SIXTH NATIONAL REPORT OF MALAYSIA

to the

Convention on Biological Diversity (CBD)

December 2019

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List of Acronyms

AATHP	ASEAN Agreement on Transboundary Haze Pollution
ABS	Access to Biological Resources and Benefit Sharing
ABTs	Aichi Biodiversity Targets
ACB	ASEAN Centre for Biodiversity
ACDS	ASEAN Catch Documentation Scheme
AGC	Attorney General's Chamber
AIS	Automatic Identification System
ALAM	Atlas of Living Malaysia
AMAF	ASEAN Ministerial Meeting on Agriculture and Forestry
AMME	ASEAN Ministerial Meeting on Environment
AMS	ASEAN Member States
APFORGEN	Asia Pacific Forest Genetic Resources Programme
APFP	ASEAN Peatland Forests Project
APMS	ASEAN Peatland Management Strategy 2006-2020
ASEAN	Association of Southeast Asian Nations
ASEAN-WEN	ASEAN Wildlife Law Enforcement Network
ASOF	ASEAN Senior Officials on Forestry
ASSP	ASEAN Strategic Partnership Mechanism
AWG	ASEAN Working Group
AWGNCB	ASEAN Working Group on Natural Resources and Biodiversity
BBP	Bornean Banteng Programme
BEACON	Biodiversity Environment and Conservation
BIMP-EAGA	Brunei Darussalam-Indonesia-Malaysia-Philippines—East ASEAN Growth Area
BIOFIN	Biodiversity Finance Initiative
BMP	Best Management Practices
BOBLME	Bay of Bengal Large Marine Ecosystem Project
BORA	Bornean Rhino Alliance
BRAHMS	Botanical Research Herbarium Management System
CAT	Citizen Action for Tigers
CA|TS	Conservation Assured|Tiger Standards
CBD	Convention on Biological Diversity
CBET	Community-based Ecotourism
CBO	Community-based organizations
CCA	Community Conserved Areas
CFCC	Collection of Functional Food Cultures
CFF	Crops For the Future

CFF	Coral Reefs, Fisheries, and Food Security
CCRI	Community Conservation Resilience Initiative
CEPA	Communication, Education and Public Awareness
CFS	Central Forest Spine
CHM	Malaysia Clearing House Mechanism
CIP	Conservation Internship Programme
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CIVAT	Coastal Integrated Vulnerability Assessment Tools
CLC	Community Learning Centre
CoC	Chain-of-Custody certification
COFI	Committee of Fisheries
CRP	Crocker Range Park
CMDV	Centre for Marker Discovery and Validation
CPB	Cartagena Protocol on Biosafety
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
CTI	Coral Triangle Initiative
CTRE	Continuous Tourism Related Education
CUZ	Community Use Zones
DE	Development Expenditure
DFR	Deramakot Forest Reserve
DID	Department of Irrigation and Drainage
DOA	Department of Agriculture
DOB	Department of Biosafety
DOE	Department of Environment
DOFM	Department of Fisheries Malaysia
DSI	Digital Sequence Information of Genetic Resources
DTCP	Department of Town and Country Planning
DVS	Department of Veterinary Science
DWNP	Department of Wildlife and National Parks
EAFM	Ecosystem Approach to Fisheries Management
EBSA	Ecologically or Biologically Significant Marine Areas
ECC	Environment and Climate Change Committee
EE	Environmental Education
EAAFP	East Asian-Australasian Flyway Partnership
EEP	Eco-school and Eco-campus Programme
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ELEM	Enforcement - Law Enforcement

EPD	Environmental Protection Department
ESAs	Environmentally Sensitive Areas
ESG	Environmental, Social and Governance
EU	European Union
EWIM	Effective Wildlife Management
FAO	Food and Agriculture Organization of the United Nations
FDAM	Fisheries Development Authority Malaysia
FDFT	Forestry Department Federal Territory
FDPM	Forestry Department Peninsular Malaysia
FDS	Forest Department Sarawak
FMC	Forest Management Certification
FMU	Forest Management Unit
FMP	Forest Management Plan
FORMADAT	Alliance of Indigenous Peoples of The Highlands of Borneo
FORTRAIN	Forestry Training Institute
FPA	Freshwater Protected Area
FPIC	Free, Prior and Informed Consent
FRC	Forest Research Centre
FRI	Fisheries Research Institute
FRL	Forest Reference Level
FRIM	Forest Research Institute Malaysia
FSC	Forest Stewardship Council
GAqP	Guidelines for Good Aquaculture Practices on Food Fish
GBIF	Global Biodiversity Information Facility
GBO	Global Biodiversity Outlook
GDP	Gross Domestic Product
GEC	Global Environment Centre
GEF	Global Environment Facility
GEI	Green Economy Initiatives
GGP	Government Green Procurement
GIS	Geographic Information System
GLC	Government-Linked Companies
GMAC	Genetic Modification Advisory Committee
GSTC	Global Sustainable Tourism Criteria
GWCP	Good Wild Craft Practice
HCV	High Conservation Value
HICoE	Centres of Excellence at Public Institutions of Higher Learning
HOB	Heart of Borneo
IAS	Invasive Alien Species
IBA	Important Bird and Biodiversity Area

IBC	Institutional Biosafety Committee
ICCA	Indigenous People and Conserved Communities Area
IDEAS	Institute of Democracy and Economic Affairs
ILC	Indigenous and Local Communities
IMMA	Important Marine Mammal Area
IMO	International Maritime Organization
IMO BWC	International Maritime Organization Ballast Water Management Convention 2004
IP	Import Permit
IPGRI	International Plant Genetic Resources Institute
IPM	Integrated Pest Management
IRA	Import Risk Analysis
IRBM	Integrated River Basin Management
ISC	Interim Steering Committee
ISMAT	Southeast Asia Marine Resources Institute
ISME	International Society for Mangrove Ecosystems
ISMP	Integrated Shoreline Management Plan
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported and Unregulated Fishing
LCC	Live Coral Cover
JAKOA	Department of Orang Asli Development
JCSPO	Jurisdictional Certified Sustainable Palm Oil
JICA	Japan International Cooperation Agency
JNPC	Johor National Park Corporation
JUPEM	Department of Survey and Mapping Malaysia
KATS	Ministry of Water, Land and Natural Resources
KeTTHA	Ministry of Energy, Green Technology and Water
KKLW	Ministry of Rural and Regional Development
KLEFF	Kuala Lumpur Eco Film Festival
KOPEL	Koperasi Pelancongan Mukim Batu Puteh Kinabatangan
KP	Kinabalu Park
KPLB	Ministry of Rural Development
KSNP	Kuala Selangor Nature Park
LIDAR	Light Detection and Ranging
LMMC	Like-Minded Megadiverse Countries
LMO	Living Modified Organisms
MAQIS	Malaysian Quarantine Inspection Services
MANAGA	Malaysia Nature Guide Association
MARDI	Malaysian Agricultural Research and Development Institute

MAT	Mutually Agreed Terms
MBC	Malaysian Biodiversity Centre
MBEON	Malaysian Biodiversity Enforcement Operation Network
MCS	Monitoring, Control and Surveillance
MDR	Matang Dolphin Research
MEXCOE	Meeting of Ministers of the Environment
MFRDMD	Marine Fishery Resources Development & Management Department
MFSSI	Malaysia Fish Stock Sustainability Index
MFT	Ministry of Federal Territories
MNS	Malaysian Nature Society
MEA	Ministry of Economic Affairs
MEAs	Multilateral Environmental Agreements
MENGO	Malaysian Environmental NGOs
MESCOT	Model Ecologically Sustainable Community Based Conservation and Tourism
MESTECC	Ministry of Energy, Science, Technology, Environment and Climate Change
MHP	Malaysia Homestay Programme
MTR 11MP	Midterm Review of Eleventh Malaysia Plan
MMEA	Malaysian Maritime Enforcement Agency
MNS	Malaysian Nature Society
MOA	Ministry of Agriculture and Agro-based Industry
MOF	Ministry of Finance
MOHR	Ministry of Human Resource
MOSTI	Ministry of Science, Technology and Innovation
MOTAC	Ministry of Tourism, Arts and Culture
MP	Malaysia Plan
MPC	Malaysian Productivity Corporation
MPDC	Marine Park Data Centre
MPI	Ministry of Primary Industries
MPIC	Ministry of Plantation Industries and Commodities
MPMIS	Marine Park Management Information System
MPOB	Malaysian Palm Oil Board
MPOC	Malaysian Palm Oil Council
MPOCC	Malaysian Palm Oil Certification Council
MPOWCF	Malaysian Palm Oil Wildlife Conservation Fund
MPA	Marine Protected Area
MRFDMD	Marine Fishery Resources Development Management Department
MSPO	Malaysian Sustainable Palm Oil
MSY	Maximum sustainable yield
MTU	Mobile Tracking Unit

MTIB	Malaysian Timber Industry Board
MUDeNR	Ministry of Urban Development and Natural Resources
MUWHLG	Ministry of Urban Well-Being, Housing and Local Government
MyBIS	Malaysia Biodiversity Information System
MYCAT	Malaysian Conservation Alliance for Tigers
MyCREST	Malaysian Carbon Reduction and Environmental Sustainability Tool
MyGAP	Malaysian Good Agricultural Practice
MyIPO	Malaysia Intellectual Property Corporation
MYKARST	Malaysian Limestone Karst
MyTDKL	Malaysia Traditional Knowledge Digital Library
NACBES	National Advisory Committee on Biodiversity and Ecosystem Services
NAP	National Agrofood Policy
NAPP	National Action Plan on Peatlands 2011-2020
NBB	National Biosafety Board
NBC	National Biodiversity Council
NBR	National Biodiversity Roundtable
NBSAP	National Biodiversity Strategy and Action Plans
NCTF	National Conservation Trust Fund
NECAP	National Elephant Conservation Action Plan
NEP	National Ecotourism Plan 2016-2025
NFPA	National Framework on Protected Areas
NFA	National Forestry Act 1984
NFP	National Forestry Policy 1978 (Revised 1992)
NGO	Non-governmental organization
NKL-SP	Nagoya-Kuala Lumpur Supplementary Protocol
NLC	National Land Council
NLD	National Landscape Department
NOSS	National Occupational Skills Standard
NPBD	National Policy on Biological Diversity 2016-2025
NPDIR	National Policy on the Development and Implementation of Regulations
NPOA-IUU	National Action Plan of Action to Prevent, Deter and Eliminate Illegal, Unrepo and Unregulated Fishing
NPP	National Physical Plan
NPWC	National Peatland Working Committee
NR	National Report
NRO	Natural Resource Office
NRE	Ministry of Natural Resources and Environment
NREB	Natural Resources and Environment Board Sarawak
NSAP-ABCSU	National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation
NSPSF	North Selangor Peat Swamp Forest

NT	National Target
NTCAP	National Tiger Conservation Action Plan
NUP	National Urbanization Policy
NWFL	National Wildlife Forensic Laboratory
ODA	Official Development Assistance
OECM	Other Effective Area-Based Conservation Measures
PA	Protected Areas
PACOS	Partners of Community Organizations
PC	Phytosanitary Certificate
PCA	Priority Conservation Areas
PCMNPS	Piasau Camp Miri Nature Park Society
PES	Payment for Ecosystem Services
PGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
POP	Public Outreach Programme
PSPC	Perak State Parks Corporation
PEFC	Programme for the Endorsement of Forest Certification
PES	Payment for Ecosystem Services
PEWANIS	Setiu Women Entrepreneurs
PFE	Permanent Forest Estate
PHVA	Population and Habitat Viability Analysis
PIC	Prior Informed Consent
PIFWA	Penang Inshore Fishermen Welfare Association
PL	Primary Linkages
PNR	Piasau Nature Reserve
PONGO	Palm Oil NGO Alliance
PSMA	Port State Measures Agreement
PSUT	Physical Supply And Use Table
PRF	Permanent Reserved Forest
PWD	Public Works Department
RAS	*Rakan Alam Sekitar*
REDD Plus	Reducing Emissions from Deforestation and forest Degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries
RIL	Reduced impact logging
ROL	River of Life
RSPO	Roundtable on Sustainable Palm Oil
SaBC	Sabah Biodiversity Centre
SBC	Sarawak Biodiversity Centre
SBE	Sabah Biodiversity Enactment
SaBIIS	Sabah Biodiversity Integrated Information System

SDG	Sustainable Development Goal
SEAFDEC	Southeast Asian Fisheries Development Center
SEEA	System of Environmental Economic Accounting
SEEN	Sabah Environmental Education Network
SEEP	Sabah Environmental Education Policy
SFC	Sarawak Forestry Corporation
SFD	Sabah Forestry Department
SFM	Sustainable Forest Management
SFMLA	Sustainable Forest Management Licence Agreement
SIMCA	Sugud Islands Marine Conservation Area
SL	Secondary Linkages
SLAAS	the Sustainable School Environment Award
SMSP	Semporna Marine Spatial Plan
SNC	Sabah Nature Club
SNP	Similajau National Park
SOM-AMAF	ASEAN Senior Officials Meeting on Agriculture and Forestry
SOMTC	Senior Official Meeting on Transnational Crimes
SOP	Standard Operating Procedure
SP	Sabah Parks
SPS	Sanitary and Phytosanitary
SSB	Sarawak Shell Berhad
SSME	Sulu Sulawesi Marine Ecoregion
SSP	Sabah Structural Plan
SWD	Sabah Wildlife Department
SWFS	Society of Wildlife Forensic Science
TED	Turtle Excluder Device
TEEB	The Economics of Ecosystems and Biodiversity
TK	Traditional Knowledge
TIHPA	Turtle Island Heritage Park
TMP	Tun Mustapha Park
TPA	Totally Protected Area
TRACC	Tropical Research and Conservation Centre
TRCRC	Tropical Rainforest Conservation and Research Centre
UCF	Urban Community Forest
UCTS	University College of Technology Sarawak, Sibu
UiTM	Universiti Teknologi MARA
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UMP	Universiti Malaysia Pahang
UMS	Universiti Malaysia Sabah

UMT	Universiti Malaysia Terengganu
UNCCD	United Nations Convention to Combat Desertification
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFSA	United Nations Fish Stocks Agreement
UNIMAS	Universiti Malaysia Sarawak
UNODC	United Nations Office on Drugs and Crimes
UNSD	United Nations Statistics Division
UPC	Unified Public Consultation
UPM	Universiti Putra Malaysia
WCC	Wildlife Conservation Centres
WRC	Wildlife Rescues Centres
WWF	World Wide Fund for Nature
YL4S	Young Leaders for Sustainability

(exchange rate (31 December 2018): $1 = RM 4.1325)

Foreword

Preamble

As a party to the Convention on Biological Diversity (CBD) since 1994, Malaysia has been consistent in fulfilling obligations to report on national biodiversity strategies and actions. Malaysia's Sixth National Report to the CBD (6NR) is the first national report on the National Biodiversity Strategy and Action Plan (NBSAP) and uses the comprehensive guidance and technical support formulated by CBD Secretariat to ensure high quality, data-driven and gender-inclusive reporting. UNDP Malaysia was appointed as the implementing partner by the Global 6NR Team to support the Malaysian Government, specifically the CBD Focal Point - the Ministry of Water, Land and Natural Resources (KATS) - in this process.

