conservation Commission - National Botanic Gardens - Coastal Zone Management Unit • Ministry of Agriculture - Fisheries Division - Soil Conservation Unit - Town and Country Development Planning Office	• Town and Country Planning Act (Cap.240) • Land Acquisition Act (Cap.228) • Barbados Constitution (Section 16) • Soil Conservation (Scotland district) Act (Cap.396) • National Conservation Commission Act (Cap.393) • Trees Preservation Act (Cap.397) • Cultivation of Trees Act (Cap.390) • Barbados Agricultural Development and Marketing Corporation Act (12/19930) • Barbados Territorial Waters Act (1997) • Marine Boundaries and Jurisdiction Act (Cap.387) • Fisheries Act 1995 (Cap.391) • Fisheries Management Regulations (1998) • Marine Pollution Control Act 1998 (Cap.392). • Coastal Zone Management Act (1998-39) • International Trade in Endangered Species of Wild Fauna and Flora Act (2006-3) • National Conservation Commission Act (Cap.393) • Wild Birds Protection Act (Cap.398) • Protection of New Plant Varieties Act (2000-17) • Plant Protection Act (2007-53)	• UN Convention on Biological Diversity; Cartagena Protocol on Biosafety • Convention on International Trade in Endangered Species (CITES) • UN Convention on the Law of the Sea • UN Convention to Combat Desertification and Drought • Convention for the Protection and Development of the Marine Environment of the Wider Caribbean; Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean • Vienna Convention for the Protection of the Ozone Layer; the Montreal Protocol on Substances that Deplete the Ozone Layer • UN Fish Stocks Agreement • FAO Compliance Agreement • International Convention for the Conservation of Atlantic Tunas • International Plant Protection Convention • Agreement on the Application of Sanitary and Phytosanitary Measures • Millennium Development Goals

The 5NR (2016) summarises additional policies and programmes not included in the 2011 report and these, along with subsequently developed policies and programmes that further advance the mainstreaming of biodiversity, are summarised in Table 7.

Table 7: Additional Integration Measures not included in the Fourth National Report

National & Sectoral Policies and Plans	Institutional Arrangements	Legislation	International Treaties/ Conventions
• Barbados Growth and Development Strategy 2013-2020 • The Draft Climate Change Adaptation Policy Framework • Physical Development Plan 2017 Revisions • Green Economy Scoping Study (2012) • Barbados Tourism Master Plan (2014-2023) • Fisheries Sector Management and Development Policy • New Fisheries Management Regulations (2014)	• Ministry of Finance and Economic Affairs • Ministry of Environment and National Beautification • Town and Country Development Planning Office • Ministry of Finance • Ministry of Economic Affairs and Investment • Ministry of Tourism and International Transport • Ministry of Agriculture and Food Security • Ministry of Energy and Water Resources • Ministry of Maritime Affairs and the Blue Economy	• Town and Country Planning Act (Cap. 240) • Fisheries Act 1993 (Cap.391) • Fisheries Management Regulations (1998)	• Convention on Wetlands of International Importance Especially as Waterfowl Habitats (Ramsar, 1971) • Convention Concerning the Protection of the World Cultural and Natural Heritage (1972). • FAO International Plant Protection Convention (IPPC), 1951 (amended 1979 & 1997). • Protocol on Specially Protected Areas and Wildlife

* See Appendix 1

In addition to the foregoing information, it is important to note the following regarding biodiversity mainstreaming in Barbados. First, despite the legislative disaggregation of responsibility for certain aspects of biodiversity, the overarching responsibility for coordinating biodiversity conservation and management lies with the Biodiversity and Conservation Management Section of the Ministry of Environment and National Beautification. The Section is the focal point for all matters emanating from, and related to, the CBD and it addresses issues related to the management and implementation of all biodiversity-related Multilateral Environmental Agreements (MEAs).

Further,biodiversity management in Barbados of necessity involves a multidisciplinary approach by several agencies that include government ministries, NGOs, CBOs, academia, the private sector, regional and international organisations. These agencies share responsibility for implementing policies, programmes and projects that directly or indirectly contribute to biodiversity conservation and management. To effectively coordinate the work of these wide-ranging stakeholders, the Biodiversity and Conservation Management Section convenes and manages a Cabinet-appointed Working Group on Biodiversity. In a decision taken on March 11th, 2014, the Cabinet of the Barbados Government assigned responsibility to the Working Group on Biodiversity not only for biodiversity-related matters

including MEAs, but also for the future implementation of issues related to the UN Convention to Combat Desertification and Drought (UNCCD). The purpose is to ensure synergies are achieved in implementing all MEAs and to streamline the various committees then services by the Ministry responsible for the environment. The composition of the Working Group on Biodiversity is provided in Appendix 2 and its Terms of Reference includes the following:

a) To advise on national policy and recommend strategies for the conservation and management of marine and terrestrial biodiversity and sustainable land management;

b) To advise and provide necessary technical input for the development of projects in the areas of biodiversity and sustainable land management;

c) To oversee the management of projects developed by the Ministry related to biodiversity, serving as the Project Steering Committee to such projects;

d) To advise on the implementation of MEAs related to biodiversity to which the Government of Barbados is a Party, including the CBD, the Ramsar Convention on Wetlands, the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, and the UNCCD; and

e) To review and monitor the status of marine and terrestrial biodiversity in Barbados.

2.6 NEW AND EMERGING ISSUES

2.6.1 CLIMATE VARIABILITY AND CLIMATE CHANGE

Since the first NBSAP was published in 2002, there have been substantial changes in the understanding and treatment of global climate change. These changes are reflected in the development and refinement of the international conventions and agreements that enable the global management of climate change as well as the evolution of both the regional and national frameworks and strategies for climate change adaptation planning. The international climate change regime, which comprises the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement, is the overarching framework for the global intergovernmental response to climate change. Small Island Developing States (SIDS) like Barbados, by becoming Parties to the Convention, have committed to implementing some measures, taking into account their specific national circumstances and objectives, and provided the industrialised countries are forthcoming with their commitments to provide financial and technological support.

For Barbados, climate change is an island-wide concern, which has implications for all sectors and for all land and coastal areas, including natural habitats, ecosystems, biodiversity and associated natural resources. Consequently, it is essential that climate change is addressed in this updated NBSAP. Recent climate trends for Barbados have been reported[24] as:

- An increase in mean annual temperature by around 0.6°C since1960, that is at an average rate of 0.14°C per decade;

24 Simpson, M. et al (2012). CARIBSAVE Climate Change Risk Atlas (CCCRA) - Barbados. DFID, AusAID and The CARIBSAVE Partnership, Barbados, West Indies.

- Increase in mean rainfall in the quarter, September to November by 12.9 mm per month(6.2%)per decade but this increase is not significant. The increase is offset partially by a decrease of around 4 mm per month (2.1%) per decade in the quarter June to August.
- The mean rate of sea-level rise for the past 60 years the in the Caribbean region has been similar to the global average of approximately 1.8 mm per year (IPCC AR5, 2014).

Detailed climate modelling projections for Barbados predict an increase in average atmospheric temperature, reduced average annual rainfall, increased sea surface temperatures and the potential for an increase in the intensity of tropical storms.

Barbados has already been engaging in adaptation planning and management through a range of actions undertaken be several agencies that are also involved in biodiversity management, thereby achieving a level of integration of climate change and biodiversity management and planning. Some activities include:

- The Integrated Coastal Zone Management Plan (ICZMP) coral reef monitoring, beach re-vegetation and coastal infrastructure works,
- The Coastal Risk Assessment and Management Programme,
- The Flood Management Project under the Water Resource Management and Flood Resilience Climate Change Adaptation Programme and
- The Water and Sanitation System Upgrade Project, which is to improve water resources management.

A Draft National Climate Change Adaptation Policy and Abatement Plan (NCCAP/AP) has been prepared and is being reviewed for submission to Cabinet, while the draft Revised PDP 2017 integrates climate change adaptation as well as biodiversity conservation in the national physical development planning process. The NCCAP/AP provides a clear and succinct analysis of the climate related vulnerabilities to which 17 strategically important socio-economic development sectors are susceptible and provided policy for adaptive risk reduction to identified climate related vulnerabilities in the priority national socio-economic sectors including coastal and marine resources, terrestrial biodiversity, water resources, agricultural resources and others. Some of the policy directives will require direct or indirect consideration of the updated NBSAP and draft Biodiversity Policy, working collaboratively with agencies responsible for implementing the CZMP and PDP.

Figure 7: Sustainable Development Goals (Source: United Nations)

2.6.2 THE UNITED NATIONS 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

At the United Nations Sustainable Development Summit held on 25th September 2015, the world community adopted the United Nations 2030 Agenda for Sustainable Development. Billed as a "plan of action for people, planet and prosperity,"[25] the Agenda outlines 17 Sustainable Development Goals (SDG) and 169 targets and their indicators which countries have committed to achieve between 2015 and 2030 (Figure 7).

25 Taken from the preamble of the 2030 Agenda for Sustainable Development.

Goal 15 is of significant relevance to biodiversity management, which is about **'Life on Land'** (Figure 8). It states: 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.' The targets are listed below:

Figure 8: SDG Goal 15
(Source: United Nations)

- 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
- 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.
- 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.
- 15.4: By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.
- 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
- 15.6: Promote fair and equitable sharing of the benefits arising from the utilisation of genetic resources and promote appropriate access to such resources, as internationally-agreed.
- 15.7: Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.
- 15.8: By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.
- 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.
- 15. A: Mobilise and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.
- 15. B: Mobilise significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.
- 15. C: Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.

3. OVERVIEW OF THE STATUS OF IMPLEMENTATION OF THE NBSAP (2002)

This Chapter provides an overview of the 2002 NBSAP and reviews the progress made in its implementation preceding the 5NRto the CBD (2016). First, a brief overview of the 2002 NBSAP is presented, followed by a review of the progress made in implementing the activities and strategies and meeting the objectives of the NBSAP, taking note of challenges and lessons learned over the period of implementation. The Chapter concludes by identifying the gaps in implementation. These gaps, along with the challenges and lessons learned, serve as part of the basis for preparing the new NBSAP.

3.1 OVERVIEW OF THE NBSAP (2002)

The NBSAP for Barbados was published by the Ministry of Physical Development and Environment, now the Ministry of Environment and National Beautification, in July 2002. The Plan was guided by the following overarching goal: "…to promote the conservation and sustainable utilisation of the island's terrestrial, marine and freshwater biodiversity." To achieve this goal a set of twelve (12) objectives were articulated, each supported by specific strategies and accompanying activities to be implemented by designated agencies. These strategies and actions were applied to the components of biodiversity described in the Biodiversity Country Study Technical Reports (Environmental Management and Land Use Planning for Sustainable Development,1998), i.e. Natural Vegetation, Agriculture, Land Resources, Terrestrial Fauna, and Marine and Fresh water species.

The Strategy and Action Plan also recognised that a four-point approach to implementation was needed that would involve actions at the level of (1) the political directorate and decision-makers, (2) the technical level, (3) communities, CBOs, NGOs and private agencies, and (4) the individual level. That approach hinged on the development and implementation of education and public awareness programmes. The specific objectives of the NBSAP (2002) were as follows:

1. To mobilise adequate financial resources for the management and conservation of Barbados' biodiversity.
2. To develop the human resource base and strengthen institutional capacity for biodiversity conservation and management.
3. To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity.
4. To use the results of the research programme to develop appropriate management techniques and mechanisms to ensure sustainable consumptive use and to preserve non-consumptive use values of biodiversity resources.
5. To revise, consolidate and formulate policy and legislation to achieve the conservation and sustainable use of biodiversity.
6. To promote biodiversity conservation and sustainable use through incentives.
7. To incorporate conservation requirements into land use planning.
8. To improve public awareness and education.

9. To establish effective in situ and exsitu biodiversity conservation measures.

10. To ensure equitable biodiversity and traditional knowledge access and benefit sharing.

11. To establish biosafety regulations in order to safeguard biodiversity.

12. To promote the conservation and sustainable use of biodiversity in various sectors (agriculture, health, fisheries, tourism).

3.2 STATUS OF IMPLEMENTATION OF THE NBSAP

Table 8 sets out the objectives and strategies for biodiversity conservation contained in the initial NBSAP and 4NR and in the subsequent period up to and beyond 2016 when the 5NR was produced. It details of the specific actions that were taken to implement the strategies in order to meet the stated objectives. In the 4NR (2011), it was observed that much of the implementation of the NBSAP was in the area of research and conservation of some key species, but that this work was actually done by Government Agencies, academia and NGOs outside of the Ministry responsible for the environment. An examination of Table 11 shows a continuation of this situation since 2011. With respect to institutional capacity, there is additional staff of the biodiversity programme area of the MENB; however, the scientific capacity to manage biodiversity continues to be inadequate, and there remains no formal mechanism to continuously monitor species or to monitor implementation of the NBSAP. On policy and legislation, implementation of the Biosafety Framework has started, and draft biosafety legislation is being prepared.