Malaysia's first National Policy on Biological Diversity was formulated in 1998. In 2016, Malaysia's commitment to biodiversity was strengthened with the launch of the National Policy on Biological Diversity 2016-2025 (NPBD). NPBD contains five (5) goals, seventeen (17) targets, and 57 actions which represent the national commitment to deliver on the CBD Strategic Plan for Biodiversity (2011-2020) and Aichi Biodiversity Targets. Under the purview of KATS, this Policy will continue to guide Malaysia's biodiversity aspirations until 2025.

Since the NPBD is aligned to the CBD Strategic Plan for Biodiversity, 6NR also represents efforts to review the status and progress of NPBD implementation. To ensure a data-driven 6NR, the 6NR Team has embarked on a rigorous stakeholder consultation process which includes the collation of data through tracking tools, consultation sessions, one-on-one meetings with agencies, data request templates, an online survey, and multiple validation meetings. The draft was also reviewed by KATS, the Global 6NR Technical Team as well as relevant stakeholders before the finalization of the Report.

Notably, Malaysia has a unique arrangement for natural resources management. The Federal Constitution of Malaysia, the supreme law of the country, provides for the separation of powers between the Federation and the States as specified in the Ninth Schedule. The Federal government has legislative and executive powers over matters such as external affairs, defense, and internal security. Matters such as land, agriculture, natural resources, and Shariah law appear on the State List. Of the thirteen (13) states that constitute Malaysia, the states of Sabah and Sarawak in East Malaysia are granted greater autonomy.

During the 6NR reporting period, Malaysia experienced a change of government following the 14th General Election (GE-14). This has resulted in the restructuring of ministries and functions to reflect current needs and priorities. Table 1 highlights changes that are related to the NPBD. The Ministry of Natural Resources and Environment (NRE) was restructured to form KATS. The new ministry was formed by the amalgamation of the Land and Natural Resource components of NRE and the water sector from the former Ministry of Energy, Green Technology and Water (KeTTHA). The Environmental Management and Climate Change Division, and Department of Environment of NRE were transferred to the new Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC). At the departmental level, the Department of Marine Parks which was under the purview of NRE was formally integrated as the Marine Parks and Resource Management Division under the Department of Fisheries which is an agency of the Ministry of Agriculture and Agro-based Industry (MOA).

Table 1: Changes in Government ministries' names and functions following the change of government post GE-14.

Former Ministries	New Ministries
Economic Planning Unit, Prime Minister's Department	Ministry of Economic Affairs (MEA) - renamed
Ministry of Natural Resources and Environment (NRE)	Ministry of Water, Land and Natural Resources (KATS) – restructured to include potable water supply and wastewater management.
Ministry of Science, Technology and Innovation (MOSTI)	Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) – restructured to include energy, green technology, environmental pollution and climate change management.
Ministry of Agriculture and Agro-based Industry (MOA)	Ministry of Agriculture and Agro-Based Industry (MOA) – the Department of Fisheries (DOFM), has absorbed the Department of Marine Parks formerly under the purview of NRE.
Ministry of Plantation Industries and Commodities (MPIC)	Ministry of Primary Industries (MPI) - renamed
Ministry of Urban Well-being, Housing and Local Government (MUWHLG)	Ministry of Housing and Local Government (KPKT) – renamed
Ministry of Rural and Regional Development (KKLW)	Ministry of Rural Development (KPLB) – renamed
Ministry of Energy, Green Technology and Water (KeTTHA)	Disbanded and agencies reassigned to other Ministries
Ministry of Federal Territories (KWP)	Ministry of Federal Territories – restructured to include the Department of Town and Country Planning (PLANMalaysia) and the National Landscape Department formerly under the purview of the MUWHLG.

All attempts were made to report current data from 2014-2018 whenever such official data is available, while significant development occurring in 2019 and information prior to 2014 was also included for specific targets that have not been previously covered in the fifth national report.

The 6NR is structured into five chapters:

Chapter 1 – Updated Biodiversity Profile and Country Context
Chapter 2 – Malaysia National Biodiversity Targets and Actions – Implementation Progress and Status
Chapter 3 – Malaysian Biodiversity Efforts towards Aichi Targets and SDGs
Chapter 4 – Challenges, Technical and Capacity Needs
Chapter 5 – Contribution of Indigenous People and Local Communities (ILCs) and Gender Empowerment in Conservation

EXECUTIVE SUMMARY

The Convention on Biological Diversity (CBD) is an international framework convention with three main goals: conservation of biodiversity, sustainable use of biodiversity resources and the equitable sharing of benefits from the use of genetic resources. As part of Malaysia's response to the CBD strategic plans 2011-2020, the National Policy on Biological Diversity (NPBD) 2016-2025 was formulated to provide the direction and framework to conserve biodiversity and use it sustainably in the face of increasingly complex challenges. The Sixth (6^{th}) National Report presents the progress of the NPBD 2016-2025 (NPBD) Indicators and Actions in achieving national and Aichi Biodiversity Targets (ABTs).

This report contains five (5) chapters: Chapter 1 provides an update on Malaysia's biodiversity profile, biodiversity threats, and its factors, and the implementation framework of NPBD 2016-2025; Chapter 2 describes Malaysia's progress in achieving the outlined Actions and Indicators; Chapter 3 discusses Malaysia's efforts towards achieving the Global Aichi targets and Sustainable Development Goals (SDGs); Chapter 4 addresses the challenges, technical and capacity needs to achieve the national targets; and Chapter 5 reviews roles of Indigenous Local Communities (ILCs) and women in conservation through relevant case studies.

Chapter 1 describes Malaysia's biodiversity profile and highlights key facts that make the country one of the twelve (12) megadiverse countries in the world. Malaysia's natural ecosystem is home to about 15,000 vascular plant species, of which nearly 30% are endemic, and 2,795 vertebrate species, of which 1,103 are endemic. The marine environment of the country is also one of the richest. Other than seagrass and benthic communities, Malaysian waters have a total of 4,006 km^2 of coral reefs hosting more than 77% of the world's known coral species – some of which lie within the Coral Triangle, the centre of global marine biodiversity. Malaysia's commitment to biodiversity is reflected in the formulation of second-generation NBSAP – the National Policy on Biological Diversity 2016-2025 which reflects aspirations to achieve the Global Aichi Targets. KATS through the Biodiversity and Forestry Management Division is the primary custodian of the NPBD. KATS is entrusted with coordinating the efforts of other government and non-governmental stakeholders to deliver actions within the NPBD.

Chapter 2 discusses the progress of NPBD targets and actions since its launch in 2016. This Chapter elaborates key measures and initiatives for specific actions, followed by the assessment of its accompanying indicator. In addition, examples of government and non-governmental stakeholder efforts implemented at all levels - federal, state, and local are included. The CBD Global Biodiversity Outlook (GBO) target dashboard methodology is adapted to report progress made for each indicator.

Chapter 3 establishes links between Malaysia's national targets defined by the NPBD with the Global Aichi Biodiversity Targets (ABT) and the 2030 United Nations Agenda for Sustainable Development (SDG). Since the Malaysian National Targets (NT) are designed based on the ABTs, efforts to deliver the NTs are, in effect representing Malaysia's achievement of the ABTs. The key difference lies in the timeframe - where ABT sets 2020 for all its targets, while most NT extends up to 2025. In this section, each ABT is mapped onto respective NTs and SDGs, and key initiatives are listed.

Chapter 4 attempts to identify the challenges, technical and capacity needs to ensure continuous progress is made on implementing NPBD. It is recognized that effective biodiversity management can be improved by building capacity particularly related to innovative financing, scientific research and knowledge development, communication and coordination mechanisms, sustainable management of natural resources, law, and enforcement, public awareness, and partnerships. Significant biodiversity management outcomes can be achieved by overcoming the barriers and leveraging support from a wide range of government and non-governmental stakeholders.

Chapter 5 illuminates the contribution of ILCs and gender empowerment in conservation. This is being done for the first time in a CBD national report submitted by Malaysia. Three case studies were compiled, one each from Peninsular Malaysia, Sabah and Sarawak depicting the role of ILCs and women in biodiversity conservation. Critical success factors of these community-managed conservation initiatives were summarized. A series of recommendations were made to upscale the participation of the ILCs and gender empowerment within biodiversity conservation in the country.

The slipper orchid (*Paphiopedilum barbatum*), endemic to Peninsular Malaysia. Photo credit: FDPM

CHAPTER 1: UPDATED COUNTRY BIODIVERSITY PROFILE AND COUNTRY CONTEXT

1.1 Malaysia as a Megadiverse Country

Malaysia is divided into two major geographical regions: Peninsular Malaysia and Malaysian Borneo, consisting of thirteen (13) states and three Federal Territories. There are eleven (11) states and two (2) Federal Territories situated in Peninsular Malaysia while the other two (2) states and one (1) Federal Territory are on the island of Borneo. Inclusive of its territorial waters, Malaysia sits between $0^{o}51'$N and $7^{o}33'$N, and $98^{o}01'$E and $119^{o}30'$E. Malaysia belongs to the Sundaland biogeographical region which comprises the Malay Peninsula and the Malay Archipelagic islands of Sumatra, Java, Borneo, and possess a wide array of coastal, marine, and terrestrial ecosystems. Sundaland is further divided into several eco-regions. The terrestrial and marine eco-regions include the Peninsular Malaysian and Borneo Lowland and Montane Forests, the Sulu-Sulawesi Marine Eco-region, and the Andaman Sea.

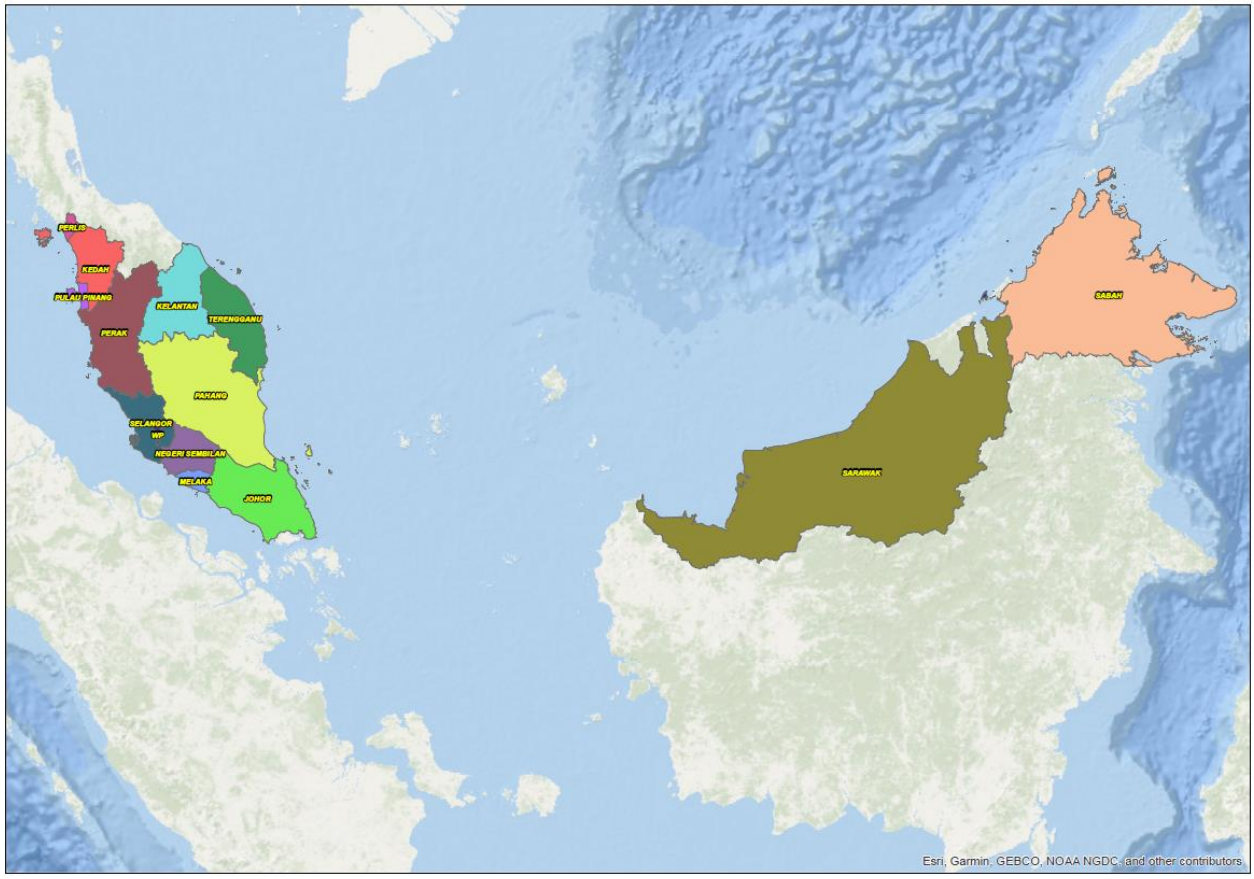


Figure 1: Map of Malaysia. Source: JUPEM.

The total land area of Malaysia covers approximately 330,345 km^2 (33.0345 million ha). Peninsular Malaysia makes up nearly 40% of the country's land area, while Sabah and Sarawak on Malaysian Borneo cover approximately 60% of land areas. There are several mountain ranges in Malaysia. With an average height of 1,800m, the highest mountain in Malaysia is Mount Kinabalu at 4,095 m while in Peninsular Malaysia, the central Titiwangsa or Main Range divides the landscape into the Eastern and Western strips. The highest point of the range is Mount Tahan at 2,187 m. Mountain ranges are also the source of Malaysia's 150 major rivers and an estimated 1,800 minor rivers and tributaries. The extensive river

systems, associated riparian, floodplain and catchment forests support an immense diversity of aquatic and terrestrial biodiversity.

Malaysia is one of twelve (12) mega-biodiverse countries in the world. Malaysia has an estimated 15,000 species of vascular plants, 306 species of mammals, 742 species of birds, 242 species of amphibians, 567 species of reptiles, over 449 species of freshwater fish, over 1,619 species of marine fish and more than 150,000 species of invertebrates. Some of the iconic species in Malaysia include the Malayan tiger, Malayan tapir, Asian elephant, Orangutan, Sunda pangolin, and Sunda clouded leopard. Sabah and Sarawak combined host the richest rainforests in the world with a high diversity of Dipterocarps, comprising 291 species or 75% of the family.

Malaysia has a total coastline of 8,840 km and 879 islands with three major coastal ecosystems: coral reefs, mangroves, and seagrass beds. Coral reefs in Malaysia are typically found on the outer edge of the coastal zones. Located within the Coral Triangle - the centre of marine biodiversity - Malaysian waters is home to approximately 4,006 km^2 of coral reefs, and hosts more than 77% of the world's known coral species. Mangroves in Malaysia are found in the inner edge of coastal zones, while seagrass beds are typically found along the coasts, growing in shallow inter-tidal zones. Seagrass and mangrove ecosystems in Malaysia are some of the most diverse in the world and are important feeding grounds for juvenile fishes, migratory sea birds, and marine mammals.

Malaysia has pledged to maintain at least 50% of its land under forest and tree cover during the Rio Summit in 1992. Malaysia has shown commitment to this pledge by maintaining 55.3% of forest cover as of 2014. To meet global targets and aspirations, Malaysia has become a party to various international environmental instruments in the area of biodiversity, climate change, ozone layer protection, desertification, endangered species, hazardous waste, marine life conservation, pollution, and wetlands conservation. Malaysian continues to pursue green growth as one of the key strategies under the 5-year Malaysia Plans. The strategy emphasizes strengthening an enabling environment for green growth, adoption of sustainable consumption and production, conserving natural resources, and strengthening resilience against climate change and natural disasters. These actions are expected to safeguard biodiversity.

1.2 Major pressures and factors to biodiversity loss

With the vision of becoming a high-income developed nation, Malaysia has undergone various stages of economic transition from the agriculture and mining sectors to manufacturing and service sectors. This development has resulted in pressure on natural resources. The Global Biodiversity Outlook 3 report identified that major pressures on biodiversity were increasing. The five main pressures were biodiversity loss, degradation, and fragmentation of natural habitat, overexploitation of biological resources, pollution, in particular, the build-up of nutrients such as nitrogen and phosphorus, invasive alien species, and climate change and acidification of the oceans. Malaysia faces similar challenges.

Socioeconomic development

Malaysia's socio-economic development stems from the country's rich natural resources. Land-use change, particularly from the agriculture and primary commodities sector, has inevitably resulted in pressure on biodiversity. However, in the past few decades, Malaysia has diversified the economy to focus more on service, production, and manufacturing sectors. This is to ensure that socioeconomic targets are met without jeopardizing the environmental targets.

Rapid urbanization and the accompanying increase road networks have also placed pressure on Malaysia's biodiversity. Statistics show that the proportion of the urban population increased to 75% in 2017 from 62% in 2000, and is projected to increase to 80% by 2030. A greater need for connectivity between urban and rural areas is reflected in the 178,140km of roads by 2016. Such networks require trade-offs in land use and affect forest species. Based on official statistics, a total of 2,444 wildlife have been recorded as roadkill from 2012 to 2017. Of this, threatened wildlife species include tapirs (69), sun bears (6), elephants (4), mountain goats (2), clouded leopards (2), and tiger (1).

In the coastal and marine ecosystems, annual national coral reef surveys conducted have shown signs of declining coral reef health between 2015 and 2018, especially in areas that are not protected. This was indicated by decreasing Live Coral Cover (LCC), high algae occurrence, and a reduction in fish and invertebrate abundance. Though coral health is affected by global factors like climate change, particularly increased sea surface temperature, reduced LCC, and low fish or invertebrate abundance are also associated with an increase in land-based activities.

Unsustainable wildlife management

Poaching from local and foreign intruders remain a threat to Malaysian wildlife. A major driver of poaching is the lucrative illegal trade of wildlife for food and exotic pets. Between 2011 and 2018, the Department of Wildlife and National Parks (DWNP) intercepted 167 cases of wildlife smuggling involving threatened and endangered species such as Malayan tigers, orangutans, pangolins, tortoises, geckos, and various exotic birds. Other valuable plants such as agarwood (*Aquillaria malaccensis* and *Aquillaria hirta*) and the Asian slipper orchids (*Paphiopedilum spp*.), were also illegally harvested and smuggled out of the country. There is also an increasing trend in illicit sales through social media and assorted online platforms.

In the marine environment, coastal fishery resources are threatened by overfishing. The decline in fish stock is driven by the growing demand for seafood and threats associated with Illegal, Unreported and Unregulated (IUU) Fishing. A fisheries assessment conducted by the Department of Fisheries Malaysia (DOFM) in 1997 showed that demersal resources are over-exploited. The 2017 stock assessment confirmed that the majority of the demersal and pelagic fish stocks in the coastal area have been exploited beyond maximum sustainable yield (MSY) and that the depleted stocks have yet to recover. Destructive fishing practices have been documented, especially off the coast of Sabah - with 2,568 reported fish bombing cases between 2010 to 2015.

Other pressures

Other pressures that threaten Malaysia's biodiversity include invasive alien species (IAS), environmental pollution, and climate change. There is an urgent need to build scientific evidence, improve management capacities, and secure financial investment to ensure that a response plan to control and mitigate the effects of these threats is in place.

Figure 2: Some of the endangered flora and fauna in Malaysia. Source: Adapted from The Star Malaysia.

1.3 Implementation of the National Policy on Biological Diversity 2016-2025

The National Policy on Biological Diversity 2016-2025 (NPBD)

Malaysia ratified the United Nations Convention on Biological Diversity (CBD) in 1994. The first National Policy on Biological Diversity was formulated in 1998. At CBD COP 10 in Nagoya, parties to the CBD agreed to formulate respective National Biodiversity Strategy and Action Plans (NBSAPs), which will be aligned to the Strategic Plan for Biodiversity 2010-2020 (Global Aichi Targets). Hence, to align with post-2010 international targets, the 1998 Policy was replaced with the NPBD 2016-2025, which serves as a national blueprint for biodiversity management in the country. The NPBD 2016-2025 contains five (5) goals, seventeen (17) targets and 57 actions that echo the twenty Global Aichi Biodiversity Targets espoused by the CBD. The Policy also specifies the implementation framework, timeline and indicators, monitoring and evaluation mechanism and a table of responsible stakeholders.

Major Stakeholders in Biodiversity

KATS[1] is the federal ministry tasked to spearhead sustainable natural resource management including biodiversity, forestry, water, land, minerals, geoscience, and geospatial matters. The Biodiversity and Forestry Management Division of KATS is the primary custodian of the NPBD and is responsible for coordinating various efforts in biodiversity management. At KATS level, policy direction was formulated to guide programme implementation at the department and agency level. KATS is also the focal point of the CBD, and coordinates efforts and data from all states in Peninsular Malaysia, Sabah, and Sarawak. There are a total of 16 departments and agencies under KATS as listed below.

Departments:

- Forestry Department Peninsular Malaysia
- Department of Wildlife and National Parks
- Department of Irrigation and Drainage
- Department of Biosafety
- Department of Director General of Lands and Mines
- Department of Mineral and Geoscience
- Department of Survey and Mapping Malaysia
- Department of Water Supply
- Department of Sewerage Service
- National Institute of Land and Survey
- National Hydraulic Research Institute Malaysia

Statutory bodies:

- Forest Research Institute Malaysia
- The Land Surveyors Board

[1] KATS is the former Ministry of Natural Resource and Environment (NRE) after the 14th General Election. See Preamble section. Website: http://www.kats.gov.my/

- Tin Industry (Research and Development) Board
- Board of Geologist Malaysia
- National Water Services Commission

Aside from KATS, the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), formed in 2018, is responsible to drive green and efficient energy sector, wealth creation through science and technology, as well as environmental pollution and climate change. The Ministry of Agriculture and Agro-based Industry (MOA) oversees agricultural and fisheries production; where the Department of Fisheries Malaysia (DOFM) under MOA is responsible for the overall aquatic natural resources management including marine parks, genetics studies, distributions and stock assessments, biosecurity and biosafety, rehabilitation, conservation, and resource utilization. The Department is supported by its own Fisheries Research Institute (FRI) and the Southeast Asia Marine Resources Institute (ISMAT). The Ministry of Primary Industries (MPI) focuses on the management of the commodities industry, which includes palm oil, rubber, cocoa, and forestry sectors. To a lesser extent, other relevant ministries involved in the NPBD 2016-2025 include the Ministry of Federal Territories (MFT) which encompasses PLANMalaysia and National Landscape Department; the Ministry of Tourism, Arts and Culture (MOTAC); and the Ministry of Rural Development (KPLB). The central planning agencies which are the Ministry of Economic Affairs and the Ministry of Finance play an important role by maintaining divisions or units that monitor the progress of biodiversity programmes and initiatives at the Federal level.

As enshrined in the Federal Constitution, the states of Sabah and Sarawak have greater autonomy over land and natural resources. The Sabah and Sarawak State Governments possess respective governing structures for forest and biodiversity.

In Sabah, the Ministry of Tourism, Culture and Environment (KePKAS) is the primary ministry for environmental policies. KePKAS works through their agencies – Sabah Forestry Department (SFD), Environment Protection Department (EPD) SabahParks (SP), and Sabah Wildlife Department (SWD). SFD plans and implements the management of the state's forest resources in accordance with the principles of sustainable forest management and carries out forestry research. The EPD was established to protect the environment and enforce environmental laws, whereas the primary function of SP is to manage terrestrial and marine protected areas. Also, SWD is entrusted to regulate, protect and conserve wildlife and its habitats in Sabah. The Sabah Biodiversity Centre (SaBC) was established in 2008 to govern the conservation and utilization of Sabah's biodiversity. Other key state entities including the Yayasan Sabah Group, which manages three major protected areas in Sabah namely Imbak Canyon, Danum Valley, and Maliau Basin, as well as the Department of Fisheries Sabah.

In Sarawak, the Ministry of Urban Development and Natural Resources (MUDeNR) is the primary ministry for environmental policies. MUDeNR works through its agencies - the Natural Resources and Environment Board (NREB), Forest Department Sarawak (FDS), and Sarawak Forestry Corporation (SFC). The management of forests including protected areas and biodiversity is under the jurisdiction of FDS and SFC. The Sarawak Biodiversity Centre (SBC) was established in 1998 and is currently regulating research and development on biological resources for Sarawak.

In addition to government stakeholders, the Malaysian Environmental NGOs (MENGO) comprising of 31 local environmental NGOs was formed in 2001. The mission of MENGO is to serve as an independent platform for Malaysian NGOs and is committed to enhancing the environmental sustainability agenda at the local, national, and international level. Since 2015, the government has also established the Malaysian CSO-SDG Alliance as a network of Civil Society Organizations (CSOs) to support the government in the implementation of Sustainable Development Goals (SDGs). The environmental group is one of three categories of CSOs along with the development and human rights CSOs. The CSOs have been incorporated into the formal mechanism of the government for SDG implementation at the National steering committee, cluster working groups, and in the taskforce.

1.4 Overall actions taken to contribute to the implementation of the Strategic Plan for Biodiversity 2011-2020

Recognizing the importance of biodiversity, Malaysia has continued to safeguard its natural resource by improving and strengthening existing provisions of the policy, legal, and institutional frameworks. Conservation and sustainable use of biodiversity have been emphasized within the context of sustainable development in Malaysia. Furthermore, Malaysia's policy to retain at least 50% of its land under permanent forest cover in perpetuity have contributed to the maintenance and enhancement of global biodiversity and GHG emission control.

During the reporting period, Malaysia is transitioning from the 10th Malaysia Plan (2011-2015) to the 11th Malaysia Plan (2016-2025). The Midterm Review of 11MP (MTR 11MP) continues to focus on environmental sustainability through strengthening governance, improving the conservation of natural resources and biodiversity as well as enhancing resilience against climate change and natural disasters. The implementation of green growth is supported by sectoral policies, namely the NPBD and other national frameworks like the National Agrofood Policy 2011-2020 (NAP) and the National Ecotourism Plan (NEP) 2016-2025.

Malaysia's approach to biodiversity conservation and management is driven by the establishment of protected areas, wherein sites with significant biodiversity and ecosystem values are protected through legal gazettement. For terrestrial, coastal and marine biodiversity, protected areas are in the form of National and State parks, Permanent Reserved Forests (PRFs), nature reserves and wildlife sanctuaries, and Fisheries Prohibited Areas. As of 2016, there are 527 protected areas listed for Malaysia: 275 for Peninsular, 195 for Sabah (including 3 in Federal Territory of Labuan) and 57 for Sarawak. These encompass land areas of approximately 4.35 million ha and 1.51 million ha of marine and coastal areas. Based on this, the terrestrial and marine protected area coverage for Malaysia are 13.2% and 3.3%, respectively.

To address habitat fragmentation, the government launched national projects to establish ecological connectivity in the form of the Central Forest Spine (CFS) initiative, the transboundary Heart of Borneo (HoB), and Coral Triangle Initiative (CTI). Under the CFS initiative, a total of 28,032.63 ha of the ecological corridor have been gazetted as Permanent Reserve Forests by the end of 2018. These gazetted areas are classified as Protection Forests and no commercial forest harvesting is permitted. In addition, boundary demarcation of PRFs and the installation of warning signboards for public notice have been carried out to protect the habitat better and enhance the conservation of wildlife. Similarly, a total of 1,961,653.11 ha

is currently protected within the HoB landscape as of September 2019 (1,423,378.31 ha in Sabah and 538,274.80 ha in Sarawak).

To address species loss and genetic erosion, conservation assessments are conducted to gauge the national status of local species. In 2017, Malaysia conducted an update to the 2010 version of the Red List of Mammals for Peninsular Malaysia. Similarly, Sarawak has produced two series of the Sarawak Plant Red List (Dipterocarpacea) in 2014 and 2016, respectively. In Sabah, the assessment for Red List for Dipterocarpacea (Part 1) is under way and is expected to be available in 2020. The updated Red List effort is synergistic with the long-term 'Flora of Malaysia" Project, which consists of documentation of flora in the three regions of Malaysia.

In terms of legislation, major success includes the passing of the Access and Benefit Sharing Act 2017 to regulate access to genetic resources and ensure equitable sharing of benefits derived from their commercialization. For the first time, the local biodiversity and traditional knowledge of the indigenous peoples and local communities (ILCs) from all three regions of Malaysia are safeguarded by a uniform legal framework. The legal instrument has enabled Malaysia to accede to the Nagoya Protocol in November 2018. Additionally, the Wildlife Conservation Act 2010 was introduced and has since been reviewed twice to include new species into the Schedule List of Protected Species. A major review is ongoing to tackle current issues like the online wildlife trade and the protection of tiger prey species. The Sabah's Wildlife Conservation Enactment 1997 was also reviewed in 2016, to set a higher minimum and maximum penalties for various offences including wildlife poaching and trafficking, as well as to expand the fully protected species list.

Internationally, Malaysia adopted the United Nations' Agenda 2030 for Sustainable Development in September 2016. Since then, Malaysia has made significant progress towards the realization of the SDGs. Biodiversity conservation objectives are embedded within the SDGs because it underpins many economic activities, particularly those related to crop and livestock agriculture, forestry, fisheries, and human wellbeing. The SDGs are consistent with the CBD Strategic Plan for Biodiversity and other multilateral environmental agreements (MEA) (See Table 2).