The draft Revised Physical Development Plan also elevates biodiversity conservation through its provisions for a Natural Heritage System and improvements to the System of Parks and Open Spaces, which together create stronger policies for sites of special ecological interest such as National Forest Candidate Sites, Natural Heritage Conservation Areas and others. In addition, the Barbados Coastal Risk Assessment and Management Programme has been in its implementation phase since 2011. The various components of this national scale project, which includes infrastructure works, institutional strengthening, and risk assessment, monitoring and management, will collectively enhance the conservation of coastal biodiversity around the island. Notwithstanding this, there is one specific aspect that directly relates to biodiversity management – the Ecosystem-Based Adaptation Pilot Project. This is a reef-generation and construction project that is being implemented as a non-engineering solution to shoreline erosion and will provide valuable information on potential replication elsewhere.

Table 8. Progress Made in Implementing the NBSAP (2002) and the Fourth (2011) and Fifth (2016) National Reports

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
1. To mobilise adequate financial resources for the management and conservation of Barbados' biodiversity.	Develop mechanisms for funding the conservation and management of biodiversity, ensuring that the costs of production are equitably shared.	Awareness of international funding opportunities was built among personnel responsible for biodiversity management. The Ministry of Tourism supported research on the valuation of sea turtles, coral reefs, and the scuba industry. This will help support and justify calls for incentives and tools for biodiversity conservation. No user fees have so far been introduced.	The Ministry of Agriculture in 2015, established the Green Agricultural Green Product and Green Energy Research Fund (AGPRF), geared toward funding with positive environmental impact. In 2015, approval was granted and legislation enacted to introduce user fees at the Barbados Marine Reserve (BMR) at Folkestone. Cabinet has also approved fees for the agricultural sector.	The AGPRF has limited financing and is time-bound, and therefore is not expected to run for the long term (over a 5-year period).
2. To develop the human resource base and strengthen institutional capacity for biodiversity conservation and management.	Strengthen the institutional and technical capacity of environmental government agencies to efficiently manage the components of biodiversity and promote their sustainable use.	The Natural Heritage Department was established in 2005 to promote biodiversity conservation through management of the National Park Plan set out in the Physical Development Plan 2003. The responsibilities of the NHD were detailed in the 4NR. Since its establishment, the NHD has continuously carried out educational and training activities including collecting and storing biodiversity specimens. Intersectoral committees with Government and private sector agencies, NGOs, and academia share information on managing biodiversity and are part of the policy-making process.	The 2012 MED study on Sustainable Land Management focused on developing a Strategic Plan & Institutional Strengthening of the Soil Conservation Unit (SCU). By a decision of Cabinet on March 11, 2014, the Working Group on Biodiversity was reconvened. This multifaceted committee with representation from government, academia, NGOs and the private sector supports biodiversity management nationally through its mandate to advise on, and ensure synergies in the implementation of biodiversity-related projects and MEAs.	There is limited availability of both human and financial resources to implement the Plan.

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
3. To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity.	Establish a national research programme to document the status of, threats to and value of biodiversity.	A national research programme has not been prepared; however, several important scientific studies have been conducted, as follows: 2005: the UWI and the Barbados Museum and Historical Society - establishment of a virtual herbarium, launched in 2009. The herbarium is active and is linked to a second web-based database: Plants of the Eastern Caribbean. It can be accessed at: **http://ecflora.cavehill.uwi.edu/vhmain.php** Surveys of plant nurseries and pet shops to monitor the types of species imported into the country. The UWI and other regional and international institutions studies on a variety of species - cattle egret, green monkey, bats, molluscs, beach vegetation, terrestrial plants, coral reefs, snakes, invertebrates, and fisheries resources including a study of the sea egg fishery. Several agencies (CERMES, CCA, NCC) collaborated on the GEF/SGP-funded coral reef monitoring programme (Reef Watchers) conducted within the BMR at Folkestone. This was a community-based programme that resulted in training volunteers form the local diving community and development of a database to assist long-term monitoring of the reefs. A biodiversity GIS was developed that includes data on indigenous, rare and endangered species. The Ministry of Agriculture: research on a variety of crops e.g., hot peppers, herbs, tomatoes, root crops, sweet peppers and others.	The University of the West Indies: Research on new and emerging threats to biodiversity, e.g., Lionfish and Sargassum seaweed. 2015-2016: Research on the extraction and use on non-traditional natural fibres – BIEP/GEF-SGP. An ecosystem-based pilot project is being implemented by the CZMU as part of the Coastal Risk Assessment and Management Project (CRMP). The project will identify the location of healthy coral types, the water quality challenges at those locations, and develop a coral nursery by renovating the existing laboratory at the Bellairs Research Institute of McGill University at Folkestone. The results will provide useful information on this non-engineering solution to shoreline erosion, which contributes to loss of coastal biodiversity.	The MED needs to develop an environmental knowledge management system to document and make accessible the results of varied R&D efforts.

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
4. To use the results of the research Programme to develop appropriate management techniques and mechanisms to ensure sustainable consumptive use, and to preserve non-consumptive use values of biodiversity resources.	Develop management approaches for the sustainable consumptive use of flora and fauna. Develop management approaches for conservation of species and ecosystems that have significant non-consumptive use value, e.g., for tourism or ecological services.	A number of management plans were developed including: National Park Plan, Graeme Hall Management Plan, Draft Beach Management Plan, Integrated Gully Ecosystem Management Plan, Sea Turtle Recovery Action Plan, Fisheries Management Plan and specific plans for flying fish, large pelagic, sea eggs and conch. Taxon-specific management is covered in reference to general biodiversity management in overarching plans.	CERMES published an evaluation of the 2015 sea eggs season, including recommendations on the future management of the fishery. Preparation of a National Plan of Action for the conservation and management of sharks as required by CITES and being spearheaded by the FAO.	
5. To revise, consolidate and formulate policy and legislation to achieve the conservation and sustainable use of biodiversity.	Implement existing national legislation and revise or develop new legislation to incorporate biodiversity management policies that are not currently adequately addressed.	There are several policies, plans and pieces of legislation, which assist in biodiversity conservation. There is also a draft Environmental Management Bill which, when enacted, will consolidate many biodiversity and other environmental management issues. The Physical Development Plan (2003) was approved in Parliament in 2007 and is a legal binding document.	The draft Environmental Management Bill is currently being reviewed and amended. Proposed additions to the Draft Tourist Accommodation (Licensing and Classification) Regulations, 2016 – Regulation 37 to include measures to protect sea turtles and corals. In January 2016, work was started on a revision of the PDP. A draft revised Plan will be completed by March 2017, and it will contain new policies that will strengthen biodiversity conservation.	The time taken to draft and amend legislation continues to be an obstacle.

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
6. To promote biodiversity conservation and sustainable use through incentives.	Develop practical incentive measures so that persons are encouraged to conserve biological diversity.	No incentive packages have been developed to date. The 2007 Intellectual Property Strategy for Barbados speaks to providing incentives to farmers who grow indigenous plant varieties.	Discussions have been underway between CZMU and other agencies to develop a certification scheme for boat operators who follow a Code of Conduct at 'Swim with the Sea Turtles' sites.	Most incentive programmes require making financial records available. This poses a problem for some private sector entities.
7. To incorporate biodiversity conservation requirements into land use planning.	Rationalise land use designation and encourage sectoral planning for environmentally friendly development.	The PDP (2003) guides all physical development on the island and provides for Environmental Impact Assessments to be conducted on all major developments, including impacts on biodiversity. The Green Deficit Management Programme (GDMP) introduced by the National Botanical Gardens as an initiative of the proposed National Silviculture Programme, was intended to rehabilitate green sites and create new ones.	The revision to the PDP is expected to contain policies that will significantly increase attention to biodiversity conservation. In addition, the Barbados National Park (BNP) as defined in the PDP 2003 was officially declared in June 2016.	

Photo Compliments: Connor Blades

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
8. To improve public awareness and education.	Develop public awareness through educational and training activities to ensure broad-based support and involvement in biodiversity conservation.	The Ministry of the Environment has an ongoing programme in primary and secondary school as well as public education and awareness activities. Environmental Studies is offered at key educational institutions including through the Caribbean Examinations Council Advanced Proficiency Level taught in several secondary schools, and undergraduate and graduate degrees at all UWI campuses.	The activities of 2002 to 2011 are continuing including the public awareness activities of the Biodiversity and Conservation Management Section of the Ministry of the Environment, which launched its website in 2016 and funded a poster to improve awareness on handling stranded marine mammals. The Barbados Sea Turtle Project (UWI) takes volunteers every year and manages a Facebook page to improve awareness of sea turtles. The private sector is also engaged in the national public awareness and education programmes e.g., Atlantis Submarine Barbados – educational tours and information; the Barbados Institute of Environmental Professionals (BIEP); the Barbados Natural Fibres Network (BNFN); Grantees of various GEF SGP programme have been an avenue for public awareness, e.g., the Reef Watchers and the Natural Fibres networks.	There is a need to for a well-articulated communication strategy for the MED. This strategy must include communication to all relevant stakeholders. Lessons learned: collaborating with the private sector to facilitate achieving this NBSAP objective is critical.

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
9. To establish effective in situ and ex situ biodiversity conservation measures.	Establish an effective and sustainable system of protected areas. Establish effective and sustainable ex situ facilities for biodiversity conservation.	The PDP 2003 contained the boundaries of, and policies for development control within, the BNP, and Natural Heritage Conservation Areas (NHCA). These are actively implemented through the Town and Country Development Planning Office.	A partnership of the Ministry of Agriculture, the BNFN, the BIEP, through funding from the GEF SGP, is in the initial stages of implementing the first national germplasm/seed bank. The seed bank will have a collection of natural fibres and seeds germplasm of economic importance, and later, will focus on conserving seeds of agronomic importance. The NCC, Botanical Gardens, and the Tissue Culture Laboratory established in 2014, will both serve to advance the objective in in-situ biodiversity conservation.	Limited human resources with the knowledge to establish and maintain a national seed bank. Collaboration/ networking with national and international partners is needed.
10. To ensure equitable biodiversity access and benefit sharing.	Promote necessary actions to facilitate equitable biodiversity access and benefit sharing.		The Intellectual Property Office has participated in regional efforts to establish a Caribbean Framework for the Protection of Traditional Knowledge, Folklore/ Traditional Cultural Expressions and Genetic Resources.[26] Barbados has participated in the regional GEF-funded project on Access and Benefit Sharing which aims to help Caribbean island countries make the best possible use of their genetic resources, generate, and share benefits derived from their use, and equitably return of the revenue generated from these activities to the protection of the resources within the region.	The challenge is the need to develop a system which guides access to genetic resources and traditional knowledge and benefits to be derives from such access as no coherent mechanism exists.

26 Source: http://www.wipo.int/meetings/en/details.jsp?meeting_id=15485

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
11. To establish biosafety regulations in order to safeguard biodiversity.	Establish activities that will safeguard the environment from risks posed by genetically modified organisms and other forms of biotechnology.	In 2005, the National Biosafety Framework for Barbados was prepared comprising policy, legislative and institutional structures for biosafety management. The Implementation Plan for the Framework was developed in 2007.	The MED is implementing the National Biosafety Framework: A draft Biosafety Bill is undergoing national consultation. Several training workshops on biosafety were held. A National roster of Experts has been created. Barbados is also participating in the GEF-funded project for Implementing NBFs in the Caribbean, which seeks to: Establish "a workable and transparent regime for biosafety." Develop "implementing systems for handling notifications or requests for approvals, enforcement and monitoring, and public information and public participation."	Challenges: lengthy timeframe for the legislative drafting and Cabinet approval as well as for developing regulations. Also, the Biosafety Policy has not yet reached the point of drafting and there have been delays in approval for participating in the project.

NBSAP (2002) and 4NR (2011) Proposals		Actions Taken 2002-2011 (as in the 4NR)	Actions Taken 2011 to 2016 (for and beyond the 5NR)	Obstacles Encountered and Lessons Learned
Objectives	Strategies			
12. To promote the conservation and sustainable use of biodiversity in various sectors (agriculture, health, fisheries and tourism).	Agriculture: Encourage agricultural biodiversity conservation & sustainable use by revising approaches to agricultural management. Health: Incorporate biodiversity conservation issues into disease control and waste management practices. Fisheries: Encourage fisheries conservation and sustainable use by revising approaches to fisheries management Tourism: Encourage measures to reduce threats to biodiversity resulting from improperly planned and managed tourism development.		The BIEP GEF SGP-funded project promoted, through various workshops, the conservation and sustainable use of traditional and non-traditional natural fibres used by the crafts sector. "Beyond the Bush" training workshops executed by the Barbados Natural Fibres Network promotes the sustainable use and conservation of natural fibres and seeds for use by crafts-persons.	Challenge: sustaining funding to execute future workshops. Lessons learned: collaboration with key partners in the public and private sectors to provide the resources required. Engaging key community leaders in the planning process and in execution of workshops within the community to maximise participation.

3.3 IMPLEMENTATION GAPS

Table 9 identifies the gaps in implementing the NBSAP, represented by those activities that have not been done to date. These gaps are significant and bring into focus the observation in the 4NR that the NBSAP "may not be adequate to address the threats identified. The threats to biodiversity are listed but actual coordinated strategies to address these have not been identified within the document. In addition, many specific targets were identified and ranked in terms of priorities; however, many of these have not yet been achieved" (Natural Heritage Department, MED, 2011, p. 60). The gaps further demonstrate that there is a notable implementation deficit that needs to be addressed.

The report suggested that the NBSAP "may need to be reviewed to determine whether the objectives, targets and associated activities listed are still relevant to the Barbados Programme of Work on Biodiversity and then include specific strategies and actions that need to be employed to address specific threats identified and more importantly achieve NBSAP objectives," and recommended that "a more focused effort be made to working towards achieving the targets identified within the document that have not yet been achieved."