Table 2: List of Multilateral Environmental Agreements (MEAs) and Reporting Status

No.	Multilateral Environmental Agreement (MEA)	Year of Ratification/ Enter into force	Reporting Status
1	Convention on Biological Diversity	1994	Fifth National Report submitted in 2014, reporting interval every four years.
	- Cartagena Protocol on Biosafety (CPB)	2003	Third national report submitted in 2015, reporting interval every four years.
	- Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization	2019	Malaysia ratified the Nagoya Protocol in 2018. Interim Report is required.
2	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1978	Annual report required, most recent national report submitted in 2017
3	Convention on Wetlands of International Importance (Ramsar Convention)	1995	Reporting takes place during CBD COP, last submitted national report to COP13 in 2018

4	United Nations Framework Convention on Climate Change (UNFCCC) - Kyoto Protocol - Paris Agreement	1994 2002 2016	National Communication every four years and Biennial Update Report every two years. Nationally Determined Contribution. The Third National Communication and Second Biennial Report (NC3/BUR2) was submitted in 2018.
5	United Nations Convention to Combat Desertification (UNCCD)	1997	Second National Report was submitted in 2018, reporting interval every four years.
6	Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal	1994	Annual report required, most recent report submitted for 2017
7	ASEAN Agreement on Transboundary Haze Pollution (AATHP)	2002	Reporting required. Reference to the "Roadmap on ASEAN cooperation towards transboundary haze pollution control with means of implementation."
8	Rotterdam Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade	2004	Reporting not required
9	United Nations Convention on the Law of the Sea (UNCLOS)	1982	Reporting not required
10	Vienna Convention for the Protection of the Ozone Layer Montreal Protocol Substances that Deplete the Ozone Layer	1989	Reporting not required
11	World Heritage Convention	1988	Period Reporting in Asia and the Pacific required. Reporting is compiled by the site manager.
12	Minamata Convention on Mercury	Signed but not ratified	Short reports due every two years, and long reports due every four years.
13	Stockholm Convention on Persistent Organic Pollutants	Signed but not ratified	
14	ASEAN Agreement on the Conservation of Nature and Natural Resources	Signed but not ratified	
15	International Maritime Organization (IMO) - International Convention for the Control and Management of Ships' Ballast Water 2004 (BWM 2004)	Signed but not ratified	

At the regional level, Malaysia participates actively in the ten-country Association of Southeast Asian Nations (ASEAN) Cooperation on Environment. Periodical meetings include the ASEAN Ministerial Meeting on Environment (AMME), the ASEAN Senior Officials on the Environment (ASOEN), ASEAN Ministerial

Meeting on Agriculture and Forestry (AMAF), ASEAN Senior Officials on Forestry (ASOF), ASEAN Senior Officials Meeting on Agriculture and Forestry (SOM-AMAF) and eleven subsidiary bodies/working groups[2]. Capacity building programmes for the ASEAN Member States (AMS) are also supported by the ASEAN Centre for Biodiversity (ACB) based in the Philippines.

1.5 Support mechanisms for national biodiversity implementation

Malaysia is a constitutional monarchy with a parliamentary democracy system. The Federal Constitution is the supreme law of the country providing the legal framework for legislation, courts, and administrative aspects. It also defines the powers of the government and monarchy, as well as the rights of citizens, and the separation of powers amongst the executive, judicial and legislative branches. Other legislative instruments include acts passed in Parliament, regulations, and other subsidiary legislation passed by the executive (Ministerial Regulations), and state laws and regulations.

In terms of terrestrial and freshwater natural resource management, state governments enact their own laws and regulations. In the marine environment, state jurisdiction extends from the low water mark up to three (3) nautical miles. Any area beyond the three (3) n.m. up to the 200 n.m. Exclusive Economic Zone falls under federal jurisdiction (the National Land Code 1965 and Territorial Sea Act 2012). The federal government jurisdiction also extends to marine fisheries, oil and gas operations, as well as any activities concerning the continental shelf.

Following the formation of Malaysia in 1963, the Federal Constitution was amended to include special provisions for the states of Sabah and Sarawak. Several Federal Acts passed by Parliament apply to the two states differently on a number of matters, especially on issues related to land and natural resource management. Therefore, both Sabah and Sarawak have greater autonomy to legislate on such matters. Table 3 provides the key legislation for biodiversity conservation.

[2] The eleven working groups are: i. ASEAN Working Group on Nature Conservation and Biodiversity; ii. ASEAN Working Group on Coastal and Marine Environment; iii. ASEAN Working Group on Water Resource Management; iv. ASEAN Working Group on Environmentally Sustainable Cities; v. ASEAN Working Group on Climate Change; vi. ASEAN Working Group on Chemicals and Waste; vii. ASEAN Working Group on Environmental Education.; viii. ASEAN Sectoral Working Group on Fisheries (ASWGFi); ix. ASEAN Sectoral Working Group on Crops; x. ASEAN Sectoral Working Group on Livestock; xi. ASEAN Working Group on Agriculture Cooperation. Source: The ASEAN Secretariat. "ASEAN Cooperation on Environment – At a glance." Available at: https://environment.asean.org/wp-content/uploads/2019/01/At-A-Glance-Brochure-2019-small.pdf and https://www.asean.org/wp-content/uploads/images/Community/AEC/AMAF/UpdateApr2014/AMAF%20Structure%202014%20as%20of%2019%20Feb%202014.pdf

Table 3: Key legislation related to biodiversity conservation

No.	Legislation	Description
Peninsular Malaysia/Federal level		
1	National Land Code 1965	An act to amend and consolidate the laws related to land and land tenure, the registration of title to land and of dealings therewith and the collection of revenue therefrom within the States of Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Penang, Perak, Perlis, Selangor, Terengganu and the Federal Territory of Kuala Lumpur, and for purposes connected therewith.
2	National Forestry Act 1984	An Act to provide for the administration, management and conservation of forests and forestry development within the States of Malaysia and for connected purposes.
3	National Parks Act 1980	An Act to provide for the establishment and control of National Parks and for matters connected therewith.
4	Wildlife Conservation Act 2010	An Act to provide for the protection and conservation of wildlife and for matters connected therewith.
5	Fisheries Act 1985	An Act relating to fisheries, including the conservation, management and development of maritime and estuarine fishing and fisheries, in Malaysian fisheries waters, to turtles and riverine fishing in Malaysia and to matters connected therewith or incidental thereto.
6	Water Act 1920	An Act to provide for the control of rivers and streams.
7	Land Conservation Act 1960	An Act relating to the conservation of hill land and the protection of soil from erosion and the inroad of silt.
8	International Trade in Endangered Species Act 2008	An Act to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora and to provide for other matters connected therewith.
9	Animals Act 1953	An Act to amend and consolidate the laws for preventing the introduction into, and the spreading within, Peninsular Malaysia of diseases of animals; for the control of the movement of animals into, within and from Peninsular Malaysia; for the control of the slaughter of animals; for the prevention of cruelty to animals; for measures pertaining to the general welfare, conservation and improvement of animals in Peninsular Malaysia; and for purposes connected therewith.
10	Environmental Quality Act 1974	An Act relating to the prevention, abatement, control of pollution and enhancement of the environment, and for purposes connected therewith.
11	Plant Quarantine Act 1976	An Act to amend and consolidate the laws relating to the control, prevention and eradication of agricultural pests, noxious plants and plant diseases and to extend co-operation in the control of the movement of pests in international trade for matters connected therewith.
12	Pesticides Act 1974	An Act to control pesticides.
13	Drainage Works Act 1954	An Act relating to drainage works.
14	Biosafety Act 2007	An Act to establish the National Biosafety Board; to regulate the release, importation, exportation and contained use of living modified organisms, and the release of products of such organisms, with the objectives of protecting human, plant and animal health, the environment and biological diversity, and where there are threats of irreversible damage, lack of full scientific evidence may not be used as a reason not to take action to prevent such damage; and to provide for matters connected therewith.

15	Access to Biological Resources and Benefit Sharing Act 2017	An Act to implement the Convention on Biological Diversity and any protocol to the Convention dealing with access to biological resources and traditional knowledge associated with biological resources and the sharing of benefits arising from their utilization and for matters connected therewith.
16	Malaysian Quarantine and Inspection Services Act 2011	This Act provides for Malaysian Quarantine and Inspection Services (MAQIS) and appoints a Director General and a Deputy Director General of Quarantine and Inspection. Function of the Director General is to enforce all written laws that are related to ensure that the plants, animals, carcass, fish, agricultural produce, soils, microorganisms and food that are imported into and exported out of Malaysia comply to the health aspect of human, animals, plants, fish and food safety.
17	Taman Negara (Kelantan) Enactment [No. 14 of 1938]	An Enactment to provide for the dedication of certain lands in Kelantan as part of the Taman Negara National Park.
18	Taman Negara (Pahang) Enactment 1939 [No. 2 of 1939]	An Enactment to provide for the dedication of certain lands in Pahang as part of the Taman Negara National Park.
19	Taman Negara (Terengganu) Enactment [No. 6 of 1939]	An Enactment to provide for the dedication of certain lands in Terengganu as part of the Taman Negara National Park.
20	Johor National Parks Corporation Enactment 1989	Gazettement and management of protected areas in the State of Johor
21	Perak State Parks Corporation Enactment 2001	Gazettement and management of protected areas in the State of Perak
22	Terengganu State Parks Enactment 1986	Gazettement and management of protected areas in the State of Terengganu
23	Malaysian Forestry Research and Development Board Act 1985	An Act to establish the Malaysian Forestry Research and Development Board, for the administration of a fund for the purpose of financing research and to provide for matters connected therewith.
24	Town and Country Planning Act 1976 [Act 172]	An Act for the proper control and regulation of town and country planning in Peninsular Malaysia and for purposes connected therewith or ancillary thereto.
25	Malaysian Maritime Enforcement Agency Act 2004	An Act to establish the Malaysian Maritime Enforcement Agency to perform enforcement functions for ensuring the safety and security of the Malaysian Maritime Zone with a view to the protection of maritime and other national interests in such zone and for matters necessary thereto or connected therewith.
26	The Fisheries Development Authority Act 1971	This act regulates the marketing of fish particularly through licensing of wholesalers, retailers, fish processors, importers and exporters. It also regulates or control the movement of fish especially at the exit point in Sabah and Sarawak for the purpose of import and export of fish and fishery products (that are not covered by MAQIS).
27	Merchant Shipping Ordinance 1952	This act regulates pollution prevention measures and other marine environment related legislations, notice, international rules and publications by commercial ships/ vessels including specific penalty section environmental damage.
28	Continental Shelf Act 1966	This act regulates the exploitation of the living natural resource (sedentary species) of the continental shelf.
29	Exclusive Economic Zone Act 1984	This act regulates the protection and preservation of the marine environment as well as marine scientific research activities and establishment and use of artificial islands, installations and structures. Without authorization no person shall in the exclusive economic zone

		or on the continental shelf shall explore or exploit any natural resources whether living or non-living.
30	Irrigation Areas Act 1953	An Act relating to the establishment and regulation of irrigation areas in Malaysia.
31	Protection of New Plant Varieties Act 2004	An Act to provide for the protection of the rights of breeders of new plant varieties, and the recognition and protection of contribution made by farmers, local communities and indigenous people towards the creation of new plant varieties; to encourage investment in and development of the breeding of new plant varieties in both public and private sectors; and to provide for related matters.
Sabah		
1	Environment Protection Enactment 2002	An Enactment to make provisions relating to the protection of environment and for matters connected therewith and incidental thereto.
2	Sabah Land Ordinance (Cap. 68)	The main legislation in Sabah for the classification of land and the provision of rights and titles over land. The Ordinance also governs matters relating to the collection of revenue, land survey and demarcation, enforcement and penalties for offences related to land and land ownership.
3	Sabah Animal Ordinance 1962	An Ordinance to amend and consolidate the law for preventing the introduction into and the spreading within Sabah of diseases of animals and birds and for the improvement of animals; and for matters incidental thereto and connected therewith.
4	Sabah Forest Enactment 1968	An Enactment to repeal and replace the law relating to the preservation of forests and the regulation and control of dealings in forest produce; and for matters connected therewith and incidental thereto.
5	Parks Enactment 1984	An Enactment to repeal and re-enact the law relating to the provision and control of National Parks and National Reserves in Sabah and to provide for matters incidental thereto and connected therewith so as to make better provisions respecting the constitution, administration, procedure, functions and finance of Parks.
6	Sabah Biodiversity Enactment 2000	An Enactment to establish the Sabah Biodiversity Council and the Sabah Biodiversity Centre and for purposes of regulating access to biological resources.
7	Wildlife Conservation Enactment 1997	A Sabah state legislation established to protect the endangered flora and fauna in the region as well as control international trade of these species.
Sarawak		
1	Natural Resources and Environment Ordinance 1993, Chapter 84	An Ordinance to establish Natural Resources and Environment Board (NREB) and for the purpose relating to conservation and management of natural resources and protection of the environment.
2	Sarawak Biodiversity Centre Ordinance 1997	An Ordinance to establish the Sarawak Biodiversity Council and the Sarawak Biodiversity Centre and for purposes of regulating R&D on biological resources and undertaking research and development and documentation of the traditional uses of biological resources by the native communities in Sarawak.
3	Forest Policy Sarawak 1954	A policy that is responsible for Sarawak forests in terms of forest reserves, and management of productive forests.
4	Forest Ordinance 2015	An Ordinance to provide for the protection and management of forests in Sarawak and to regulate the taking of forest produce and for matters connected therewith.

5	Sarawak Forestry Corporation Ordinance, 1995	An Ordinance to establish and incorporate the Sarawak Forestry Corporation, to provide for its functions and powers, and for matters connected therewith
6	National Parks and Nature Reserves Ordinance 1998	An Ordinance for the constitution and management of National Parks and Nature Reserves and all matters incidental thereto.
7	Wild Life Protection Ordinance 1998	An Ordinance to provide better provisions for the protection of wild life, the establishment and management of Wild Life Sanctuaries and all matters ancillary thereto.
8	Sarawak Research and Development Council Ordinance 2017	An Ordinance to establish the Sarawak Research and Development Council for the initiation, promotion, co-ordination and advancement of research and development in Sarawak.

The government remains the major source of funding for biodiversity through annual development and operating budgets. To supplement this and ensure funds are used specifically for biodiversity conservation, the National Conservation Trust Fund (NCTF) was established in 2015 and is administered by KATS. In addition, there are other environmental and biodiversity-related trust funds managed by respective agencies including the Marine Reserve and Park Trust Fund managed by the DOFM, the Biodiversity Conservation Trust Fund administered by DWNP, and the Department of Environment Trust Fund for Promoting Environmental Awareness and Education. Notably, MESTECC also maintains a suite of funds to promote scientific research and ideation, which include the Science Fund and Inno Fund. In Sabah, the Forest Community and Forest Rehabilitation Funds are maintained by SFD to restore degraded forest reserves and to support community projects within or adjacent to forest reserves. In Sarawak, the Wildlife Conservation Trust Fund was set up in 2015 and administered by SFC to receive tax-exempted donations from individuals, institutions or any other entities for carrying out research, development, management or protection of wildlife. Aside from government funding, the Global Environment Facility (GEF) also contributes significant funding to build government capacity through supporting projects in the thematic areas of biodiversity, climate change, land degradation, international waters, and chemical waste since the mid-1990s.

CHAPTER 2 MALAYSIA NATIONAL BIODIVERSITY TARGETS AND ACTIONS – IMPLEMENTATION PROGRESS AND STATUS

National Policy on Biological Diversity 2016-2025 (NPBD) – A Background

Launched in 2016, the NPBD has five (5) overarching goals encompassing stakeholder empowerment, reducing pressures on biodiversity, safeguarding ecosystems, species, and genetic diversity, ensuring fair and equitable sharing of benefits from the utilization of biodiversity and building the capacity of all stakeholders. Seventeen (17) national targets support the five (5) goals. The targets address all key facets of biodiversity conservation including awareness-raising, mainstreaming biodiversity, strengthening protected areas, preventing the extinction of species and addressing invasive alien species (IAS). The targets also address capacity building, establishing a scientific basis as well as biodiversity financing.

Each target is accompanied by a set of actions and accompanying indicators. There is a total of 57 actions in this Policy. The lead agencies and key partners for implementing each of the actions have also been identified. The NPBD timeframe is for the period 2016 – 2025. The implementation of the Policy is divided into four phases, coinciding with the Malaysia Plans and their mid-term reviews. Figure 3 shows the breakdown of the NPBD goals and targets.

The Biodiversity Baseline Study was completed in 2018 which established the baseline information on seven (7) NPBD indicators, i.e., Indicator 1.1 (public awareness on biodiversity), Indicator 2.2 (number of collaborative projects with civil society), Indicator 2.3 (number of collaborative projects with private sector), Indicator 5.3 (number of indigenous peoples and local communities actively participating in ecotourism), Indicator 6.3 (number community conserved areas), Indicator 10.1 (resources for enforcement) and Indicator 11.1 (public awareness on Invasive Alien Species). 6NR will focus on reporting the progress status and achievements of the NPBD targets based on the 57 indicators.

This chapter details progress made to each NPBD target by describing key initiatives for each specified action. The section is immediately followed by the assessment of indicator progress status based on the CBD Global Biodiversity Outlook 4 dashboard (See Table 16). A summary table of implementation progress is included at the end of Chapter 2 (Table 18).

Figure 3: The National Policy on Biological Diversity (2016-2025) contains 5 goals and 17 targets as Malaysia's aspiration to deliver CBD objectives.

NPBD Targets and Actions Implementation Status and Progress

Target 1: By 2025, more Malaysians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

In keeping with Malaysia's commitment to conserving its biological diversity, Target 1 was envisioned to raise awareness across all segments of society, nurture youth participation as well as engagement with legislature and judiciary. Behaviour change across all segments of society is crucial to address the underlying drivers of biodiversity loss. Hence, improving public awareness across the country is vital to account for the value and promote sustainable use of biodiversity.

Action 1.1 Create awareness across all segments of society

Communication, Education and Public Awareness (CEPA) programmes are usually carried out to promote awareness on biodiversity issues to the public. Such programmes are usually embedded in the annual plans of related government agencies and organized in partnership with the private sector and NGOs. Among the biodiversity awareness activities implemented include environmental camps, nature walks, talks, exhibitions, quizzes, workshops, seminars, tree-planting, and radio shows especially in conjunction with commemorative events such as International Day of Forest (21 March), Earth Day (22 April), World Environment Day (5 June), World Wetlands Day (2 February), World Oceans' Day (8 June).

To complement these activities, key biodiversity agencies maintain nature education and interpretation centres (Table 4) to educate the public. Several local NGOs have also taken initiative to create similar nature education centres. For example, MNS maintains a network of Environmental Education Centres across Peninsular Malaysia in both urban and natural settings to promote awareness and engage the public in environmental discussions. This includes the FRIM-MNS Nature Education Centre in Kepong, Ecocare Environmental Education Centre in Kerteh, Environment Interpretive Centre in Sepang, Urban Environment Education Hub in Kuala Lumpur, the BOH Nature Study Centre in Cameron Highlands, and Belum Discovery Centre.

Table 4: List of Education Centre/ Interpretive Centre maintained by key biodiversity agencies.

No	Agency	No. of Education / Interpretation Centre	Location
1	Department of Wildlife and National Parks (DWNP)	9	Peninsular
2	Forestry Department Peninsular Malaysia (FDPM)	13	Peninsular
3	Department of Fisheries (DOF)	23	Peninsular
4	Perak State Park Corporation (PSPC)	1	Peninsular
5	Johor National Park Corporation (JNPC)	4	Peninsular
6	Sabah Forestry Department (SFD)	27	Sabah
7	Yayasan Sabah	4	Sabah
8	Sabah Parks (SP)	7 (5 terrestrial parks, 2 marine parks)	Sabah

9	Sabah Wildlife Department	1	Sabah
10	Sarawak Forestry Corporation (SFC)	10	Sarawak

In Malaysia, citizen engagement in biodiversity monitoring and conservation efforts has increased in recent years. An example of such efforts is the establishment of the "Rakan Alam Sekitar" (RAS) or Friends of Environment Programme initiated by the Department of Environment (DOE) in 2009. RAS' objectives are to build awareness, mobilize society in rehabilitation and restoration as well as environmental monitoring. In addition to monitoring and reporting environmental infringements, RAS hosts more than 10 programmes annually to inspire a love for nature through nature-based activities. By the end of 2018, RAS has registered more than 300,000 members of the public.

Citizen science has also seen a rise in Malaysia. For example, in 2018, the International City Nature Challenge was held for the first time in ten Klang Valley urban areas, facilitated by academia and civil society affiliated with Universiti Malaya. Other citizen science activities include annual bird count events across Malaysia. For example, the MyGarden Bird Count, Raptor Watch in Port Dickson; Kenyir Bird and Nature Quest in Terengganu; Wings of Kuala Kubu Bharu in Selangor; Fraser's Hill International Bird Race; Borneo Bird Festival in Sabah; the Sarawak International Bird Race; and the Taman Negara Bird Count. Such annual events engage the public in spotting and counting birds while contributing to the avifauna database. In Sabah, citizen science programmes are exemplified by the involvement of ILCs in protecting and monitoring their rivers from pollution.

The annual international Kuala Lumpur Eco Film Festival (KLEFF) has been an important platform to showcase biodiversity to the public. Conceived in 2008, KLEFF is a week-long film festival screening selected movies and documentaries from around the world on environmental issues. KLEFF has reached out to over 100,000 Malaysians through its film screenings and other programmes outside of the festival such as the Green Market, Film Making Workshops, and Green Vibes – all which continuously promote the environmental cause to the public. The Sabah Eco Film Festival has also been active since 2011.

Indicator 1.1: By 2025, the level of public awareness on the importance of biodiversity has doubled compared to the 2016 level.

Status: Progress towards target but at an insufficient rate
The nation-wide Biodiversity Baseline Study completed in 2018 found that 91% of Malaysians had a poor understanding of biodiversity and its importance. Notably, the majority of the population with a higher level of understanding are students. With the baseline established, the National CEPA Action Plan on Biodiversity is being drafted to streamline future CEPA programmes for biodiversity.

Action 1.2 Nurture participation amongst children and youth

In pursuing the aim to raise environmental awareness among children, the curriculum for Environmental Education (EE) has been adopted since the 1990s in primary and secondary schools. EE is incorporated as part of lesson plans for several subjects including moral, religious studies, biology, and life skills. The teachers responsible for delivering these subjects have undergone training in EE at the Teacher Training Institute. Subsequently, the EE Training Module has been developed and distributed to schools to support teachers.

To complement government efforts on EE, WWF Malaysia introduced the international Eco-school and Eco-campus Programme (EEP) established by the Foundation for Environmental Education (FEE) to Malaysian schools since 2011. The Programme guides schools and campuses towards sustainable pathways through a series of environmental actions. It currently supports close to 200 schools in Malaysia. Apart from nurturing young leaders for the environment, the EEP also fosters networking under the annual Eco-school Conference, which gathers youths from the global Eco-school network in Malaysia for exchange and lesson sharing. WWF Malaysia is currently working in close collaboration with the Ministry of Education to develop extra-curricular activities with environment and biodiversity focus.

Besides EE, the Sustainable School Environment Award (SLAAS) Programme was introduced by the Ministry of Education (MOE) and the Department of Environment (DOE)) to all primary and secondary schools as an incentive for students and teachers to create a green school environment and cultivate environmentally conscious behaviours. At the national level, LESTARI was introduced by the DOE to promote environmental awareness and behaviour in schools. In Sabah and Sarawak, the "School of Friends of the Environment" (Sekolah Rakan Alam Sekitar – SERASI) campaign has been implemented to recognize efforts made by schools towards environmental protection.

Conservation volunteerism is another powerful way to engage young people to develop their capacity and skills to become active leaders and citizens. The "Voluntourism" programme was introduced by the Ministry of Tourism (MOTAC) to engage volunteers in cleaning up tourism destinations. Another example is the Citizen Action for Tigers (CAT) Walk initiated by the Malaysian Conservation Alliance for Tigers (MYCAT) – focused exclusively on conservation of tigers, their prey species, and their habitats. CAT Walk is held twice a month, during which volunteers patrol the Sungai Yu Wildlife Corridor. The corridor connects the greater Taman Negara landscape with the Titiwangsa range. Volunteers dismantle snares, report illegal logging activities and encroachment within the forest reserves. Reef Check Malaysia trains certified divers as 'EcoDivers' which enables them to participate in Reef Check surveys that are conducted annually around the country. Data collected from these surveys are channeled into a global dataset that is used to monitor reef health. Other volunteering opportunities are hosted mainly by NGOs like WWF-Malaysia, Malaysian Nature Society (MNS), Global Environment Centre (GEC), and Tropical Research and Conservation Centre (TRACC).

Many government agencies conduct routine awareness campaigns in relation to their functions. In Peninsular Malaysia, apart from the MOE and DOE, the Department of Wildlife and National Parks (DWNP), the Forestry Department Peninsular Malaysia, and the Forest Research Institute of Malaysia (FRIM) and various municipal councils are active in environmental and wildlife education. For example, in 2017, DWNP conducted public awareness programmes in a total of 51 schools with 1,785 participants through various activities including the Biodiversity Education Programmes, local community outreach programmes, site visits, exhibitions, and talks. In Sabah, the Sabah Forestry Department (SFD), the Sabah Wildlife Department (SWD), Sabah Parks (SP) and the Department of Environment have been instrumental in EE programmes. For Sarawak, key government agencies include the Forest Department Sarawak (FDS), Sarawak Forestry Corporation (SFC), Ministry of Tourism, and local municipal councils.

In Sabah, the Sabah State Government has launched the Sabah Environmental Education Policy (SEEP) to guide EE programmes since 2009. The Policy implementation is overseen by the Sabah Environmental Education Network (SEEN) with periodic monitoring of the policy implementation. The Sabah State Government also established the Sabah Nature Club (SNC) under the Yayasan Sabah to promote interest and knowledge about wildlife, forest, and the environment among the youths in Sabah. In addition, the annual EE Race is held, targeting primary and secondary school principals to deepen teacher's knowledge and appreciation for the environment. For students, an environmental education programme for pre-school and primary school students - the KEEDS programme - has been implemented since 2009. In addition, the Wildlife Conservation Education and Awareness Outreach Programmes are implemented in primary and secondary schools across Sabah. All these programmes are implemented in collaboration with the private sector and civil society.

Similarly, in Sarawak, the state government has run the Environmental Education Nature Camp for School Children since 2001 through inter-agency partnerships. The Nature Camp is managed by the Nature Camp Committee comprising of various state agencies.

Indicator 1.2: By 2025, at least 500,000 youths and children are participating in nature-based activities annually.

Status: On track to achieve target

There are more than 300,000 active registered members of the RAS programmes administered by the Department of Environment by 2018. In addition, the Malaysian Nature Society (MNS) maintains and supports its flagship Nature Lover's Club (Kelab Pencinta Alam) as a key extra-curricular programme in public schools. As of 2018, more than 400 schools and nearly 20,000 students in Malaysia are members.

A school nature education programme as part of the Rimba Project at the Rimba Ilmu Botanic Garden, Universiti Malaya. Photo credit: star2.com

Action 1.3 Engage with the legislature and judiciary

The body of legal practitioners in Malaysia, the Malaysian Bar Council, established the Environment and Climate Change Committee (ECC) in 2011. ECC is responsible for environmental issues, climate change, and public health. One key priority of the ECC is to push for the introduction of environmental legal doctrines into Malaysian courts, such as inter-generational responsibility and environmental justice, which counters the usual device of legal personality and capacity. ECC has formed six working groups, one of which is the Ecological Sustainability and Renewable Energy Working Group[3].

For the judicial sector, Malaysia has established the National Judicial Working Group on Environment in 2015 as a result of our participation in the ASEAN Chief Justices' Roundtable on Environment. The Working Group is tasked to conduct environmental programmes at the state and district levels across the country. In January 2016, Special Environmental Courts for civil matters were established throughout Malaysia in which the High Courts, Sessions Courts and Magistrates' Courts in all thirteen (13) states have been assigned to hear civil environmental cases. Since then, the Judiciary and Legal Training Institute has also integrated specific trainings on environmental law. This special environmental court framework has been emulated in Sabah and Sarawak.

Rimba, WWF Malaysia and TRAFFIC Southeast Asia have provided support to build the capacity of the government agencies in the prosecution of wildlife offences. This is to enhance the prosecution rate of offenders. For example, a Snare Reference Manual has been prepared which catalogues and documents trapping and snaring techniques to serve as reference material for prosecution officers. Besides the development of handbooks and manuals, training workshops have been organized to enhance the knowledge of wildlife crime evidence handling and case preparation for judges and prosecution officers. International experts were invited to promote exchange and knowledge sharing in wildlife crime prosecution through the Justice for Silent Victims project.

Indicator 1.3: By 2021, the Parliamentary Environmental Caucus has been established.

Status: On track to achieve target
On 17th October 2019, lawmakers approved the formation of the Special (Parliamentary) Select Committee on Science, Innovation and Environment[4].

[3] The other working groups are Nuclear Energy Working Group; Green House Gas Emissions Working Group; Intervention and Strike Force Working Group; Law Reform Working Group, and Education and Training Working Group. Source: The Malaysian Bar Council.

[4] Four new Parliament Special Select Committees formed
Source: https://www.thestar.com.my/news/nation/2019/10/17/four-new-parliament-special-select-committees-formed#ipQo2MwcfP2gw3yz.99

Target 2: By 2025, the contributions of indigenous peoples and local communities, civil society and the private sector to the conservation and sustainable utilisation of biodiversity have increased significantly.

Securing greater buy-in to conserve biodiversity requires the engagement of all segments of society. This can be achieved through partnerships and collaborations between key stakeholders. Target 2 highlights the need for recognition, support, and empowerment of key stakeholders especially ILCs, civil society, and the private sector in biodiversity conservation.