Table 9. Gaps in Implementing the NBSAP (2002)

NBSAP Objective	Activities not Implemented	Comment
Objective 1: To mobilise adequate financial resources for the management and conservation of Barbados' biodiversity.	Establish user fees for biodiversity resource users.	Only the AGPRF has been identified to date. No user fees established.
Objective 2: To develop the human resource base and strengthen institutional capacity for biodiversity conservation and management.	Enhance the capacity of a selected institution to scientifically describe, classify and store collected specimens.	
Objective 3: To conduct essential research to inform the development and implementation of management practices for the sustainable use of biodiversity.	Develop/support monitoring of impacts of exploitation, habitat loss, pollutants and alien species on the distribution and abundance of terrestrial, marine, and freshwater biodiversity, alien, indigenous and rare species. Adopt biodiversity indicators under the National Indicators Programme and identify additional indicators to highlight biodiversity degradation. Assess past, current, and future patterns of consumption of biodiversity. Assess the economic value of consumptive use of biodiversity. Assess the non-consumptive value of biodiversity (e.g., biological control, prevention of soil loss, ecotourism). Assess the role of education in biodiversity conservation and management. Assess the effects of climate change on biodiversity conservation and management. Convert the Herbarium at the University of the West Indies, Cave Hill Campus, to a National Herbarium. Develop a National Clearing House Mechanism as a forum for national/ regional biodiversity researchers.	
Objective 4: To use the results of the research Programme to develop appropriate management techniques and mechanisms to ensure sustainable consumptive use, and to preserve non-consumptive use values of biodiversity resources.	Identify ecological factors affecting the population status of exploited species. Identify biodiversity resources with high non-consumptive use value. Develop taxon-specific management plans to protect species of significant non-consumptive use value of key biodiversity resources. Incorporate appropriate elements into management plans to protect biodiversity of simultaneously high consumptive and non-consumptive use value. Develop management approaches to control alien species which studies have shown to have demonstrable negative impacts on indigenous biodiversity.	

NBSAP Objective	Activities not Implemented	Comment
Objective 5: To revise, consolidate and formulate policy and legislation to achieve the conservation and sustainable use of biodiversity.	Endorse and encourage creation of the post of Environmental Legal Officer as recommended by the EMLUP. Develop regulations to fully implement the revised Environmental Legislation for Barbados. Review present incentives and dis-incentives for biodiversity management and incorporate into national policy. Develop regulations under the CZM Act to minimise impacts of coastal constructions on the beach and near-shore marine environment. Strengthen the Marine Pollution Control Act to reduce the impact of land-based sources of marine pollution, and the CZM Act. Formulate national legislation to address biosafety and bio-technology concerns. Facilitate community involvement in revising existing and/or developing new legislation. Conduct biodiversity legislation and enforcement workshops for relevant user groups.	
Objective 6: To promote biodiversity conservation and sustainable use through incentives.	Develop innovative mechanisms for funding incentive package. Adopt suitable economic valuation methods to value biodiversity so that it can be included in the national accounting system. Research in this area has been conducted only for sea turtles. Identify sustainable economic alternatives to activities that threaten biodiversity. Promote participation of NGOs in funding.	
Objective 9: To establish effective in situ and ex situ biodiversity conservation measures.	a) Provide for adequate buffer zones and plan environmentally sound development in areas bordering protected areas. b) Identify species of flora and fauna requiring ex situ conservation measures. Establish or support captive-breeding facilities, plant nurseries/ arboreta. Manage the collection of biological resources from natural habitats for ex situ conservation.	

NBSAP Objective	Activities not Implemented	Comment
Objective 10: To ensure equitable biodiversity access and benefit sharing.	Designate authority(ies) responsible for biodiversity and traditional knowledge access. Develop a database of entities involved in granting access to biodiversity and traditional knowledge. Define considerations for biodiversity access (e.g., expectations of, and impacts on stakeholders; resources and legal frameworks required etc. Define considerations for traditional knowledge access (e.g., definitions of traditional knowledge, regional harmonisation, international efforts etc. Create and inventory of local/ traditional innovations and technologies. Create conditions to facilitate access to genetic resources for environmentally sound uses. Assess whether the Government is a sufficient beneficiary of bilateral agreements between local NGOs, companies etc. involved in the sale of biodiversity. Create conditions and policies to facilitate equitable access and benefit sharing. Establish equitable and environmentally friendly bilateral agreements between local institutions and international pharmaceutical companies.	
Objective 12: To promote the conservation and sustainable use of biodiversity in various sectors (agriculture, health, fisheries and tourism). Strategy 1: (Agriculture): Encourage agricultural biodiversity conservation and sustainable use by revising approaches to agricultural management.	Develop an official mechanism for collaboration with the Ministry of Agriculture on the conservation and sustainable use of agrobiodiversity. Promote knowledge in the farming sector of the economic value of appropriate farming practices e.g., improved yields, erosion control, biological pest control, organic fertilisers etc. Collect and disseminate indigenous knowledge and innovations on environmentally sound and biologically diverse farming practices. Develop local organic farming practices and train persons to certify organic farms. Establish an Organic Farm Management Programme. Establish a pilot project that converts an abandoned cane field into an organic food forest. Establish a National Integrated Pest Management Programme. Establish an effective National Plant and Animal Quarantine Programme. Educate farmers about the impacts of agrochemicals on the environment and the benefits of organic fertilisers. Promote cultivation of crops that require less water and agrochemicals to produce good yields. Encourage a secure market system for organic products. Promote diverse organic house gardens. Develop a national planting material programme that includes awareness, certification, and standards for seed exchange. Regulate and restrict use of herbicides and pesticides which result in biodiversity loss. Establish a national programme to preserve germplasm for the Barbados Blackbelly sheep.	

NBSAP Objective	Activities not Implemented	Comment
Strategy 2: (Health): Incorporate biodiversity conservation issues into disease control and waste management practices.	Review existing management strategies for mosquito and rodent control regarding the impacts on non-target species and ecosystems (e.g., Graeme Hall Swamp). Ensure use of pesticides conforms to international standards. Promote biological control of disease vectors. Support enforcement of existing legislation by the Solid Waste Project Unit. Implement national awareness programme on the value of natural habitats, to deter wide-scale de-bushing and to inform on the impacts of illegal dumping on the marine environment. Ensure appropriate techniques and machinery are used in the clean-up of dumpsites. Support recycling schemes through subsidies and incentives to reduce cost of landfill maintenance. Ensure that solid waste and hazardous waste sites are adequately distanced and buffered from sensitive ecosystems and habits of endangered species.	
Strategy 3: (Fisheries): Encourage fisheries conservation and sustainable use by revising approaches to fisheries management.	Ensure important breeding grounds are protected within NHCAs. Provide mechanisms for inter-agency and stakeholder consultations. Ensure that regulatory systems maintain populations at levels that ensure ecosystem integrity and function. Regulate fishing apparatus and methods to reduce adverse effects on marine biodiversity. Reduce at-sea dumping of garbage. Maintain catch statistics to monitor populations of target species and the impacts of exploitation. Sensitise fisher folk on the importance of sustainable fishing practices and marine protected areas. Train fisherfolk for self-enforcement of regulatory measures. Encourage alternative income generation for fisherfolk and ensure secure markets for catch. Improve monitoring and enforcement at sea by strengthening the capacity of the Coast Guard. Implement a monitoring programme on the impacts of climate change on fish stocks.	

NBSAP Objective	Activities not Implemented	Comment
Strategy 4: (Tourism): Encourage measures to reduce threats to biodiversity resulting from improperly planned and managed tourism development.	Conduct research on the contribution of tourism facilities and activities to biodiversity loss. Sensitise the tourism sector to the negative impacts of tourism on the environment. Encourage sound environmental management techniques at tourism facilities. Educate tourism personnel on the relationship between tourism and biodiversity conservation. Promote regulatory measures to maintain the balance between tourist numbers and the carrying capacity of sensitive habitats. Restrict development of large tourism centres and conduct CBAs to inform decision-making. Prevent high impact tourism in undeveloped areas of significant biodiversity importance. Promote only small-scale, fully trained guided tourism in important biodiversity areas. Consider the need for a head tax on all tourist arrivals.	

4. THE AICHI BIODIVERSITY TARGETS 2020

4.1 PROGRESS TOWARDS IMPLEMENTING THE AICHI BIODIVERSITY TARGETS

The 5NR describes the progress Barbados has made in contributing to achievement of the Aichi Biodiversity Targets since 2011. In summary, Barbados' activities have in different ways and in varying degrees contributed to the twenty global targets through national level actions on each target.

Appendix 3 details activities undertaken that contribute to the global targets.

4.2 NATIONALLY- PRIORITISED AICHI BIODIVERSITY TARGETS

For the next period, Barbados has selected twelve (12) national priority targets from among the 20 global targets and will focus resources on advancing these as a means of addressing national priorities while also contributing to global goals. The nationally prioritised Aichi Targets are listed in Table 10. As shown in the Table, the language of five of these Targets—1, 3, 11, 12 and 13—has been adjusted to more closely align the targets with national circumstances. The prioritised targets have been integrated into the revised NBSAP 2019.

Table 10. Nationally Prioritised Aichi Targets

Aichi Target		National Target	
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.			
1	By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	1	By 2020, at the latest, Barbadians will be more knowledgeable about the values of biodiversity and the steps they can take to conserve and use it sustainably.
4	By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	2	By 2020, at the latest, the Barbados Government and business and stakeholders at all levels in Barbados, will have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.			
5	By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	3	By 2030, the rate of loss of all natural habitats including forests is decreased by 25%.
7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	4	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.
8	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	5	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
9	By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	6	By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.
10	By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.	7	By 2025, anthropogenic pressures on coral reefs (e.g., nutrient loads, anchor damage, overfishing) and other vulnerable ecosystems impacted by climate change or ocean acidification, are minimised, so as to maintain their integrity and functioning.
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.			
11	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically-representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes	8	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are designated within connected systems of protected areas and plans for effective area-based conservation measures are in development.

Aichi Target		National Target	
12	By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	9	By 2020, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.
13	By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.	10	By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.			
17	By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory, and updated national biodiversity strategy and action plan.	11	By 2020, document all traditional and scientific knowledge and technology relating to biodiversity so that it improved, widely shared, transferred and applied.
19	By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	12	By 2020, at the latest, financial resources to conduct projects and research in the area of biodiversity should increase substantially.
20	By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.		

5. THE BARBADOS NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN 2020

5.1 INTRODUCTION

This revised NBSAP draws on the assessment of the implementation of the 2002 NBSAP, which included an analysis of gaps in implementation and identification of lessons learned, as set out in Section 3. These gaps and lessons have been integrated into the revised draft NBSAP. It also draws on the stakeholder review of the global Strategic Plan for Biodiversity and the Aichi Biodiversity Targets (2011-2020) which resulted in the selection of thirteen (13) prioritised national targets adapted to the Barbados case. Thirdly, it is developed around a stakeholder-articulated Vision for biodiversity management, which is consistent with broader national development goals. These three aspects of work have been woven together to articulate a NBSAP implementable over the period 2019 to 2025, a timeframe that also concludes simultaneously with that of the National Strategic Plan for Barbados 2020-2035.

5.2 THE VISION

Our Vision

By 2035 Barbados' terrestrial and marine biodiversity is valued by all, resilient, and at the centre of our development goals, demonstrating that all Barbadians share in understanding and reaping the benefits of, and are actively involved in, sustainable practices for its conservation for present and future generations.

5.2.1 NATIONAL GOALS THAT SUPPORT THE VISION OF THE NBSAP

Goal 4 of the National Strategic Plan (NSP) 2006-2025 is "Building a Green Economy – Strengthening the Physical Infrastructure and Preserving the Environment" and a key objective in support of that goal is "to promote the unsustainable use of our renewable resources and the wise management of our non-renewable natural resources." The vision for the NBSAP is therefore directly linked with these national level goals, and the prioritised targets for biodiversity conservation—, which are based on the global targets—further articulate aspects that contribute to achievement of the NSP objective. The specific goals, objectives and activities that will lead to realisation of the vision of the NBSAP are detailed below.

5.3 PRIORITY TARGETS, OBJECTIVES AND ACTIONS

The priority strategies for biodiversity conservation in Barbados to 2025 are aimed at improving the wellbeing of all Barbadians based on the Vision articulated. The priority targets, objectives and actions that will be implemented to achieve this vision are as follows:

Decision VIII/6 of the Conference of the Parties to the CBD states that communications, education, and public awareness strategies should be developed and implemented, wherever possible, as components of NBSAPs[27]. Effective implementation of conservation actions depends on informed and motivated stakeholders who understand the value in biodiversity conservation and how to achieve it. For this to occur education at all levels is necessary and can be achieved by carefully targeted communications strategies. While Barbados has conducted several educational and public awareness activities over the years, it is believed that this is a continuous process that must be adaptable to changes biodiversity conditions.