Action 2.1 Recognise, support and empower indigenous peoples and local communities

The indigenous and local communities (ILCs) often live in and around natural areas[5]. The indigenous peoples of Peninsular Malaysia are collectively known as *Orang Asli* while *natives* or *Anak Negeri* refer to indigenous peoples in Sabah and Sarawak. The main economic activities for ILCs are agriculture, eco-tourism and traditional artisanal activities such as fishing, non-timber forest products, and medicinal plant collection. The Department of Orang Asli Development (JAKOA) is the main government agency in Peninsular Malaysia responsible for improving the welfare of the *Orang Asli*. In Sabah and Sarawak, the development of ILCs is under the purview of the respective state governments. Increasingly, assistance is being provided to indigenous communities in the form of entrepreneurial training, capacity building to increase their participation in sectors including ecotourism and small industries such as handicrafts to enhance their participation as a custodian of the forest.

To incentivize nature protection by the ILCs, initiatives such as the "Prosperous Village of the 21st Century" programme is being implemented. In the 2019 Budget Speech, programmes to support and empower ILCs in environmental management in collaboration with the United Nations Development Programme (UNDP) was announced. Other government initiatives include the nation-wide tree replanting programme in coastal areas implemented since 2005. The programme has actively engaged ILC participation in tree replanting, coastal area restoration, and ecotourism development. Between 2014-2018, a total of 312 awareness campaigns were conducted nationwide under this programme, empowering a total of 64,450 participants from various communities (See Table 5). The initiative has also actively engaged and funded civil society including CBOs through allocating approximately 10% of the annual funds to local NGOs and CBOs including PIFWA, Jaring, Sahabat Hutan Bakau in Sitiawan, Kuala Gula and Setiu. The replanting project has given rise to community engagement on mangrove replanting, especially the "Friends of Mangrove" network. Several communities (Kuala Gula in Perak, Northern Selangor Peat Forest, Selangor and Setiu, Terengganu) have successfully developed and are currently operating ecotourism activities as a result of their involvement in mangrove rehabilitation.

[5] The diverse indigenous groups make up approximately 13.8% of the total Malaysian population.

Table 5: Number of awareness programmes and participants from the National Coastal Forest Replanting Programme. Source: FDPM

	2014	2015	2016	2017	2018
Awareness programmes	42	52	83	76	59
Number of participants	8,705	5,948	11,443	26,793	11,561

Community-based Natural Resource Management is widely carried out, especially in Sabah. Sabah community-based NGO, PACOS Trust has been working to empower indigenous communities since 1987 through systematic building and strengthening of community organization. Some of the key efforts of PACOS includes ensuring active participation of ILCs in regulating and protecting access to biological diversity and indigenous knowledge and advocating on development related issues faced by ILCs. PACOS has also established a network of Community Learning Centres (CLC) which are education centres for sustainable development and traditional knowledge for children and community members. Currently, there are 25 CLCs in Sabah and three (3) in Sarawak, mainly in the Upper Baram areas, with the Penan communities.

Since 2014, the Sabah EU-REDD+ Project has been implemented to enhance the capacity to engage local communities in forest management and rehabilitation effectively. To date, the Project has engaged with 271 households in ten (10) villages in Gana, Kota Marudu, 152 households in five (5) villages in Kinabatangan, and 70 households in three (3) villages in Bundu Tuhan on community development activities. The initiative promotes community forestry through co-management of designated forest compartments and supports alternative livelihoods for the communities. The Project also emphasizes on women empowerment through capacity building (exposure to sustainable organic farming and homestay) and awareness programmes through facilitated peer group learning from other established women groups. Similarly, a public-private-community pilot project on Payment for Ecosystem Services (PES) in the Babagon Water Catchment has been initiated by Yayasan Hasanah in partnership with government and local CBOs. The project aims to build the capacity of local communities to understand resource governance, community empowerment and socio-economic opportunities associated with maintaining the clean water supply. Further, to streamline support for ILCs, the international ICCA Consortium has supported a three-year initiative to increase the resilience of ILCs' customary institutions and natural resource stewardship systems through constructive engagement with decision-making processes since 2014. The project supports communities[6] in five (5) villages and is part of the global Community Conservation Resilience Initiative elaborated in Chapter 5.

The Fifth National Report featured the success of the "*tagal*" system for community-based resource management of the inland fish population established since 2000. The community co-management partnership[7] with the state authority promotes greater awareness for the conservation of freshwater resources, income generation and empowerment of ILCs in the state. This partnership is based on Section

[6] This project involves 5 communities from different parts of Sabah, each facing different issues: the Sungai Tombonuo ethnic group from Sungai Eloi, Dusun ethnic group from Terian and Kiau, Murut Tahol from Alutok Ulu Tomani, and Dusun Rumanau ethnic group from Mangkawagu.

[7] The Tagal system is acknowledged under the Inland Fisheries and Aquaculture Enactment 2003 in Sabah.

58 of the Sabah Native Courts Rules of 1995 (Native Customary Law) and Section 36 of the Sabah Inland Fisheries and Aquaculture Enactment 2003. To date, there are more than 600 *Tagal* zones in nearly 200 rivers in 17 districts in Sabah. Subsequently, the *tagal* principle was extended to other areas such as rice-field water canals, brackish water rivers, and coastal waters. To increase the benefits to the local communities, the state government has introduced ecotourism initiatives in some successful *Tagal* sites. Similarly, the marine ecosystems also benefitted from the *tagal* principle through the implementation of fisheries refugia as well as *tagal* for sea cucumber in 2011 aimed to protect and restore the population of sea cucumber in Sabah. The success of *tagal* model has since been replicated in the states of Sarawak and Pahang. In Sarawak, the "*tagang*" system is enforced through a customary law ('*Peraturan dan Undang-Undang Kecil Tagang'*), established by the local communities. These laws are recognized by the Department of Agriculture Sarawak and further endorsed by the respective district officers. The Department of Agriculture Sarawak is currently conducting fish assessments to identify high conservation value rivers for setting up *Tagang* systems in the Rajang delta, Baleh and Kubaan Puak. Currently, there are 126 *tagang* in Sarawak.

Figure 4: ILCs children in Sabah posing with the fish catch from their community tagal during the open season. Photo credit: MyBis

In Sarawak, the State Government recognizes the participation of ILCs in managing protected areas and wildlife. The Honorary Wildlife Ranger is a volunteer-based programme to involve locals as the eyes and ears of the government and also tasked to conduct CEPA programmes. For protected areas, Special Parks Committee (for national parks and nature reserves) and the Special Wildlife Committee (for wildlife sanctuaries) are formed with selected members of the communities as committee members to ensure the participation in managing these areas. In recognition of the importance of community engagement,

the Sarawak Government has amended the Biodiversity Centre (Amendment) Ordinance, 2014 and its Regulations 2016 to incorporate among other, provisions of Free, Prior, and Informed Consent (FPIC) in regulating Access and Benefit Sharing. Some of the working models in community-based resource management are the FORMADAT (Alliance of Indigenous Peoples of The Highlands of Borneo) and community representative committees in Kubaan Puak, Ba'Kelalan, and Long Semadoh.

The adoption of Ecosystem Approach to Fisheries Management (EAFM) by the Department of Fisheries Malaysia has incorporated the community-based resources management at the national level. The EAFM approach also has been adopted into the Extension Strategic Plan 2018-2030 to empower the local communities in the management of aquatic resources in Malaysia. In December 2017, the myKP (my Fisheries Communities) was launched to promote community-based volunteer programmes and to instill the importance of protecting and conserving the aquatic natural resources in our waters especially in the Freshwater Protected Area (FPA) and Marine Protected Areas (MPA). Similarly, there are a number of EAFM Demonstration sites established in the states of Sabah, Sarawak, Perak, Kedah, Selangor, and Terengganu.

Indicator 2.1: By 2021, policy and legal provisions to empower indigenous peoples and local communities to be custodians of biodiversity have been developed.

Status: Progress towards target but at an insufficient rate

The concept of Community Conserved Areas (CCAs) has been recognized in several policy documents including the National Physical Plan, the Sabah Biodiversity Strategy 2012-2022, and the NPBD. However, a systematic approach and legal provisions to empower ILCs as custodians for natural resources have yet to be developed at the national level. At the state level, Sabah has paved the way for ICCA recognition, with 3,384 ha which includes the Bundu Tuhan Native Reserve (884 ha) and Sg. Pin Conservation Area (2,500 Ha).

BOX 1

Empowering NGO to Manage Wetland – Kuala Selangor Nature Park

In 1940, mangrove virgin forest was found in Kuala Selangor. However, the land was cleared for salt plains from 1965 to the 1970s. Further development continued whereby a marina, shrimp farm and golf course were constructed within the mangrove ecosystem. The Malayan Nature Society (now the Malaysian Nature Society) and the Asian Wetlands Bureau (now Wetlands International) conscious of the area's conservation value, petitioned for a protected area to the Selangor state. The Kuala Selangor Nature Park was established in September 1987. The Selangor State Government has also granted the Malaysian Nature Society (MNS) management rights of KSNP under a cooperative arrangement. KSNP remains to be the first and only park to be managed by an NGO in Malaysia. In 1997, the Kuala Selangor Nature Park was recognized as a nature reserve for conservation and ecotourism, and is recognized as an Important Bird Area (IBA) by Birdlife International.

The park which is located at the mouth of the Selangor River, covers 653 ha of mangroves, mudflats, forests and lakes. KSNP contains three distinct habitats including secondary forest, mangrove forest and a man-made brackish water lake system. The area hosts various wildlife such as smooth otters (*Lutra perspicillata*), longtailed macaques (*Macaca fascicularis*) and silvered leaf monkeys (*Trachypithecus aurata*). More than 140 species of birds have been sighted in KSNP, including Nordman's greenshank *Tringa guttifer* and the mangrove Pitta (*Pitta megarhyncha*). The park is also the site of the milky stork (*Mycteria cinereal*) reintroduction programme. Fireflies inhabit the Sonneratia trees lining the Selangor River near Kampong Kuantan. This has generated income for the locals through ecotourism.

Recently, MNS has initiated the process for KSNP to be accorded RAMSAR site. KSNP continues to receive support from state government, local authorities and private sector for the preservation nature in the park.

Figure 5: Kuala Selangor Nature Park, co-managed by the Malaysian Nature Society and the Selangor State Government is an established nature education centre for mangroves. It is example of state government's empowerment of civil society in the management of a protected area.

Action 2.2 Recognise, support and empower civil society

In Malaysia, NGOs and civil society play an essential role in public environmental education and complementing government roles in biodiversity conservation. NGOs have been engaged in a range of activities including environmental monitoring, enforcement and patrolling and capacity-building[8]. Examples include the institutionalization of SDG-CSO Alliance, National Biodiversity Roundtable (NBR), the routine collaboration to implement programmes such as annual reef surveys, wildlife inventories, scientific research, tree replanting programmes[9], and CEPA activities. NGOs and civil society actively contribute to the formulation of the five-year development plan in the area of green growth and environmental sustainability.

Indicator 2.2: By 2025, the number and/or size of collaborative projects with civil society have doubled compared to the 2016 level.

Status: Progress toward target but at an insufficient rate
The Biodiversity Baseline Study showed that environmental NGOs have at least one (1) project implemented in collaboration with the government. Although the majority of NGOs actively engage with government partners, there is currently no systematic registry of civil society and government collaborative projects. However, there has been an increasing trend of engaging with civil society. In the recently announced Budget 2020, the government has allocated RM 15 million NGOs for conservation efforts.

Action 2.3 Develop sustained collaborations with the private sector

Private sector contributions towards biodiversity objectives have been increasing through Corporate Social Responsibilities (CSR) programmes. Bursa Malaysia (Malaysian stock exchange) published a framework for CSR reporting and practices for listed companies has made it mandatory for listed companies to disclose and report CSR-related activities in their annual reports since 2007. In 2010, Bursa Malaysia also launched its Business Sustainability Programme, aimed at encouraging listed companies to integrate sustainability into their business strategies. The programme publishes guidance for company directors and hosts an online Sustainability Knowledge Portal. CSR is encouraged through various incentives, including tax relief for businesses demonstrating good CSR. In December 2014, Bursa Malaysia and FTSE launched an Environmental, Social and Governance (ESG) index - the FTSE4GOOD Bursa Malaysia Index - to support investors in making ESG investment, encourage best practice disclosure and ensure a

[8] Rai Singh, H. and Abdul Rahman, S. 2012. An Approach for Environmental Education by Non-Governmental Organizations (NGOs) in Biodiversity Conservation. Procedia - Social and Behavioral Sciences 42. Available at: https://ac.els-cdn.com/S1877042812010579/1-s2.0-S1877042812010579-main.pdf?_tid=d3828356-3e45-4a7a-8920-7e1db1871b82&acdnat=1551064585_dbfa2128be220d7de32e0f5ec64178b5

[9] between 2017-2018, the Forestry Department Peninsular Malaysia has engaged several NGOs in forest restoration programme which involved RM 300,000 allocated to five (5) NGOs to replant 10 ha of forest area. The NGOs are Regional Environmental Awareness Cameron Highlands (REACH) (2ha); Tropical Rainforest Conservation and Research Centre (TRCRC) (4 ha); Malaysian Nature Society (MNS) (2 ha); Pertubuhan Pelindung Khazanah Alam (PEKA) (2ha) and Sultan Ahmad Shah Environment Trust (SASET) (4 ha) in Cameron Highland and Janda Baik, Pahang

low carbon and sustainable economy. Additionally, financial regulators (Bank Negara and the Securities Commission) launched the Value-Based Intermediation Strategy and the Sustainable and Responsible Investment framework respectively to facilitate socially responsible financing and investment.

Increasingly, private sector contributions to environmental conservation, biodiversity protection, and sustainability efforts have moved beyond CSR activities to long-term conservation programmes. This is met by the government support through collaboration and endorsement, providing tax incentives, policy and regulations on reporting and voluntary standards, as well as the endorsement of such programmes through awards and recognition of the partnership. Some of these examples include Maybank's support in tiger conservation; Yayasan Sime Darby's[10] "Plant-a-Tree" programme within selected estates (Carey island and Jentar Estate in Pahang), wildlife protection and the ecosystem monitoring and biodiversity conservation in Sabah; Yayasan Hasanah's[11] support towards ecosystem, wildlife protection and empowerment of the local community in protecting the Central Forest Spine (CFS) region in Peninsular Malaysia. The Malaysian oil and gas company – Petroliam Nasional Berhad (PETRONAS) and Shell Malaysia also contributed significant funding towards biodiversity environmental conservation, education and research. The majority of such efforts are captured within each organization's Annual or Sustainability Report.

There are several successful models of public-private sector partnerships in protected area management. Several concession models are found in Protected Areas (PAs), namely Mutiara Taman Negara Resort operating in Taman Negara National Park, Kuala Tahan, Pahang, and Borsamulu Park Management Sdn. Bhd. in Mulu National Park, Miri, Sarawak. In Sabah, the Reef Guardian Sdn. Bhd. has been appointed by the Sabah State Government to manage the 46,317 ha Sugud Islands Marine Conservation Area (SIMCA) which is situated within the Coral Triangle and Sulu-Sulawesi Tri-National Sea Turtle Corridor. The company has been entrusted to enforce regulations in SIMCA, implement marine conservation efforts, and promote education and awareness in return for the right to operate tourism facilities on the island. This collaborative effort has already shown a reduction in cases of encroachment into the protected areas by fishermen, while long-term monitoring has shown increased diversity and abundance of fish species, corals cover, as well as episodes of sea turtles nesting. In Pulau Pinang, The Habitat Penang Hill is another one of a similar arrangement. Established on 17.21 ha of state land bordering the Bukit Kerajaan Virgin Jungle Reserve, the Penang State Government granted a concession for the company to develop ecotourism and manage the forest reserve.

Indicator 2.3: By 2025, the number and/or size of collaborative projects with the private sector have doubled compared to the 2016 level.

Status: Progress towards target but at an insufficient rate

Private sector contributions towards government efforts in conservation have increased significantly. However, there is currently no baseline established on the number of collaborative projects between government agencies and the private sector. In the recently announced Budget 2020, the government has

[10] Yayasan Sime Darby is the philanthropic arm of the Sime Darby Berhad comprised of Sime Darby Plantation and Sime Darby Property among other. It was established in June 1982.

[11] Yayasan Hasanah is the philanthropic arm of the Khazanah Nasional Berhad (the Malaysian sovereign wealth fund) which was established on July 2015.

allocated RM 10 million for biodiversity conservation through a matching grant mechanism with the private sector.

Action 2.4 Enhance stakeholder participation in decision making processes

Public participation and consultation are indispensable components in the formation of public policy, especially with regards to environmental conservation legislation. Early stages of public participation are provided for under the Town and Country Planning Act 1976 with the obligation of the authority to make available the draft structure and local plan to the public. The Environmental Impact Assessment (EIA) for prescribed activities is also open for public consultation. In 2011, the Selangor State Government became the first state to amend its forestry enactment [Selangor National Forestry Act (Adoption) (Amendment) Enactment 1985] to make public consultation compulsory for degazettement of forest reserves.

In 2012, a circular was issued instructing all ministries to make draft laws and regulations available to the public for fourteen (14) days. This was followed by the launch of the National Policy on the Development and Implementation of Regulations (NPDIR) aimed to promote an effective, efficient, and accountable regulatory process. Some of the key initiatives include mandatory Regulatory Impact Assessment[12] prepared by the relevant agency as technical inputs and information to the public stakeholders. In early 2018, the Unified Public Consultation (UPC) online portal was launched by the Malaysian Productivity Corporation (MPC) to improve regulatory policy and management by facilitating greater public participation and promote transparency. Recently, the Department of Wildlife and National Parks (DWNP) has submitted documentation and the proposed amendments for the Wildlife Conservation Act 2010 and wildlife conservation orders [Wildlife Conservation (Hunting Prohibited Areas) Order 2013 and Wildlife Conservation (Open Season, Methods and Times of Hunting) Order 2014] for public consultation on UPC.

In addition to providing an enabling framework for public participation in law-making, several efforts are notable in demonstrating the need for public participation for a conservation outcome. Box 2 illustrates a case example of participatory decision-making involving the state government, local authorities, NGO, and local communities in the utilization, conservation, and management of a marine park off the coast of Sabah.

Indicator 2.4: By 2016, the National Biodiversity Roundtable has been established and is represented in the National Steering Committee for NPBD.
Status: On track to exceed target

[12] Regulatory Impact Assessment (RIA) involves a systematic appraisal of the social, economic and environmental impacts of proposed regulations and other kinds of policy instruments before they are adopted. RIA is now almost universally practiced by members of the Organization of Economic Cooperation and Development (OECD) and European Union (EU) as a key tool for improving the efficiency, transparency and accountability of regulatory decision making. Source: Kirkpatrick, C. 2015. Regulatory impact assessment: diffusion among developing countries, In: Radaelli, C. and Dunlop, C. (eds) Handbook of Regulatory Impact Assessment (Edward Elgar) (in press).

The National Biodiversity Roundtable (NBR) - which comprises of academia, NGOs, and civil society members - has been established. The NBR will be represented at the NPBD National Steering Committee Meeting.

BOX 2

Tun Mustapha Park (TMP) – A participatory planning and management for a multiple use marine park in Sabah

Spanning 898,763 ha, Tun Mustapha Park (TMP) was the biggest marine park in Malaysia at the time when it was gazetted as a multiple use park in May 2016. The park is the result of more than 13 years of negotiations between government authorities, international partners, local communities, and non-governmental organizations, including WWF-Malaysia. Located within one of the major conservation areas of the Sulu Sulawesi Marine Ecoregion (SSME) and a priority seascape within the Coral Triangle, TMP encompasses more than 50 islands and islets off the northern tip of Sabah. The park hosts one of the world's richest marine flora and fauna complexes, including coral reefs, mangroves and seagrass beds and is home to threatened species such as the dugong (*Dugong dugon*), otters (*Lutra perspicillata*), humpback whales (*Megaptera novaeangliae*), and sea turtles. The rich fishing ground is also important for sustaining the livelihood of approximately 80,000 coastal inhabitants in the area. Like other marine ecosystems in Sabah, the region is currently threatened by overfishing, cyanide and blast fishing, as well as pollution.

The Sabah State Government has three objectives for TMP: 1) eradicate poverty; 2) develop environmentally sustainable economic activities; and 3) conserve habitats and threatened species. In 2011, an Interim Steering Committee (ISC) was established to manage and guide the development of an integrated management plan for TMP. The Committee comprised of stakeholders representing the region's interests and is chaired by the Ministry of Tourism, Culture, and Environment Sabah. There are six technical working groups focused on different aspects of management, including a zoning working group, which facilitated all stages of the planning process. Stakeholder outreach was focused on these three objectives, with emphasis on how a well-designed multiple use MPA can achieve TMP's three objectives.

Engagement and consultation with the communities and commercial fishing sector was an integral part of the TMP establishment process because the area is an important for fishing. Prior to the gazettement of TMP, regular consultations were held with the communities for zoning, fisheries management, awareness raising, capacity building and alternative livelihood programmes to obtain support for the conservation purpose of marine protected areas. Particularly, communities and fishing sector inputs were integrated with planning tools i.e. Marxan with Zones, to prepare the zoning plan for TMP. One of the primary objectives of the plan was to meet basic representation targets for key marine habitats and species within TMP. As a result, four zones were designated to be: 1) Preservation Zone which prohibits all extractive activities; 2) Community Use Zone which allows non-destructive small scale and traditional fishing activities, and encourages the nearby communities to take part in the management of their own resources; 3) Multiple Use Zone which allows non-destructive and small scale fishing activities as well as other sustainable development activities, such as tourism and recreation; and 4) Commercial Fishing Zone which allows large scale extractive fishing practices. The TMP zoning process was undertaken in three stages: prioritization, review and consultation, each of which produced a proposed zoning map for considerations in terms of enforcement and stakeholder support. The

TMP is the first multi-use park (IUCN Category VI) gazetted by the Sabah Government under the Sabah Parks Enactment 1984 which previously only catered for 'no take areas' except for recreational activities. Currently, new subsections under the Enactment are being drafted taking account of the zoning of activity areas within the waters of TMP. In addition, external funding was secured to install communication equipment systems to improve patrols and surveillance.

Sabah Parks and WWF will continue their close partnership and have already made long-term plans until 2027 in management, community outreach, surveillance and enforcement, scientific research, and education in TMP. Despite challenges encountered, the community engagement and participatory decision-making approach adopted throughout the planning process created a platform for the local communities to participate and secure tangible benefits from the park gazettement. The example of TMP can be further adapted and replicated in marine ecosystems in other parts of Malaysia.

Figure 6: Fisheries are a source of livelihood for the 80,000 coastal inhabitants in northern Sabah near TMP area. Photo: WWF Malaysia.

Target 3: By 2025, biodiversity conservation has been mainstreamed into national development planning and sectoral policies and plans.

Biodiversity conservation has traditionally been the domain of the environment sector. The notion of mainstreaming biodiversity began to contextualize in 2008 when the Common Vision on Biodiversity was published to explain the concept, importance, and ways to embed biodiversity into other sectors. Recognizing that biodiversity underpins the economic growth and social wellbeing, Target 3 aims to promote biodiversity mainstreaming by embedding it into development planning, recognizing the economic value of biodiversity and ecosystem services, protecting environmentally sensitive areas, and promoting sustainable consumption and production.

Action 3.1: Embed biodiversity conservation into national and state development planning and sectoral policies and plans

The Eleventh Malaysia Plan (11MP), with the theme of "anchoring growth on people," has encapsulated 'Green Growth' as one of six strategic thrusts to guide the five-year national development planning. The Green Growth thrust among others aims to significantly reduce greenhouse gas emissions, improve conservation of terrestrial, coastal, and marine ecosystems, and promote sustainable consumption and production practices. The same principles were reiterated in the latest spatial planning document – the National Physical Plan 3 (2016-2020). In the context of biodiversity conservation, this broad level direction is echoed in the NPBD 2016-2025.

By 2018, the Mid-term Review of the 11MP (MTR 11MP) shows key results in the green growth thrust including the establishment of the Green Economy Indicators, the Roadmap for System of Environmental Economic Accounting (SEEA) 2016-2020; the Government Green Procurement (GGP) Action Plan; the Malaysian Carbon Reduction and Environmental Sustainability Tool and the Sustainable Infrastructure Rating Tool (INFRASTAR) for sustainability assessments. The MTR 11MP has prescribed new priorities for the remaining period to focus on strengthening environmental governance, conserving natural resources as well as combating climate change, and reducing disaster risks (See Figure 7).

Sectoral policies and plans that integrate environmental and biodiversity considerations are highlighted in Table 6.

Figure 7: The Priority areas and strategies towards achieving green growth. Source: Midterm Review of the Eleventh Malaysia Plan, 2018

Table 6: Sectoral Policies and Plans with biodiversity and/or environmental elements. These Policies, carries the mandate of various ministries and agencies other than KATS, may have bearings or implications to the state of biodiversity.

Sectoral Policies	Plans
• **National Urbanization Policy 2 2016-2025** • **National Commodity Policy 2011-2020** • **National Agrofood Policy 2011-2020** • **National Timber Industry Policy, 2009-2020** • **National Mineral Policy 2, 2009** • **National Policy on the Environment, 2002** • **National Forestry Policy 1978 (Revised 1992)** • **National Policy on the Environment 2002** • **National Policy on Climate Change 2009** • **National Water Resources Policy 2012** • **National Green Technology Policy 2009** • **National Biotechnology Policy, 2005** • **National Science and Technology Policy 2013-2020**	• Rural Development Master Plan • Rural Tourism Master Plan • Third National Industrial Master Plan • Logistics and Trade Facilitation Master Plan • Integrated River Basin Management Plan • Integrated Shoreline Management Plan • Central Forest Spine Master Plan • National Coastal Zone Physical Plan • National Action Plan for the Management of Coral Reefs in Malaysia • Construction Industry Transformation Programme

In recognizing the impacts of development on wildlife, the Wildlife Conservation Act 2010 is being reviewed to include the requirement of a Wildlife Impact Assessment (WIA) for all development projects. Currently, development project proponents are required to conduct an Environmental Impact Assessment (EIA) to assess the impact of the prescribed activities and the proposed measures that will be instituted to prevent, reduce or control adverse impacts. The proposed WIA is expected to complement the EIA.

The agriculture sector plays an important role in Malaysia's economic development by providing rural employment, uplifting rural incomes, and ensuring national food security. Biodiversity elements have been incorporated into current policy and regulatory frameworks such as the National Agriculture Policy (2011-2020), DOFM Strategic Fisheries Plan (2011-2020), DOFM Capture Fisheries Management Strategic Plan (2015-2020), DOFM Extension Strategic Plan 2018-2030 and eight (8) National Plan of Actions.

At the state level, the first marine spatial plan - the Semporna Marine Spatial Plan (SMSP) was launched in June 2014 as a result of the collaboration between the Sabah Town and Country Planning Department, Semporna District Office and WWF-Malaysia. The SMSP covers the entire territorial waters of Semporna District (768,000 ha) and is located at the apex of the biologically diverse Coral Triangle. The SMSP project has gone through extensive consultation with local government and NGO stakeholders to guide the Semporna District Council in developing its strategic vision for growth and develop an Integrated Marine Spatial Plan. In addition, a Coastal Integrated Vulnerability Assessment Tools (CIVAT) study was conducted in the area in collaboration with Universiti Malaysia Sabah (UMS) to assess the vulnerability of coastlines and provide recommendations for climate change adaptation for the community.

Indicator 3.1: By 2018, a policy and/or regulatory framework for incorporating biodiversity conservation into national and state development and into sectoral policies and plans in place.

Status: Progress toward target but at an insufficient rate
The "Green Growth" strategy within the Eleventh Malaysia Plan (11MP), the Mid-Term Review of the 11MP, and the Sustainable Development Goals (SDGs) Agenda have influenced more integration of biodiversity and environment across sectoral policies and plans. The NPBD 2016-2025 has also been adopted by the relevant ministries and agencies making them more aware of the need for biodiversity considerations in their operations.

Action 3.2: Recognize the economic value of biodiversity and ecosystem services

To integrate biodiversity values in an economy-wide framework, the Department of Statistics Malaysia (DOSM) has partnered with the United Nations Statistics Division (UNSD) on the pilot initiative for the System of Environmental Economic Accounting (SEEA) as well as the development of measurement for the green economy. As a result, Malaysia has published the SEEA Roadmap. The Roadmap enables data monitoring to track interactions between the economy and the state of the environment through an accounting system. The Roadmap has selected four potential SEEA accounts that are relevant in Malaysia namely energy, water, air emission (for energy use) and land (agriculture). Currently, the pilot account for water and energy has been developed while an ocean account is being explored. For green economy measurement, a total of 79 green economy indicators have been agreed as national green indicators.

These indicators can be used in monitoring the achievement of sustainable development of the country and support the measurement of SDGs achievement in Malaysia.

At the agency level, the Guidelines on the Economic Valuation of the Environmental Impacts of EIA Projects (Prescribed Activities) has been prepared by DOE to assist project initiators in the identification, quantification, and the monetization of the environmental impacts of the project. The Forestry Department of Peninsular Malaysia (FDPM) also maintains a Forest Planning and Economy Division which conducts economic valuation studies within the Permanent Reserved Forest (PRF) to guide forestry planning at the federal and state level. On a smaller scale, economic service assessments have been carried out at Ulu Muda Forest Reserve and Kinabatangan floodplain to advocate for the protection of designated areas. In Sarawak, studies on ecosystem services and natural capital valuation are being conducted at Song-Katibas and Baleh under the Green Economy Project within the Heart of Borneo landscape.

In the marine environment, economic valuation studies of marine biodiversity within marine parks in Peninsular Malaysia have been carried out and the findings were used to justify conservation programmes or the establishment of new MPAs.