Similarly, integration or mainstreaming is a continuous process. As economic and social circumstances change, the pressures on, and threats to, biodiversity also change. As such, despite the achievements made to date, Barbados must remain vigilant to see that the importance of biodiversity remains in the forefront of national development policies and plans. In addition, availability of financial resources is continuously referenced as a challenge to effective biodiversity management, including activities that advance mainstreaming. With this background, the following measures are recommended:

TARGET 1: By 2030, at the latest, Barbadians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Strategic Objectives Target 1:

1. To communicate to the public on matters related to biodiversity conservation and management.
2. To continuously integrate biodiversity concerns and conservation actions into national policies and programmes, including their implementation.

Strategic Actions Target 1:

1. Raise awareness through the design and implementation of a communication strategy about the NBSAP and key issues related to biodiversity conservation and management at the national level among a wide but defined group of audiences and user groups.
2. Increase the participation of stakeholders in relevant data collection and dissemination, the development of key indicators for biodiversity conservation and develop a platform for access, storage, dissemination, and use (data management) of knowledge and data created.

27 GEF/UNEP/CBD, 2007, Communication Strategy for Issues in NBSAPs

3. Encourage collaboration among strategic partners to implement provisions of the NBSAP through information sharing.

4. Designate personnel with responsibility for continuous intersectoral liaison, and for monitoring sectoral and cross-sectoral activities and programmes that are biodiversity-related.

5. Develop and implement a continuity programme for increasing awareness among public sector decision-makers and technical personnel in targeted economic sectors and in the cross-cutting area of economic planning. This programme should be geared towards maintaining and expanding mainstreaming by continuously updating stakeholders on changing issues/developments in biodiversity management and formulating appropriate response measures.

6. Periodically revisit and upgrade the education and awareness programme to remain current and cutting edge.

7. Implement education and awareness activities (e.g., seminars, public information events) in response to new developments and /or occurrences in biodiversity matters(e.g., new information of species, changes in policy).

8. Design public awareness and education programmes targeting primary and secondary schools through linking with their science and environmental programmes.

9. Provide support for Barbados to implement provisions of Principle 10 of the Rio Declaration related to access to information and to give effect to the 'Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean'[28] .

TARGET 2: By 2030, at the latest, the Barbados Government, businesses and stakeholders at all levels will have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

This target is directly related to the national goal of building a Green Economy and the objective of promoting the sustainable use of our renewable resources and the wise management of our non-renewable natural resources. Barbados already has in place several management plans for provisioning species such as in fisheries (sea urchin, flying fish), wildfowling, and blackbelly sheep. The 5NR and stakeholder consultations, however, have revealed that there remains exploited and exploitable species to be identified and managed sustainably in order to conserve them for future use.

Strategic Objective Target 2: To develop appropriate management approaches and practices for the sustainable consumption of biodiversity-based products.

28 Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean. https://www.cepal.org/en/escazuagreement

Strategic Actions Target 2:

1. Identify and document species of plants and animals used, and with the potential to be used, in commercial and subsistence provisioning services.
2. Identify human-induced and ecological factors that affect the population status of these species: extent of human exploitation; vulnerability to natural events; exposure to natural predators, diseases etc.
3. Develop indicators and prepare and implement a monitoring plan to track the status of these species.
4. Develop species-specific management plans for the identified species to ensure their continued regeneration.
5. Develop management plans to control alien and other predatory species and, where possible, ecological factors which negatively impact on the identified species.

TARGET 3: By 2035, the rate of loss of all of Barbados' natural habitats, including forests, will be decreased.

Strategic Objective Target 3: To preserve the biodiversity of remaining indigenous vegetation cover, areas designated in the National Physical Development Plan (PDP) as Significant Natural Features (or similar designations in the revised and updated PDP), and other known significant species and habitats within and outside of the boundaries of the Barbados National Park.

Strategic Actions Target 3:

1. Create memoranda of understanding for the Planning, Policy and Research Unit, the Natural Heritage Department and other relevant agencies of the Ministry of the Environment and National Beautification to work closely with the Town and Country Development Planning Office to effectively implement the land use policies pertaining to natural heritage conservation in the 2003 Physical Development Plan, (and those of the Revised PDP (2017) when they come into force), in order to strengthen in situ conservation in specially designated areas.
2. Identify species of fauna and flora requiring ex situ conservation measures.
3. Build the capacity of the National Botanical Gardens agency to actively implement ex situ conservation of significant species of flora.
4. Establish a formal collaborative mechanism among identified government agencies, academic and research institutions, non-governmental organisations and private sector agencies to develop a national register of biological resources for ex situ conservation

TARGET 4: By 2030, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Strategic Objective Target 4: To conserve the biodiversity of areas under use in agriculture, aquaculture and forestry.

Strategic Actions Target 4:

1. Develop and implement education and training programmes about sustainable practices to conserve biodiversity for active members of the agricultural, aquacultural, and fibre sectors, including the benefits of such practices.
2. Develop and implement specific programmes to minimise the impacts of agriculture and aquaculture activities on biodiversity, for example:
    - National Integrated Pest Management Programme
    - National Programme for Organic Farming, including training and certification.
3. Collect and disseminate indigenous knowledge and innovations on environmentally-sound and biologically-diverse farming practices.
4. Regulate and restrict the use of herbicides and pesticides which result in biodiversity loss.
5. Investigate the impacts of the use of biomass and non-chemical fertilisers on crop yields.

TARGET 5: By 2030, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Strategic Objective Target 5: To minimise the level of pollution from human activities being released into the natural environment (terrestrial, marine and atmospheric) that can negatively impact biodiversity resources.

Strategic Actions Target 5:

1. Establish a formal reporting mechanism for sharing information by agencies represented on the Working Group on Biodiversity among the members of that group, and specifically with the lead agency(ies) for biodiversity conservation, on sources and levels of pollution and recorded impacts on all aspects of biodiversity within their purview.
2. Establish an information system, managed by a designated agency[29] , to record and monitor pollution levels (continuous and incidental) in ecosystems of national importance, as well as the observed impacts on the ecosystems.

29 This system will likely be managed by EPD and housed in the National Statistical Service.

3. Provide support for the effective enforcement of the Marine Pollution Control Act, the Solid Waste Management Act particularly as it relates to illegal dumping and waste disposal, including the siting and management of hazardous waste facilities, and other legislation and management plans related to pollution.

4. Periodically, on an annual basis, examine the implementation of existing mosquito and rodent control activities, de-bushing and other clean-up activities to ensure that impacts on biodiversity are minimised or mitigated.

5. Ensure that the on-going Biodiversity Education and Public Awareness Programmes include education and awareness about the dangers of polluting (including risks to human health) and promotes practical measures to assist the general public in pollution reduction.

TARGET 6: By 2030, invasive alien species and pathways are identified and prioritised, priority established species are managed and measures are in place to prevent the introduction and establishment of new invasive alien species.

Strategic Objectives Target 6:

1. To minimise the impacts of invasive alien species of flora and fauna on local biodiversity.

2. To reduce the pathways by which invasive alien species of flora and fauna can enter local ecosystems.

Strategic Actions Target 6:

1. Identify and update the list of IAS to Barbados.

2. Compile existing information and conduct studies to determine the population size of the priority IAS identified and their impact on biodiversity to date.

3. Establish species-specific strategies to eradicate or control population sizes of IAS to manageable levels. In cases where IAS impacts on native biodiversity cannot be controlled,biosecure areas for the conservation of threatened native species will be identified and resources sought to implement them.

4. Establish monitoring programmes, in collaboration with key agencies, to track populations of priority invasive species and their impact on biodiversity.

5. Develop legislation or amend existing legislation and regulations for border controls at all seaports and the airport with respect to all imported species.

The actions under this target should be implemented under the 'Preventing the Costs of Invasive Alien Species in Barbados and the countries of the OECS' Project, which is scheduled to be completed in 2022.

TARGET 7: By 2030, sources of endogenous anthropogenic pressures on coral reefs (e.g. excess nutrients, anchor damage, overfishing, inter alia) are identified and effects minimised to maintain the integrity and functioning of coral reefs.

Strategic Objective Target 7: To protect coral reefs and other coastal ecosystems in Barbados against the impacts of global climate change and ocean acidification.

Strategic Objectives Target 7:

1. Liaise with the Coastal Zone Management Unit (CZMU) in order to access information generated through the CZMU's Coral Reef Monitoring Programme, on trends on the status of the reef ecosystems around the island.
2. Maintain an in-house database, or formalise a communication system with the CZMU, to generate periodic reports on the status of the reef ecosystems, the threats, and the impact of measures implemented to protect them.
3. Support the work of the CZMU being implemented through the Coastal Risk Assessment and Monitoring Programme to protect coastal ecosystems.
4. Develop regulations as necessary, and support effective enforcement of the Coastal Zone Management Act, the Marine Pollution Control Act, the Fisheries Management Act and other related legislation and regulations aimed at protecting coastal ecosystems.

TARGET 8: By 2030, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are designated within connected systems of protected areas, and plans for effective area-based conservation measures are being developed.

Strategic Objectives Target 8: To establish and develop management action plans for zones of protection for important biodiversity and ecosystem services.

Strategic Actions Target 8:

1. Quantify the acreage of biodiversity ecosystems protected by the Barbados National Park and System of Parks and Open Spaces under the Barbados Physical Development Plan (PDP) 2003, and the Integrated Coastal Zone Management Plan (ICZMP). Include any additional acreage included in the Revised PDP 2017 (including proposed buffer zones) and proposals for marine protected areas, as projections pending legislation.
2. Develop specific action plans to effectively and equitably manage these areas, including strengthening the capacities of agencies with direct responsibility for managing these areas, to implement the action plans.

Success in implementing actions under this target can be achieved through linking with the Proposed Marine Management Area at Carlisle Bay.

TARGET 9: By 2030, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.

Strategic Objective Target 9: To identify and protect threatened species of flora and fauna in Barbados.

Strategic Actions Target 9:

1. Support existing (e.g., UWI), and initiate new monitoring programmes as necessary, to assess threats to and status of native biodiversity.
2. Develop species-specific or, where appropriate, ecosystem-based management plans to mitigate threats and monitor the implementation of these plans and the impact on the status of the species protected.
3. Develop appropriate indicators to be used in the management and monitoring plans.

Linking with the 'Preventing the Costs of Invasive Alien Species in Barbados and the OECS' Project will facilitate implementation of the actions under this strategic objective. The project runs to 2022.

TARGET 10: By 2030, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.

Strategic Objective Target 10: To safeguard the genetic diversity of socio-economically and culturally important species of cultivated plants and animals in Barbados, and their wild relatives.

Strategic Actions Target 10:

1. Establish a national programme to preserve germplasm for nationally important cultivated plants and farmed animals and any remaining wild relatives (e.g., Barbados Blackbelly sheep; West Indies Sea Island cotton).
2. Establish and maintain a national register of genetically significant breeds.
3. Through collaborative arrangements among the agencies responsible, develop and implement management strategies, including monitoring and evaluation, to safeguard the genetic diversity of these socio-economically and culturally important species.

TARGET 11: By 2030, document all traditional and scientific knowledge and technology relating to biodiversity so that it is improved, widely and equitably shared, transferred and applied.

Strategic Objective Target 11:To document and equitably share all traditional and scientific knowledge and technology relating to biodiversity in Barbados.

Strategic Actions Target 11:

1. Commission a desk and/or field study to gather, collate and document traditional knowledge related to biodiversity.
2. Commission a project to gather and compile all available scientific studies on biodiversity, including research findings and research gaps and needs.
3. Prepare an annotated bibliographic database of scientific, peer-reviewed, and other validated publications contributing to traditional and scientific knowledge of Barbados' biodiversity.
4. Establish a National Biodiversity Clearing House Mechanism (BCHM) as a means of sharing the information gathered in the foregoing activities.

Actions under this project are in line with the national project related to provisions of the Nagoya Protocol on Access and Benefit Sharing and links with the ABS project will result in the successful completion of actions under this strategic objective.

TARGET 12: By 2025, at the latest, financial resources to conduct projects and research in the area of biodiversity should increase substantially.

Strategic Objective Target 12: To collaborate with key partners to coordinate financial resources to execute national projects and research.

Strategic Actions Target 12:

1. Undertake an inventory of relevant biodiversity-related projects being implemented nationally and develop a database of agencies related to the projects.
2. Undertake an annual project collaboration meeting with private and public sector agencies, academia, CSOs and regional and international agencies to discuss how existing projects can fit within the Ministry's biodiversity annual workplan.
3. Inclusion of biodiversity-specific activities for funding in the Ministry's annual budget.
4. Work closely with the NGOs/CSOs/CBOs to collaborate to submit project proposals related to biodiversity, and which have synergies with the Ministry's workplan.

5.4 NBSAP ACTION PLAN

Table 11: Action Plan for Implementing the National Biodiversity Strategy 2017-2025

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
TARGET 1: By 2030, at the latest, Barbadians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.				
Objective 1: To communicate to the public on matters related to biodiversity conservation and management.				
Activities				
Design and implement a public awareness and education programme for primary and secondary schools.	A report mapping the baseline of various environment and biodiversity-related programmes and resources undergoing at primary and secondary schools. A 50% increase in the number of schools under the Ministry's schools programme. A 20% increase above baseline in the types of programmes designed and implemented. Report of a comprehensive national biodiversity knowledge survey. A 20% increase in the number of biodiversity-related resource materials used in schools.	Approved mapping report. Presentation to stakeholders on the results and recommendations contained in the report. Ministry's administrative records of the contract and ToR to undertake the mapping survey. Ministry's administrative and financial reports on annual school activities. Records from target schools. Ministry's annual workplan and budget allocations.	Targeted participants are unavailable for awareness building activities. Insufficient human and financial resources to implement. Limited financial resources. Insufficient expertise in specialist areas. Unwillingness of target groups to participate in the project intervention.	MENB – National Biodiversity Unit Ministry of Education

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Collaborate with stakeholders in the public and private sectors, academia and CSOs to develop and implement training programmes targeting tertiary level.	The number of training modules included in environment/ecology programmes. A 25% increase above baseline in biodiversity-related research projects undertaken.	Curriculum of existing and new programmes incorporating biodiversity studies. Articles and research reports at tertiary level institutions available to the public. Ministry's administrative and financial reports on collaborations. Administrative records of research related to environment and biodiversity.	Unwillingness of target groups to collaborate. Limited financial resources. Insufficient expertise in specialist areas. Targeted participants are unavailable for awareness building activities.	MENB – National Biodiversity Unit Private sector CSOs Academic institutions – e.g. UWI, SJPI, BCC,
Engage creative sector stakeholders to develop key messages on biodiversity management.	The number of creative sector collaborations to develop content for a biodiversity public awareness campaign. A 20% increase in biodiversity-related public awareness messages reaching the public using mixed media.	Ministry's administrative and financial reports on collaborations. Ministry's administrative records of contracts and ToRs. Content messages as delivered in various media – print, online, PSAs, etc.	Unwillingness of target groups to collaborate. Limited financial resources. Insufficient expertise in specialist areas. Targeted participants are unavailable for awareness building activities.	MENB – National Biodiversity Unit Creative industry practitioners Ministry of Education National Cultural Foundation (NCF)

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Design an online biodiversity toolkit to be used as a resource by educators and students.	Online toolkit accessible for use. The number of educators and students using the toolkit.	Ministry's administrative and financial reports. Ministry's administrative records of contracts and ToRs. Evidence of toolkit uploaded on Ministry's website for download. Number of downloads of the toolkit. Evidence of use by target groups.	Unwillingness of target groups to participate in project intervention. Limited technical resources available for target groups to access and use toolkit. Targeted participants are unavailable for awareness building activities.	MENB – National Biodiversity Unit Ministry of Education
Design and implement awareness and sensitisation programmes for decision-makers.	At least one (1) awareness workshop on biodiversity per annum targeting specific areas, for example, ecosystem values, ABS mechanisms, etc. Meetings held with various Ministries to identify biodiversity-related activities undertaken.	Records of seminars/ workshops agendas, presentations, and lists of participants. Ministry's administrative and financial reports. Ministry's administrative records of contracts and ToRs.	Unwillingness of target groups to participate in project intervention.	MENB – National Biodiversity Unit
Objective 2: To continuously integrate biodiversity concerns and conservation actions into national policies and programmes, including their implementation.	National policy and strategic planning documents contain specific strategies for conserving biodiversity.	Published national policy and planning documents.	Inadequate coordination of cross-sectoral inputs in plan and policy preparation.	Ministry of Finance, Economic Affairs and Investment (MFI) MENB

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Activities				
Designate personnel with responsibility for continuous intersectoral liaison and for monitoring sectoral and cross-sectoral activities and programmes that are biodiversity related.	Four (4) Meetings of the Working Group on Biodiversity per year. Representatives of the Biodiversity Unit of the Ministry of Environment and National Beautification sit on the following committees: - Town Planning Committee - EIA Committees - National Botanical Garden Committee	Minutes and attendance of WGB meetings. Minutes/ reports of committee meetings attended by the Biodiversity Unit's representatives.	Lack of awareness in line ministries of the need to involve biodiversity stakeholders.	Line ministries e.g. Agriculture, Education, Tourism etc.
Develop and implement a continuity programme for increasing awareness among public sector decision-makers and technical personnel in targeted economic sectors and in the cross-cutting area of economic planning.	The number of seminars/ workshops convened in the past year, attended by persons from the public and private sectors and NGOs.	Seminars/workshops agendas, presentations, and lists of participants.	Targeted participants are unavailable for awareness building activities.	MENB – National Biodiversity Unit
Implement education and awareness activities (e.g., seminars, public information events) for all relevant stakeholders, in response to new developments and/or occurrences in biodiversity matters, e.g. new information of species, changes in policy etc.	The number of activities as articulated in the revised NBSAP Education and Communication Strategy implemented.	Based on the NBSAP Education and Communication Strategy.	Insufficient human and financial resources to implement the Education and Communication strategy.	MENB – National Biodiversity Unit

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
TARGET 2: By 2030, at the latest, the Barbados Government, businesses and stakeholders at all levels will have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.				
Objective: To develop appropriate management approaches and practices for the sustainable consumption of biodiversity-based products.	The following (named) government agencies, businesses and other stakeholders are utilising measures (specify) for environmental sustainability in their activities.	Published reports of specific activities taken by named agencies.	Limited financial resources. Insufficient expertise in specialist areas.	MENB MFI Private sector organisations
Activities				
Identify and document types and quantities of species of plants and animals used, and with the potential to be used, in commercial and subsistence provisioning services.	The number of species of plants and animals currently used in production and consumption and targeted for use in the future.	Published lists. Approved biodiversity assessment report.	Budgetary constraints for acquiring personnel.	MENB coordinating relevant government and private sector agencies and NGOs
Develop species-specific sustainability management plans for the identified species to ensure their continued regeneration.	Species-specific management plans circulated to stakeholders for review and comment.	Species-specific management plan approved by the WGB.	Relevant stakeholders unavailable to consistently provide the inputs for monitoring.	MENB coordinating relevant government and private sector agencies and NGOs
Develop indicators and prepare and implement a monitoring plan to track the status of these species.	Specified number of consultations held. The number of indicators and monitoring plans developed.	Published Indicators and monitoring plan. Periodic implementation status reports.	Relevant stakeholders unavailable to consistently provide inputs.	MENB coordinating government and private sector agencies and NGOs

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
TARGET 3: By 2035, the rate of loss of all of Barbados' natural habitats, including forests, will be decreased.				
Objective: To preserve the biodiversity of remaining indigenous vegetation cover, areas designated in the National Physical Development Plan (PDP) as Significant Natural Features (or similar designations in the revised and updated PDP), and other known significant species and habitats within and outside of the boundaries of the Barbados National Park.	Quantified and mapped extent of natural forest cover. Quantified and mapped natural habitats. Quantified trends in natural forest and habitats coverage.	Published reports on the status and trends in natural habitats including forests.	Insufficient/inconsistent human resources and finance flows.	MENB in collaboration with relevant line ministries/agencies, e.g. CZMU, TCDPO, Agriculture etc.
Activities				
Create memoranda of understanding (MOU) for the National Biodiversity Unit and other relevant agencies of the MENB to work closely with the TCDPO, to effectively implement the land use policies pertaining to natural heritage conservation in the Revised PDP (2017), in order to strengthen in situ conservation in specially designated areas.	Named departments and agencies have accepted MOUs. The National Biodiversity Unit included on the list of agencies consulted by the TCDPO to review development applications, and on committees overseeing spatial planning projects.	Cabinet approval of signed MOU. Records of consultative meetings on spatial planning projects. Records of development applications reviewed.	Inadequate coordination by lead agencies.	MENB and TCDPO leads NHD National Botanical Gardens (NBG) Soil Conservation Unit (SCU)
Identify species of fauna and flora requiring ex situ conservation measures.	Number of species listed for ex situ conservation.	Lists of species published and presented to the agencies responsible for implementation.	Lack of resources and personnel to collect data and compile lists.	MENB – National Biodiversity Unit
Develop a national register of biological resources for ex situ conservation.	Criteria for inclusion of species on the register. Number and types of species selected for inclusion on the register.	National register of resources for ex situ conservation published and lodged with the National Biodiversity Focal Point.	Lack of resources and personnel may negatively impact completion of this activity.	MENB – National Biodiversity Unit
Build the capacity of the National Botanical Gardens (NBG) agency to actively implement ex situ conservation of significant species of flora.	Number of staff appointed at the NBG. Number of staff trained in ex situ conservation.	Letters of appointment. Documented training programmes. Certificates of participation in training.	Lack of resources assigned to strengthen the NBG.	MENB – National Biodiversity Unit

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
TARGET 4: By 2030, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.				
Objective: To conserve the biodiversity of areas under use in agriculture, aquaculture and forestry.	Acreage in named locations, and named species of plants and animals, that are the focus of sustainable management practices.	Farming records on sustainable management practices.	Inability of some farmers to practise sustainable management.	MENB, Ministry of Agriculture, private sector agricultural organisations and NGOs
Activities				
Develop and implement education and training programmes about sustainable farming practices to conserve biodiversity for active members of the agricultural, aquacultural and fibre sectors, including the benefits of such practices.	Number of persons trained (and named agencies represented) in sustainable farming practices, and in identifying and managing impacts on biodiversity.	Training documents. Register of participants. Issued certificates of participation.	Insufficient financial resources. Targeted participants unavailable to attend training sessions.	MENB, MAFS, private sector agricultural organisations and NGOs
Develop and implement specific programmes to minimise the impacts of agriculture and aquaculture on biodiversity, for example: National Integrated Pest Management (IPM) and a national programme for Organic Farming, including training and certification.	Number of persons trained in IPM and/or organic farming. Number of farmers practising IPM and/or organic farming,	Programme documents; training manuals. Register of participants. Issued certificates of participation.	Insufficient financial resources. Targeted participants unavailable to attend training sessions.	MEBN, MAFS, private sector agricultural organisations and NGOs
Collect and disseminate indigenous knowledge and innovations on environmentally sound and biologically diverse farming practices.	Documented findings on indigenous knowledge and innovation. Actions taken to disseminate information.	Reports on indigenous knowledge & innovations on environmentally-sound and biologically-diverse farming practices.	Unavailability of or delays in collecting information.	National Biodiversity Unit of the MENB MAFS
Regulate and restrict the use of herbicides and pesticides which result in biodiversity loss.	Specific herbicides and pesticides identified, and regulations drafted and approved by Parliament.	Gazetted regulations.	Delays in drafting regulations.	MENB – National Biodiversity Unit MAFS – Pesticides Control Board
Investigate the impacts of the use of biomass and non-chemical fertilisers on crop yields.	Relevant research conducted and findings documented.	Reports on the impacts of the use biomass and non-chemical fertilisers on crop yields.	Insufficient coordination between the MENB and MAFS.	MAFS in close collaboration with the MENB.

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
TARGET 5: By 2030, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.				
Objective: To minimise the level of pollution from human activities being released into the natural environment (terrestrial, marine and atmospheric) that can negatively impact biodiversity resources.	**Percentage reduction in pollution levels at named locations/ habitats/ ecosystems.**	**Reports of pollution trends at named locations/ habitats/ ecosystems.**	**Ineffective functioning of the information-sharing mechanism**	**MENB – National Biodiversity Unit, WGB, EPD**
Activities				
Establish a formal reporting mechanism (MOU) for sharing information by agencies responsible for pollution monitoring (e.g. EPD) with the lead agency(ies) for biodiversity conservation, on sources and levels of pollution in specified locations.	Named agencies' acceptance of the MOU. Amended ToR of the WGB includes sharing information on pollution and impacts on biodiversity.	Signed MOU. Cabinet paper endorsing amendment to the ToR.	Reluctance or refusal of relevant agencies to sign the MOU.	MENB - National Biodiversity Unit coordinating with all relevant agencies.
Establish an information system, managed by the National Biodiversity Unit, to record and monitor pollution sources and levels (continuous and incidental) and their impacts on ecosystems of national importance.	Database set up within, and managed by, the National Biodiversity Unit. Data entries on ecosystems vulnerable to pollution, trends in pollution levels and impacts on the ecosystems.	Computerised populated database.	Delays or refusal of agencies responsible for pollution monitoring, sharing information with the National Biodiversity Unit.	MENB - National Biodiversity Unit Environmental Protection Department (EPD)
Provide support for the effective enforcement of the Marine Pollution Control Act, the Solid Waste Management Act particularly as it relates to illegal dumping and waste disposal, including the siting and management of hazardous waste sites, and other legislation and management plans related to pollution.	Representation of the National Biodiversity Unit on relevant committees established within the agencies responsible for implementing pollution legislation.	Minutes of meetings reflecting participation and input by the National Biodiversity Unit.	Unavailability of National Biodiversity Unit to attend meetings.	MENB - National Biodiversity Unit EPD Sanitation Services Authority (SSA), etc.
Periodically examine the implementation of existing mosquito and rodent control activities, de-bushing and other clean-up activities to ensure that impacts on biodiversity are minimised or mitigated.	Documented reports on the review of the mentioned activities; reports on the observed impacts of these activities on biodiversity, and the management measures taken.	Published reports.	Lack of access of the National Biodiversity Unit to reports from the department of the Ministry of Health and Wellness responsible for vector control.	MENB - National Biodiversity Unit Ministry of Health and Wellness (MHW) Vector Control or Environmental Health Department

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Ensure that the on-going Biodiversity Education and Public Awareness Programme includes education and awareness about the dangers of polluting (including risks to human health) and promotes practical measures to assist the general public in pollution reduction.	Number of reviews of the education and public awareness programme. Amendments to activities – planned and implemented, focusing on pollution.	Published reviews and amendments to the programme.	Failure to procure technical personnel to deliver public awareness activities on pollution and biodiversity.	MENB - National Biodiversity Unit in collaboration with EPD and relevant agencies of the MHW
TARGET 6: By 2030, invasive alien species and pathways are identified and prioritised, priority established species are managed and measures are in place to prevent the introduction and establishment of new invasive alien species.				
Objectives: 1. To minimise the impacts of invasive alien species (IAS) of flora and fauna on local biodiversity. 2. To reduce the pathways by which invasive alien species of flora and fauna can enter local ecosystems.	Number and names of priority IAS being controlled. Specified pathways of entry into local ecosystems identified and managed. Specified measures in place to prevent entry of new IAS.	Documented reports of controlled IAS, pathways being managed, and measures to prevent entry of new IAS.	Insufficient resources (human and financial).	MENB working in collaboration with the WGB and other agencies
Activities				
Identify and update the list of invasive alien species (IAS) to Barbados.	Updated list of IAS.	Updated e-list on the Ministry's website, social media platforms, and hard copies published and available through relevant agencies.	Specific information on IAS not available.	MENB - National Biodiversity Unit and the WGB
Compile existing information and conduct studies to determine the population size of the IAS identified and their impact on biodiversity to date.	Data on the population size of the priority IAS Evidence of impacts on biodiversity	E-data on Ministry's and stakeholder agencies' websites and social media platforms. Published reports on impacts on biodiversity.	Specific information on IAS not available.	MENB - National Biodiversity Unit and the WGB

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Establish species-specific strategies to eradicate or control the population sizes of prioritised IAS to manageable levels. In cases where IAS impacts cannot be controlled, biosecure areas for the conservation of threatened native species will be identified and resources sought to implement them.	Number, names and pathways of IAS prioritised for control. Strategies for managing and controlling each prioritised species.	Documented strategies. Mapped biosecure areas/ habitats. Implementation status reports.	Unavailability of specialist expertise to complete the tasks. Limited financial resources.	MENB - National Biodiversity Unit
Establish monitoring programmes, in collaboration with key agencies, to track populations of priority IAS and their impact on biodiversity.	Number of monitoring stations for populations of specific species. Data collected from the monitoring stations.	Monitoring reports on changes in population size and impacts of the targeted IAS.	Lack of financial and human resources.	MENB - National Biodiversity Unit
Develop legislation or amend existing legislation and regulations for border controls at all seaports and the airport, with respect to all imported species.	Relevant legislation or amendments drafted and laid in Parliament.	Gazetted legislation.	Delays in preparing the drafting instructions as well as in drafting the legislation.	MENB - National Biodiversity Unit Office of the Attorney General
TARGET 7: By 2030, sources of endogenous anthropogenic pressures on coral reefs (e.g. excess nutrients, anchor damage, overfishing inter alia) are identified and effects minimised to maintain the integrity and functioning of coral reefs.				
Objective: To protect coral reefs and other coastal ecosystems in Barbados against the impacts of global climate change and ocean acidification.	**Percentage reduction in named types of pressure on reefs.** **Percentage regeneration in coral growth and improved condition of reefs.**	**Documented, illustrated reports on improved status of reefs.**	**Lack of capacity of agencies to continuously implement reef protection measures**	**MENB - National Biodiversity Unit** **CZMU** **EPD** **Fisheries Division**
Activities				
Utilise information generated through the CZMU Coral Reef Monitoring Programme, to establish the status and trends of the reef ecosystems around the island.	Coral reef status report is available to all stakeholders.	Report circulated to stakeholders and available on the website and social media platforms of the MENB and those of its partners.	Weak communication and flow of information from the CZMU to the National Biodiversity Unit.	MENB – National Biodiversity Unit CZMU

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Maintain an in-house database, or formalise a communication system with the CZMU, to generate periodic reports on the status of the reef ecosystems, the threats, and the impact of measures implemented to protect them.	Personnel from the National Biodiversity Unit assigned to develop the database and equipment and resources allocated. Or, MOU established with the CZMU and MENB to participate in generating the periodic reports.	Reports available on the websites and social media platforms of the CZMU and National Biodiversity Unit and circulated to stakeholders.	Weak communication and flow of information from CZMU to the National Biodiversity Unit.	MENB – National Biodiversity Unit CZMU
Support the work of the CZMU being implemented through the Coastal Risk Assessment and Monitoring Programme (CRMP) to protect coastal ecosystems.	Consultations held with the CZMU. Areas for collaboration in the CRMP and NBSAP identified. Collaborative activities specified.	Documented collaborative activities.	Weak communication and flow of information from CZMU to the National Biodiversity Unit.	MENB – National Biodiversity Unit CZMU
Develop regulations as necessary and support effective enforcement of the Coastal Zone Management Act, the Marine Pollution Control Act, the Fisheries Management Act and other related legislation and regulations aimed at protecting coastal ecosystems.	The number of stakeholders participating in the review of the legislation. Drafted amendments. Prepared plan of action for improving enforcement.	Gazetted amended legislation. Cabinet approval of Action Plan for strengthening enforcement.	Identified obstacles to effective enforcement. Delays in drafting the legislation. Lack of agreement by implementing agencies on actions for strengthening enforcement.	MENB – National Biodiversity Unit CZMU Fisheries Division EPD Office of the Attorney General
TARGET 8: By 2030, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are designated within connected systems of protected areas, and plans for effective area-based conservation measures are being developed.				
Objective: To establish and develop management action plans for zones of protection for important biodiversity and ecosystem services.	Percentage of terrestrial and coastal and marine areas legally protected. Action Plans for protecting the areas. Staff specifically responsible for protected areas.	Mapped legislated boundaries of protected areas. Periodic reports on management of protected areas.	Lack of resources to implement management and action plans.	NHD NCC MENB CZMU

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Activities				
Quantify the acreage of biodiversity ecosystems protected by the Barbados National Park and System of Parks and Open Spaces under the draft Revised PDP 2017 (including proposed buffer zones), and proposals for marine protected areas, as projections pending legislation.	Quantified acreages and boundaries of protected ecosystems.	Gazetted legislation delineating and quantifying the terrestrial and marine protected areas.	Insufficient human and financial resources. Inadequate information for quantification. Delays in drafting relevant legislation.	MENB - National Biodiversity Unit NCC NHD CZMU TCPDO Office of the Attorney General
Develop specific action plans to effectively and equitably manage these areas, including strengthening the capacities of agencies with direct responsibility for managing these areas to implement the action plans.	Action Plans. Quantity of staff, expertise, equipment and finance allocated. Number and type of training sessions completed by staff to manage these areas.	Published action plans circulated to stakeholders. Letters of appointment of staff. Issued certificates of participation in training.	Insufficient resources to assign and train staff. Insufficient financing in national budget.	MENB - National Biodiversity Unit NCC NHD CZMU
TARGET 9: By 2030, pressures on known threatened species have been identified and mitigated, and conservation status has been improved.				
Objective: To identify and protect threatened species of flora and fauna in Barbados.	**Percentage reduction in threats.** **Percentage improvement in status of threatened species.**	**Reports on the changing levels of threats and the status of threatened species.**	**Insufficient human and financial resources.**	**MENB in collaboration with relevant agencies**
Activities				
Support existing (e.g., UWI), and initiate new monitoring programmes as necessary, to assess threats to and status of native biodiversity.	Meetings completed with the UWI and other named agencies. Threatened native species of flora and fauna and their associated threats identified. Existing monitoring programmes identified, and new ones prepared.	Monitoring plan for threatened native species agreed by the Working Group on Biodiversity and other participating agencies and published on the Ministry's website and social media platforms.	Lack of resources to conduct necessary research.	MENB - National Biodiversity Unit UWI

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Develop species-specific or, where appropriate, ecosystem-based management plans to mitigate threats and monitor the implementation of these plans and the impact on the status of the species protected.	Species Management Plans (SMP) and plans to monitor implementation of these SMPs.	Published and circulated SMPs. Status reports on implementation of the SMPs.	Availability of personnel assigned to these tasks.	MENB - National Biodiversity Unit WGB
Develop appropriate indicators to be used in the management and monitoring plans.	Stakeholder workshops/ meetings to develop indicators. List of agreed indicators.	Published indicators.	Availability of personnel assigned to these tasks.	MENB - National Biodiversity Unit WGB
TARGET 10: By 2030, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.				
Objective: To safeguard the genetic diversity of socio-economically and culturally important species of cultivated plants and animals in Barbados, and their wild relatives.	**Number of identified socio-economically and culturally important species being actively protected.** **Number of significant breeds.**	**Register of significant breeds published and available electronically.**	**Insufficient resources.**	**MENB** **MAFS** **NHD and others**
Activities				
Establish and maintain a national register of genetically significant breeds.	Number of stakeholder consultations to compile list of genetically significant breeds.	Reports of stakeholder consultations. Published list of genetically significant breeds.	Unavailability of personnel assigned to these tasks.	MENB – National Biodiversity Unit, WGB and others as needed
Through collaborative arrangements among the agencies responsible, develop and implement management strategies to safeguard the genetic diversity of these socio-economically and culturally important species.	Number of consultations and other collaborative measures. Documented plans to safeguard genetic diversity.	Reports of stakeholder consultations. Published management plans.	Unavailability of personnel assigned to these tasks.	MENB – National Biodiversity Unit, WGB and others as needed

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Establish a national programme to preserve germplasm for nationally important cultivated plants and farmed animals and any remaining wild relatives, (e.g., Barbados Blackbelly sheep; West Indies Sea Island cotton).	National programme prepared through stakeholder consultations and built on the outputs of Activities 1 and 2.	Published national programme.	Unavailability of personnel assigned to these tasks.	MENB – National Biodiversity Unit, WGB and others as needed
TARGET 11: By 2030, document all traditional and scientific knowledge and technology relating to biodiversity so that it is improved, widely and equitably shared, transferred and applied.				
Objective: To document and share all traditional and scientific knowledge and technology relating to biodiversity in Barbados.				
Activities				
Commission a desk and/or field study to gather, collate and document traditional knowledge related to biodiversity.	Inventory report on traditional knowledge. Number of annotated items or sources of traditional knowledge. Number of actual documents gathered, either in electronic or hard copy.	Final accepted reports of the study.	Availability of personnel and resources.	MENB – National Biodiversity Unit, WGB and others as needed
Commission a project to gather and compile all available scientific studies on biodiversity, including research findings and research gaps and needs.	Consultants contracted or staff assigned. Number of items/sources of scientific studies. Identified gaps and needs. Number of actual documents gathered, either in electronic or hard copy.	Final accepted reports of the study.	Availability of personnel and resources.	MENB – National Biodiversity Unit, WGB and others as needed

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Prepare an annotated bibliographic database of scientific, peer-reviewed, and other validated publications contributing to traditional and scientific knowledge of Barbados' biodiversity.	Number of items in the database. Number of actual documents gathered, either in electronic or hard copy.	Final accepted reports.	Availability of personnel and resources.	MENB – National Biodiversity Unit, WGB and others as needed
Establish a National Biodiversity Clearing House Mechanism (BCHM) as a means of sharing the information gathered in the foregoing activities.	Personnel assigned to design and set up the BCHM. The outputs of Activities 1, 2 and 3 are accepted by the Ministry and included in the BCHM.	Active online BCHM containing the Reports from Activities 1, 2 and 3.	Availability of personnel and resources.	MENB – National Biodiversity Unit, WGB and others as needed
TARGET 12: By 2025, at the latest, financial resources to conduct projects and research in the area of biodiversity should increase substantially.				
Objective: To collaborate with key partners to coordinate financial resources to execute national projects and research.				
Activities				
Undertake an inventory of relevant biodiversity related projects being implemented nationally and develop a database of agencies related to the projects.	Inventory report on biodiversity related projects being implemented. Database of project implementing and funding agencies. The number of projects identified and documented. Number of agencies funding biodiversity projects.	Ministry's annual reports. Accessible database of agencies implementing biodiversity projects. Accessible database of agencies funding biodiversity projects. Final accepted reports. Ministry's administrative and financial records.	Unavailability of personnel assigned to these tasks. Willingness of agencies to partner with the Ministry and provide required information.	MENB – National Biodiversity Unit, WGB and others as needed

OBJECTIVE AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/ CONSTRAINTS	AGENCY RESPONSIBLE
Undertake an annual project collaboration meeting with private and public sector agencies, CSOs and regional and international agencies to discuss how existing projects can fit within the Ministry's biodiversity workplan.	Number of meetings held. Number of stakeholders consulted. Number of projects identified and incorporated into the Ministry's annual biodiversity workplan.	Ministry's financial and administrative records.	Willingness of agencies to partner with the Ministry. Unavailability of personnel assigned to these tasks.	MENB – National Biodiversity Unit, WGB and others as needed
Inclusion of biodiversity-specific activities for funding in annual budget.	Number of biodiversity activities included in budget estimates for funding. The total annual budget allocated by the Ministry for funding biodiversity-related projects.	Ministry's financial and administrative records. Annual Government budget estimate report.	Unavailability of personnel assigned to these tasks.	MENB – National Biodiversity Unit, WGB and others as needed
Work closely with the NGOs/CSOs/CBOs to collaborate to submit project proposals related to biodiversity and which has synergies with the Ministry's workplan.	Number of project proposals approved by the Ministry and submitted by collaborative partners. Number of agencies working with the Ministry to submit project proposals. Number of collaborative projects implemented. Total annual value of collaborative projects.	Ministry's financial and administrative records. Approved project proposals' reports, administrative and financial records. Database of project results.	Unavailability of personnel and resources. Willingness of agencies to partner with the Ministry and provide required information.	MENB – National Biodiversity Unit, WGB and others as needed

5.5 SWOT ANALYSIS OF THE EXISTING NATIONAL CAPACITY TO SUCCESSFULLY IMPLEMENT THE NBSAP

The success of the implementation of the NBSAP will be dependent on the Ministry having the capacity in terms of human, financial, and technical resources,as well as access to reliable and transparent information. The following table presents a view of the current national capacity to implement the NBSAP:

Table 12: SWOT Analysis of the National Capacity to Implement the NBSAP

Strengths	Weaknesses	Opportunities	Threats
Biodiversity matters already being addressed by the Ministry. Dedicated staff aware of the national, regional and international issues related to biodiversity, which impacts Barbados. Functional Working Group. Interaction with a wide stakeholder base for consultations. Work programme includes working with schools.	Inadequate staffing of the Biodiversity and Conservation Management Section to efficiently and effectively with national biodiversity matters as proposed under the NBSAP. Biodiversity matters not dealt with in a harmonised and integrated manner. No legislative framework to allow for all national biodiversity-related matters to be dealt with under a single entity. Insufficient resources (financial, human, technical) allocated at the national level for biodiversity matters. No real knowledge of biodiversity-related activities being undertaken at the national level; therefore, limited information is available to assist in decision making impacting biodiversity conservation and management. While stakeholders are engaged with regard to consultations on strategic documents, they are not provided the opportunity to engage with the Ministry with regards to the national biodiversity annual workplan.	To establish a National Biodiversity Unit with appropriate resources to deal with all national biodiversity-related matters. Amend appropriate legislation, where required, to provide for the establishment and mandate of a National Biodiversity Unit. The Ministry to collaborate more closely with stakeholders in all sectors to design the annual biodiversity workplan to meet the targets of the NBSAP.	National financial circumstances may prevent, or delay, establishment of the National Biodiversity Unit. Opposition to the setting up of the proposed National Biodiversity Unit. Insufficient resources to fully staff the proposed National Biodiversity Unit. Competition from other entities for funding to execute projects under the Unit.

5.6 ESTABLISHMENT OF A NATIONAL BIODIVERSITY UNIT

The successful implementation of the NBSAP will rely on an appropriate framework being established to competently and effectively undertake the activities under the NBSAP. The current situation of limited staff and financial resources is one which does not support this objective, and as such, it is essential that the Government of Barbados establishes a National Biodiversity Unit to deal with the implementation of the NBSAP and other matters related to biodiversity conservation, sustainable use, and overall management.

In establishing the National Biodiversity Unit, the follow recommendations are made:

- Its establishment must be supported by an appropriate legislative framework.
- The development of a National Biodiversity Policy which addresses how Barbados will treat matters related to biodiversity within the context of national development strategies.
- The development of an appropriate institutional framework with the necessary resources to undertake the mandate of the National Biodiversity Unit as provided under legislation. Below is a proposed structure for the human resources required to adequately deal with the implementation of the NBSAP and other biodiversity-related matters.

5.6.1 PROPOSED STAFFING STRUCTURE OF THE NATIONAL BIODIVERSITY UNIT

1. Senior Environmental Officer (Biodiversity) – 1
2. Education and Knowledge Officer – 1 (This role may be undertaken by the existing Education Officer for the Ministry.)
3. Biodiversity Officers – 2 (Their roles will be to deal with matters arising from relevant existing, and new MEAs, and for overall projects.)
4. Research/ Field Officers - 3

Table 13: Objectives and Actions: Establishing the National Biodiversity Unit

OBJECTIVES AND ACTIONS	INDICATORS	MEANS OF VERIFICATION	RISKS/CONSTRAINTS	
Objective: To establish a National Biodiversity Unit to have oversight of national biodiversity matters.				
ACTIVITIES				
Create the legislative framework for establishing the National Biodiversity Unit.	Draft legislation circulated for national consultation. Number of stakeholders reviewing and commenting on the draft legislation. Reading of legislation in Parliament. Approval of legislation and regulations giving effect to the establishment of the National Biodiversity Unit.	Government administrative and financial records. Recorded parliamentary proceedings. Stakeholder list for consultations. National Gazette re: proclamation of legislation.	Willingness of Government to support the development of the National Biodiversity Unit. Willingness of stakeholders to participate in the consultation process.	MENB
Implement the institutional framework for the Unit.	At least seven (7) staff members appointed fulltime to the Unit. Physical space assigned to the Unit.	Government administrative and financial records.	Willingness of Government to support the development of the National Biodiversity Unit. Limited financial resources to fully staff and equip the Unit.	MENB
Provide resources required to effectively and efficiently run the National Biodiversity Unit.	Budget allocation to the Biodiversity Unit. Human resources appointed to the Unit. Required technical resources allocated to the Unit.	Government administrative and financial records.	Willingness of Government to support the development of the National Biodiversity Unit. Limited financial resources to fully staff and equip the Unit.	MENB

6. APPENDICES

6.1 APPENDIX 1: ADDITIONAL INTERNATIONAL TREATIES RATIFIED BY BARBADOS THAT ARE RELEVANT TO BIODIVERSITY CONSERVATION.

1. The Convention on Wetlands of International Importance Especially as Waterfowl Habitats (Ramsar, 1971).

Also known as the Ramsar Convention, this MEA has as its mission: "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world..." (Ramsar Secretariat, 2014). The Convention requires that each Contracting Party designates suitable wetlands within its territory to be included in a List of Wetlands of International Importance (Article 2.1). At least one such designation must occur at the time of signing or when the country is depositing its instrument of ratification or accession (Article 2.4). By ratifying the Convention, each contracting Party accepts an international responsibility to conserve, manage and wisely use migratory stocks of waterfowl (Article 2.6), and to ensure that persons responsible for wetlands management take into consideration the recommendations of Conferences on the conservation, management and wise use of wetlands and their flora and fauna.

Barbados ratified the Ramsar Convention in 2005 and has one designated Ramsar site which is the Graeme Hall Swamp. The site is also designated as a Natural Heritage Conservation Area within the 2003 PDP, as part of the System of Parks and Open Space, and this provides some policy support to the Ramsar designation. Of particular importance in this NBSAP is the issue of Shooting Swamps. Barbados is on the North American flyway of several known migratory birds such as the Pectoral Sandpiper (Calidris melanotos), Lesser Yellowlegs (Tringaflavipes), and American Golden Plovers (Pluvialisdominica) (Burke, 2008). The rest stops for these birds include the Chancery Lane Swamp and the Graeme Hall Swamp, both of which have special designations within the Barbados System of National Parks and Open Space. The rest stops also include several shooting swamps, which have been classified as Important Bird Areas (IBAs) by Birdlife International (Burke, 2008).

Barbados has maintained a shooting swamp monitoring programme and engaged the assistance of the Barbados Wildfowlers Association in sustainably managing the sport. The Natural Heritage Department reports (2012) that some hunters have agreed to maintain artificial wetlands year-round and that a formerly disused shooting swamp in the south-east of the island has been restored as a shorebird reserve – the Woodbourne Shorebird Reserve (WSR). After its restoration was completed, flocks of Lesser Yellowlegs (Tringaflavipes) and about twenty (20) species of shorebirds were sighted there between July and August 2009 (Burke, 2009).

2. Convention Concerning the Protection of the World Cultural and Natural Heritage (1972).

This is also known as the World Heritage Convention. "Natural Heritage" within the Convention refers to natural features consisting of physical and biological formations of universal aesthetic or scientific value, geological and physiographical formations and areas

which constitute the habitat of threatened species of plants and animals of universal value for science and conservation, and natural sites or areas of outstanding universal value from the point of view of science, conservation, and natural beauty (Article 2).

Barbados accepted this convention in 2002 and thereby accepted the obligation to do all it can to ensure "the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage...situated on its own territory" (Article 4). Specific obligations include: adopting a general policy aimed at giving the natural heritage function within the life of the community and integrating its protection into comprehensive planning programmes; setting up services and appropriate legal, scientific, technical, administrative and financial measures; developing scientific and technical studies and research to build the capacity of the country to counteract the dangers that threaten natural heritage; and fostering establishment or development of national or regional centres for training (Article 5).

In 2005 Barbados, through the World Heritage Task Force, submitted the Scotland District to the Tentative List, which is an inventory of those properties which each State Party intends to consider for nomination as a World Heritage Site. The Scotland District is on the Tentative List only and has not yet been considered by the World Heritage Committee as a World Heritage site. Success in achieving such a designation could depend on the level of protection afforded in the National Park Designation of the area, the development and implementation of a management plan for the area, and the enforcement of the relevant national legislation, in particular the Town and Country Planning Act, the Coastal Zone Management Act, the Soil Conservation (Scotland District) Act.

3. The FAO International Plant Protection Convention (IPPC), 1951 (amended 1979 and 1997).

This is a multilateral treaty for international cooperation in plant protection. It makes provision for governments to apply measures to protect their plant resources from harmful pests and phytosanitary measures which may be introduced through international trade [Articles I (1) and II (3)]. The Convention is governed by the Commission on Phytosanitary Measures (CPM), which consists of all member states. The Convention extends beyond the protection of cultivated plants to the protection of the environment (1997 amendment Preamble para 5) including natural flora and plant products [1997 amendment Article IV (b)]. To this end, the CPM cooperates with the Convention on Biological Biodiversity and in recent years adopted the IPPC Strategic Framework 2012-2019. One of the Objectives of the Framework is to protect the environment, forests and biodiversity from plant pests.

4. The Convention on the Protection and Development of the Marine Environment in the Wider Caribbean (Cartagena Convention) 1982.

This regional environmental convention provides the legal framework for cooperative regional and national actions in the Wider Caribbean. It is supported by three additional technical agreements or Protocols on Oil Spills, Specially Protected Areas and Wildlife (SPAW), and Land-based Sources of Marine Pollution (LBS). Barbados ratified the Convention and Oils Spills Protocol in May 1985, and the SPAW Protocol in October 2002. It is not yet party to the Protocol Concerning Pollution from Land-based Sources and Activities; however, national

legislation in the form of the Marine Pollution Control Act CAP 392A (2000) addresses marine pollution from land-based sources.

The SPAW protocol addresses the protection of endangered or threatened species of flora and fauna and their habitats, as well as areas that require protection to safeguard their special value. To this end, it requires Parties to establish Protected Areas as necessary, to conserve, maintain and restore:

a) coastal and marine ecosystems "to ensure their long-term viability and to maintain biological and genetic biodiversity,"

b) Habitats and their associated ecosystems critical to the survival and recovery of endangered, threatened or endemic species of flora or fauna;

c) The productivity of ecosystems and natural resources that provide economic or social benefits and upon which the welfare of local inhabitants is dependent; and

d) Areas of special biological, ecological, educational, scientific, historic, cultural, recreational, archaeological, aesthetic, or economic value...." (Article 4).

6.2 APPENDIX 2. COMPOSITION OF THE WORKING GROUP ON BIODIVERSITY

1. Professor Julia Horrocks – Primatologist and Herpetologist, University of the West Indies (UWI) – Chairman
2. Professor Sean Carrington – Botanist, UWI – Deputy Chairman
3. Professor Hazel Oxenford – Marine Biologist, UWI
4. Dr. Angela Fields – Malacologist, UWI
5. Dr. Karl Watson – Ornithologist
6. Representative – Ministry of Agriculture and Food Security
7. Fisheries Biologist – Fisheries Division, Ministry of Maritime Affairs and the Blue Economy
8. Representative – Soil Conservation Unit, of Agriculture and Food Security
9. Representative – Veterinary Services, Ministry of Agriculture and Food Security
10. Marine Biologist – Coastal Zone Management Unit, Ministry of Maritime Affairs and the Blue Economy
11. Representative – National Conservation Commission, Ministry of Environment and National Beautification
12. Ms. Kim Downes-Agard – Ministry of Environment and National Beautification, who will act as Secretary to the Working Group.

Other members will be co-opted as necessary, particularly in the execution of projects.

6.3 APPENDIX 3:IMPLEMENTING THE AICHI BIODIVERSITY TARGETS IN BARBADOS

The following presents a synopsis of Barbados' progress towards implementing the Aichi targets during the reporting period.

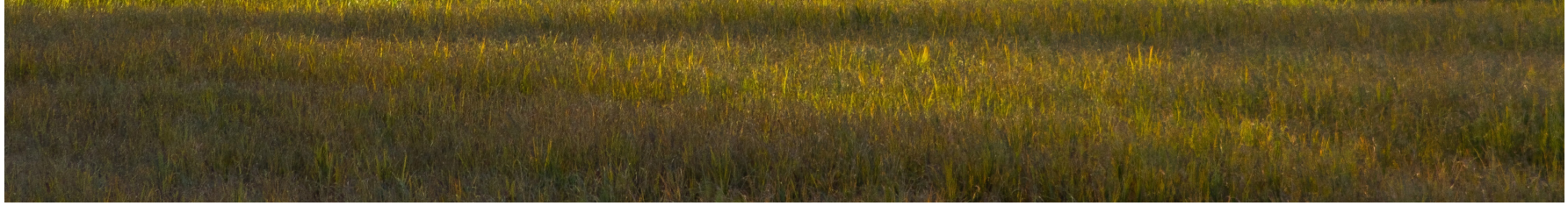
Table 14: Barbados' Progress towards Implementing the Aichi Targets

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.			
1	By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	· Trends in awareness and attitudes to biodiversity. · Trends in public engagement with biodiversity. · Trends in communication programmes and actions promoting social corporate responsibility.	· The MED continues to move forward with its awareness and education programmes on biodiversity conservation and management. · The new NBSAP will contain a detailed communication strategy and action plan. · Training workshops, conferences and seminars have been undertaken in a wide cross section of areas relevant to the environment and obligations under various MEAs. · Participation in activities marking major environmental days observed globally. · Outreach programmes to communities and schools to sensitise about environmental issues. · There is a noticeable trend in the involvement of the private sector in conservation and biodiversity maintenance e.g. the conversion of quarry mines to ecologically balanced spaces.

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
2	By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	· Trends in incorporating natural resource,biodiversity, and ecosystem service values into national accounting systems. · Trends in number of assessments of biodiversity values, in accordance with the Convention. · Trends in guidelines and applications of economic appraisal tools. · Trends in integration of biodiversity and ecosystem service values into sectoral and development policies. · Trends in policies considering biodiversity and ecosystem services in environmental impact assessment and strategic environmental assessment.	· As part of the development of its new NBSAP Barbados is currently undertaking an assessment of biodiversity values. · While specific studies have not been undertaken to access the value of biodiversity various studies undertaken by the Ministry of Agriculture – Fisheries Division and other stakeholders and statistical data can be used to assist in determining such values. · The Green Economy Scoping Study[30] published in 2014 provides tangible linkages between agricultural biodiversity, and economic development. · One of the challenges faced in determining ecosystem values, especially in non-traditional areas is the lack of statistical data and accessibility of the limited data that is captured by various government departments and within the private sector.
3	By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated,phased out or reformed to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, considering national socio-economic conditions.	· Trends in the number and value of incentives, including subsidies, harmful to biodiversity, removed, reformed or phased out. · Trends in identification, assessment and establishment and strengthening of incentives that reward positive contribution to biodiversity and ecosystem services and penalise adverse impacts	· Data not available to access progress

30 Moore, W., Alleyne, F., Alleyne, Y., Blackman, K., Blenman, C., Carter, S., Cashman, A., Cumberbatch, J., Downes, A., Hoyte, H., Mahon, R., Mamingi, N., McConney, P., Pena, M., Roberts, S., Rogers, T., Sealy, S., Sinckler, T. and A. Singh. 2014. Barbados' Green Economy Scoping Study. Government of Barbados, University of West Indies - Cave Hill Campus, United Nations Environment Programme, 244p. (Revised January 2015)

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
4	By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	· Trends in Ecological Footprint and/or related concepts. · Trends in extent to which biodiversity and ecosystem service values are incorporated into organisational accounting and reporting. · Trends in biodiversity of cities ecological limits assessed in terms of sustainable production and consumption. · Trends in population and extinction risk of utilised species, including species in trade.	· Much work still needs to be undertaken at achieve this target there is an increasing focus on sustainable utilisation of biodiversity of economic importance as evidenced by the species-specific management plans developed by the Fisheries division (e.g., sea egg); the focus on regenerating old quarries (e.g., Walker's reserve); the conversion of a bird shooting wetland to a conservation area.
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use			
5	By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	· Trends in proportion of degraded/threatened habitats. · Trends in extent of selected biomes, ecosystems, and habitats. · Trends in condition and vulnerability of ecosystems. · Trends in fragmentation of natural habitats. · Population trends of habitat dependent species in each major habitat type.	· Loss of habitat in sensitive areas such as the Scotland District Area remains a concern due to land slippage. · No assessment has been undertaken to determine the rate of loss of natural habitat. A 2015 study of the natural fibres and seeds of economic importance to the crafts sector has brought to light limited availability of some fibre and seed plants, which were present in abundance in specific locales on the island. · Grass and pasture fires remain a threat to biodiversity and there is need to undertake baseline studies and to monitor loss of habitat due to this threat. · The challenge remains the availability of data to make the assessment.



No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
6	By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	· Trends in proportion of depleted target and by catch species with recovery plans. · Trends in area, frequency, and/or intensity of destructive fishing practices. · Trends in catch per unit effort. · Trends in extinction risk of target and by catch aquatic species. · Trends in fishing effort capacity. · Trends in population of target and by catch aquatic species. · Trends in proportion of utilised stocks outside safe biological limits.	Several management plans have been developed by the Fisheries Division of the Ministry of Agriculture including an overall fisheries management plan.[31][32][33] The Fisheries Management Plan contains 8 fishery-specific management plans for the follow: (i) Shallow-shelf reef fishes, e.g. parrotfish, surgeonfish, grunts; (ii) Deep slope fishes, e.g. snappers, groupers; (iii) Coastal pelagics, e.g. herrings, jacks, small tunas; (iv) Large pelagics, e.g. dolphin, tunas, kingfish, swordfish, shark; (v) Flying fish; (vi) Sea urchins, i.e. sea egg; (vii) Turtles, e.g. loggerhead, hawksbill, leatherback; and (viii) Lobsters; e.g. spiny, spotted Section 3(3)) of the 1993 Fisheries Act makes provision for the development of strategies for the sustainable utilisation of fish stock. "The objective of fisheries management and development shall be to ensure the optimum utilisation of the fisheries resources in the waters of Barbados for the benefit of the people of Barbados."
7	By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	· Trends in area of forest, agricultural and aquaculture ecosystems under sustainable management. · Trends in population of forest and agriculture dependent species in production systems. · Trends in production per input. · Trends in proportion of products derived from sustainable sources.	The Ministry of Agriculture has developed several polices for the sustainable development of the agricultural sector. Policies for the agricultural sector have been articulated within the framework of the National Policy which in addition to other strategies refer to defining a green belt for agriculture.[34] Focus on implementing water storage facilities and rain harvesting facilities on farms; and implementation of water conservation technologies Data will need to be disaggregated to make a full assessment of progress towards the target.

31 P. McConney, R. Mahon and H. Oxenford. 2003. Barbados Case Study: The Fisheries Advisory Committee. Caribbean Coastal Co-Management Guidelines Project
32 P. McConney, R. Mahon and C. Parker. 2003. Barbados Case Study: The Sea Egg Fishery. Caribbean Coastal Co-Management Guidelines Project
33 Patrick McConney. Multi-objective Management of Inshore Fisheries in Barbados: A Biodiversity Perspective
34 A Review of Agricultural Policies: Case Study of Barbados. 2005. The CARICOM Regional Transformation Programme for Agriculture

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
8	By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	· Impact of pollution on extinction risk trends. · Trend in emission to the environment of pollutants relevant for biodiversity. · Trend in levels of contaminants in wildlife. · Trends in incidence of hypoxic zones and algal blooms. · Trends in nitrogen footprint of consumption activities. · Trends in ozone levels in natural ecosystems. · Trends in pollution deposition rate. · Trends in proportion of waste water discharged after treatment. · Trends in sediment transfer rates. · Trends in water quality in aquatic ecosystems.	Data not available to access progress.
9	By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	· Trends in number of invasive alien species. · Trends in invasive alien species pathways management. · Trends in the impact of invasive alien species on extinction risk trends. · Trends in incidence of wildlife diseases caused by invasive alien species. · Trends in the economic impacts of selected invasive alien species. · Trends in policy responses, legislation and management plans to control and prevent spread of invasive alien species.	Studies are being undertaken regarding the Lionfish and Giant African snail about management. More data is required to fully make an assessment on progress to this target.

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
10	By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintaintheir integrity and functioning.	· Extinction risk trends of coral and reef fish · Trends in climate change impacts on extinction risk · Trends in climatic impacts on community composition · Trends in climatic impacts on population trends · Trends in coral reef condition · Trends in extent, and rate of shifts of boundaries, of vulnerable ecosystems	Several coral reef studies are being undertaken by the Centre for Resource Management and Environmental Studies (CERMES), Faculty of Science and Technology, The University of the West Indies, Cave Hill Campus, Barbados, including a recent study Mapping the return of acroporid corals on fringing reefs along the west coast of Barbados.[35] Further studies are required to generate data required to make a full assessment on progress towards this target.
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity			
11	By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures and integrated into the wider landscapes and seascapes.	· Trends in extent of marine protected areas, coverage of key biodiversity areas and management effectiveness. · Trends in protected area condition and/or management effectiveness including more equitable management. · Trends in representative coverage of protected areas and other area-based approaches, including sites of importance for biodiversity, and of terrestrial, marine and inland water systems. · Trends in the connectivity of protected and other area-based approaches integrated into land and seascapes. · Trends in the delivery of ecosystem services and equitable benefits from protected areas.	The national system of protect areas management remains under several different government ministries, sometime with limited coordination of activities. The National Park Development Plan was developed to guide the development of the Barbados National Park and Natural Heritage Conservation Areas in Barbados. Barbados's system of Parks and Open Spaces is detailed in the Physical Development Plan and comprises 6 categories and specific land use policies for each of the categories. The categories: · OS 1 The Barbados National Park · OS 2 Natural Heritage Conservation Areas · OS 3 Coastal Landscape Zone · OS 4 Public Parks and Open Spaces · OS 5 National Attractions · OS 6 Barbados National Forest Candidate Sites The system of protected areas includes: · Carlisle Bay - a Marine Protected Area · Folkestone Marine Reserve - Barbados' first marine protected area.

35 R. MACLEAN AND H.A. OXENFORD. 2016. Mapping the return of acroporid corals on fringing reefs along the west coast of Barbados. CERMES Technical Report No 80. http://www.cavehill.uwi.edu/cermes

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
12	By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	· Trends in abundance of selected species. · Trends in extinction risk of species. · Trends in distribution of selected species.	Technical workshop in 2013 to discuss the conservation of the Barbados Leaf-Toed Gecko; distribution studies Ongoing work by the Fisheries Division of the Ministry of Agriculture on the abundance and distribution of fish stock of economic importance including invasive species such as the Lionfish.
13	By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.	· Trends in genetic diversity of cultivated plants and farmed and domesticated animals and their wild relatives. · Trends in genetic diversity of selected species. · Trends in number of effective policy mechanisms implemented to reduce genetic erosion and safeguard genetic diversity-related to plant and animal genetic resources.	Mapping of natural fibres and seeds used by the crafts sector (2015). Ministry of Agriculture, collaborating with national Barbados Natural Fibres Network (an NGO) to establish a seed bank for natural fibres and seeds in the first instance and then for crops of agricultural importance.
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services			
14	By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods, and wellbeing, are restored and safeguarded, considering the needs of women, indigenous and local communities, and the poor and vulnerable.	· Population trends and extinction risk trends of species that provide ecosystem services. · Trends in benefits that humans derive from selected ecosystem services. · Trends in proportion of the population using improved water services. · Trends in proportion of total freshwater resources used.	Trend towards greater private sector involvement in conservation and restoration with specific focus on restoration of quarry sites and conversion of bird shooting swamps to national reserves. The beautification of Historic Bridgetown focused on the upgrade of Constitution River with an aim toward flood mitigation intervention; landscaping using indigenous plants and the creation of a marine life habitat.

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
15	By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	· Status and trends in extent and condition of habitats that provide carbon storage. · Population trends of forest-dependent species in forests under restoration. · Trends in area of degraded ecosystems restored or being restored. · Trends in proportion of degraded/threatened habitats. · Trends in primary productivity. · Trends in proportion of land affected by desertification.	Trend towards greater private sector involvement in conservation and restoration with specific focus on restoration of quarry sites and conversion of bird shooting swamps to national reserves. The beautification of Historic Bridgetown focused on the upgrade of Constitution River with an aim toward flood mitigation intervention; landscaping using indigenous plants and the creation of a marine life habitat.
16	By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, consistent with national legislation.	· Number of Parties to the CBD that have ratified the Protocol. · Number of Parties to the Nagoya Protocol that have legislative, administrative or policy measures and institutional structures in place for implementing the Nagoya Protocol.	
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.			
17	By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	· Trends in implementation of National Biodiversity Strategies and Action Plans, including development, comprehensiveness, adoption and implementation.	Work commenced towards developing new NBSAP targets.

No.	Aichi Targets	Relevant indicators	Progress toward implementation during the reporting period
18	By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	· Trends in degree to which traditional knowledge and practices are respected through: full integration, participation and safeguards in national implementation of the Strategic Plan. · Trends of linguistic diversity and numbers of speakers of indigenous languages. · Trends in land-use change and land tenure in the traditional territories of indigenous and local communities. · Trends in the practice of traditional occupations.	· June designated national cultural heritage month. · Extraction and documentation of traditional aspects of products and services which have a unique characteristic because of traditional know-how and practices as well as geographical location to be used as a tool for protection such products under an intellectual property regime.
19	By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared, and transferred and applied.	· Number of maintained species inventories being used to implement the Convention.	By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared, and transferred and applied.
20	By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	· In Decision X/3 the Conference of the Parties adopted a set of 15 indicators to assess progress in the implementation of the financial resource mobilisation strategy and Target 20 of the Strategic Plan.	Traditional funding sources such as the GEF/SGP, CDB and Government financing continue to be significant contributors to supporting related projects.

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