Indicator 3.2: By 2020, a natural resource accounting programme has been established for the valuation of biodiversity and ecosystem services.

Status: Progress toward target but at an insufficient rate
In response to the need for an integrated statistics framework that could reflect the relationship between environment and economy, the System of Environmental-Economic Accounting (SEEA[13]) and the Green Economy Indicators have been piloted. To date, the physical supply and use table (PSUT) -Energy and PSUT-Water have been established as part of the SEEA initiative, while 79 GEIs have been developed to measure progress towards SDGs.

Action 3.3: Protect Environmentally Sensitive Areas in Statutory Land Use Plans

Biodiversity conservation objectives are interconnected to land use planning. The current statutory land use plan at the federal level is Malaysia's National Physical Plan 3 (2016 – 2020) launched by the PLANMalaysia in 2017. The NPP-3 continues the policy for Environmentally Sensitive Areas (ESA) originated from NPP-1. ESAs refer to areas that are of critical importance in terms of the goods, services and life-support systems they provide such as water purification, pest control, and erosion regulation.

[13] The SEEA contains internationally agreed standards, definitions, classifications, accounting rules and tables for producing internationally comparable statistics on the environment and its relationship with the economy. The SEEA framework is consistent with the System of National Accounts (SNA) to facilitate the integration of environmental and economic statistics.

Based on these criteria, the ESA areas are ranked as ESA 1, 2 or 3 according to the scale of human activities permitted. Figure 8 shows the ESA areas in Peninsular Malaysia identified in NPP-3.

Environmentally Sensitive Areas (ESA)

Level 1 -Vulnerable ecosystems such as existing and proposed PAs; threatened habitats outside PAs; catchment areas and area above 1000 m contour;

Level 2 - All other forests and wetlands outside PAs; areas of peat and soft soil; 500m buffer zones around Level 1 areas; and all areas between 300 m – 1000 m contour.

Level 3 - All marine parks, islands and coastal areas; 500m buffer zone around Level 2 areas; water catchment and groundwater recharge; and all areas between 150 m – 300 m contours.

The ESA Framework is an important spatial planning tool to help guide the development of sustainable land use at the local, district, and state levels. By 2014, the NPP identified 4.49 million ha of Level 1 ESAs, 4.44 million ha of Level 2 ESAs, and 2.86 million ha of Level 3 ESAs in Peninsular Malaysia. However, these need to be translated to the state and local plans for the effective protection of the ESAs. In 2015, the subsidiary legislation related to Environmental Impact Assessments was replaced with an updated version [Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015] which stipulated that EIAs need to be prepared for certain activities within or adjacent to ESAs.

The provisions for ESAs also extend to spatial planning in Sabah. The Sabah Structural Plan (SSP) 2033 launched in October 2016 has identified ESAs important to biodiversity and ecosystem services in which development should be prohibited. Through the SSP, ESAs will be integrated into land-use planning. In Sarawak, the State Government has developed a map of priority conservation areas (PCA) for Sarawak with support from WWF-Malaysia. The map was developed through a technical working group consisting of multi agencies involved in natural resources management, environmental management, land use and development planning. A Sabah Action Plan to protect the PCAs is expected by the end of 2019.

Figure 8: Environmentally Sensitive Areas (ESAs) in Peninsular Malaysia. Source: The National Physical Plan 3, 2015.

Aside from ESAs, the concepts of High Conservation Values (HCV) have also been promoted. HCVs are areas of biological, ecological, social or cultural value of outstanding significance or critical importance

(See Figure 9). In 2018, HCV Malaysia Toolkit Steering Committee, set up to guide the development of a HCV Framework in Malaysia, produced the Malaysian National Interpretation of the Common Guidance on the Identification of High Conservation Values (HCVs).

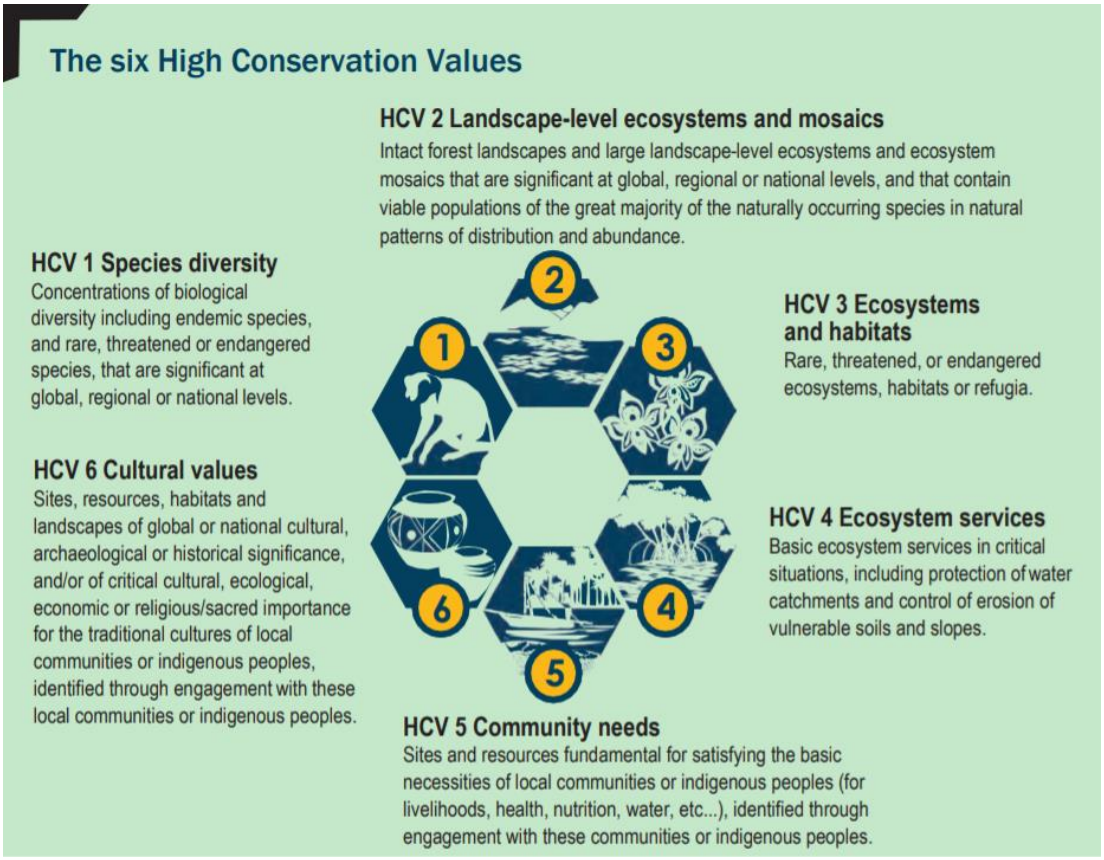


Figure 9: The HCV categories which are applicable to terrestrial biome. Source: The HCV Resource Network (HCVRN).

In the marine environment, since the commencement of the 10th and 11th Malaysia Plan, numerous studies to identify areas rich in marine biodiversity as potential sites for MPAs were conducted. As a result, nine (9) areas have been identified[14] of which three (3) are currently in the process of gazettement as marine parks. These include Lima Group of Islands in Mersing, Johor; Song Song Group of islands off Yan, Kedah; Tanjung Tuan, Negeri Sembilan/Melaka; and Besar group of Islands and coastal mangrove areas in Melaka.

Indicator 3.3: By 2020, all states have identified hotspots where biodiversity is of significant conservation value.

[14] Terumbu Payung submerged reefs in the waters off Kelantan; MS Awazisan Maru ship wreck in Kelantan that sunk during World War II, Lima Group of Islands in Mersing, Johor; Dangli Group of Islands off Langkawi, Kedah; Song Song Group of islands off Yan, Kedah; Sembilan Group of Islands off Bagan Datoh, Perak; Pulau Jarak, Perak; Tanjung Tuan, Negeri Sembilan/Melaka; and Besar group of Islands and coastal mangrove area in Melaka

Status: Progress toward target but at an insufficient rate

There is no national definition or national identification framework for biodiversity hotspots. However, some agencies have a respective definition for biodiversity hotspots in the context of high biodiversity value. For example, forestry departments have managed Protection Forest in addition to the identification and protection of High Conservation Value (HCV) Forest within PRF. As of 2018, there are a total of 37 HCVF covering 2670.49 ha in Peninsular, a total of 3.3 m ha of HCVF identified by SFD, and 106,197 ha PRF identified and protected within the Forest Management Units in Sarawak. In addition, there are ecoparks, wildlife sanctuaries, as well as a network of turtle sanctuaries in critical nesting sites throughout Malaysia.

Action 3.4 Promote Sustainable Consumption and Production

Sustainable Consumption and Production (SCP) is one of the key drivers to achieve green growth. Currently, the SCP Blueprint is being finalized at the federal level as a guide for all stakeholders to adopt and implement SCP. CEPA programmes are actively conducted to promote low-carbon lifestyle in schools by mainstreaming SCP practices in the curriculum and co-curriculum syllabus. One of the key programmes as part of SCP implementation is the Government Green Procurement (GGP), implemented to further expand the green economy and create a green market locally.

To enhance GGP and green technology, the '*MyHijau'* (MyGreen) Programme was introduced in 2012. Under this programme, the MyHIJAU Label[15] and MyHIJAU Directory initiatives are conducted, both of which aim to promote the sourcing as well as the purchase of environmentally friendly goods and services. In addition, the Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST) was launched in 2015 to guide the standard of green buildings in the country. The Public Works Department (PWD) has made it mandatory for all new public building projects worth RM50 million and above to adopt MyCREST.

Indicator 3.4: By 2020, 20% of the Federal Government's procurement is green.

Status: Progress toward target but at an insufficient rate

By 2017, 21% of Government Green Procurement (GGP) for selected products and services are green - amounting to RM286.3 million. Ongoing efforts are being made to expand the product groups guided by the GGP Long Term Action Plan.

Target 4: By 2025, our production forests, agriculture production and fisheries are managed and harvested sustainably.

The sustainable management and use of natural resources are crucial in achieving biodiversity conservation and sustainable development objectives. Forestry, agriculture, and fisheries are important sub-sectors in Malaysia and play a significant role in the national economy. They are also a means for employment, foreign exchange and protein source for Malaysian particularly the rural population. A healthy natural ecosystem underpins the growth of the primary industries; thus efforts to promote sustainable management of natural resources and preserve biodiversity is central to sustainable development. The emphasis for Target 4 is the drive towards sustainable management in the forestry, agriculture and fisheries sector.

Action 4.1 Strengthen Sustainable Forest Management

Forest is a state matter. The forestry sector in Peninsular Malaysia is guided by the National Forestry Policy 1978 (Revised 1992) (NFP) and the National Forestry Act 1984 (NFA) administered by the Forestry Department Peninsular Malaysia. This Policy streamlines forest management at the state level in Peninsular Malaysia. All eleven State Governments in Peninsular Malaysia have adopted this standardized framework and passed it as State enactments. The states of Sabah and Sarawak[16] have independent forest management policies that contain similar provisions to the NFP. In Sabah, the Sabah Forest Policy 2018 was launched to reinforce objectives for environment protection, biodiversity conservation, and socio-economic well-being. For Sarawak, the new Forests Ordinance (Chapter 71) 2015 was enacted to repeal the Forest Ordinance 1958. This Ordinance enhanced the deterrent punishments and strengthen provisions for enforcement agencies to search and investigate

Malaysia has continuously worked towards improved forest mapping and inventories. Between 2010 to 2014, Malaysia harmonized the geospatial and statistical data (cadastral data). Through the exercise, some regions gained while others lost forest area through realignment of data. States with the oldest gazettement had the most challenges in harmonizing their figures due to the different land area units used. Additionally, double-counting was prevented especially in forests with double gazettement. The historical data reported in the previous report hence have been updated. Currently, forest cover data is available up to 2014. By 2014, the total forested area is 18.278 million ha: of which 11.618 million ha is Permanent Reserved Forest (PRF); 3.848 million ha of Stateland Forest and 2.745 million ha Totally Protected Area (TPA). Table 7 shows the forest cover data for Malaysia. Annex I shows the maps of PRF in Peninsular, Sabah and Sarawak.

[16] The Forest Policy of Sarawak 1954 guides forest management in Sarawak. Source: Forest Policy of Sarawak 1954 at Forest Department of Sarawak website: https://forestry.sarawak.gov.my/page-0-416-1105-Forest-Policy-Of-Sarawak-1954.html

Table 7: Forest data in Malaysia. Source: Ministry of Water, Land and Natural Resources (KATS).

	Area (1000 ha)
	2014
a. Permanent Reserved Forest (PRF)	11,618
b. State Land Forest	3,848
c. Totally Protected Areas	2,745
Total Forested Area	18,278

In Peninsular Malaysia, the National Forestry Policy 1978 (Rev. 1992) states that the "Permanent Forest Estate", also known as the Permanent Reserved Forest, will be managed and classified under four (4) major functions: Production Forest; Protection Forest; Amenity Forest; and Research & Education Forest. Under the National Forestry Policy, the conservation of biological diversity is an explicit objective of Protection Forest as well as Research and Education Forest. Further, the National Forestry Act 1984 gives provision for all or part of a PRF to be classed as one or more of eleven (11) functional classes which can be matched to the four functions specified in the NFP. State Governments in Peninsular have adopted aspects of the National Forestry Act into their respective State Forest Enactments. A number of states have added a twelfth functional class, '(l) State Park' to their forestry enactments. Table 8 shows the twelfth Functional classes of PRF in Peninsular Malaysia. Class (a) denotes timber production forest while Class (b) – (l) are considered Protection Forest and is managed with specific management plan and guidelines by FDPM.

Table 8: List of functional classes and functions according to Section 10(i) of the National Forestry Act 1984.

Production Forest	(*a*) timber production forest under sustained yield
Protection Forest	(*b*) soil protection forest; (*c*) soil reclamation forest; (*d*) flood control forest; (*e*) water catchment forest; (*f*) forest sanctuary for wildlife; (*g*) virgin jungle reserved forest;
Amenity Forest	(*h*) amenity forest;
Research & Education Forest	(*i*) education forest; (*j*) research forest; (*k*) forest for federal purposes. (l) state park

Within the Production Forests, various management prescriptions are implemented, such as:

i. Maintaining the species compositions of dipterocarps and non-dipterocarps after forest harvesting;
ii. Retention of 32 timber tree species which are important as food source and nesting site for fauna such as primates, birds and squirrels;
iii. Establishment of HCVFs for critical ecosystems and Endangered, Rare and Threatened species;
iv. Implementation of harvesting activities in accordance to the enforced Guidelines on Reduced Impact Logging;
v. Implementation of river buffers as wildlife corridors; and
vi. Implementation of forest management certification under the internationally recognized certification standards.

In Sabah, the Sabah Forest Enactment 1968 covers Forest Reserves. The forest reserves are then categorized into one or more of the seven classes according to their management objective. Forest management is characterized by the Forest Management Units (FMUs), which is a partnership of the Sabah Forestry Department with the private sector, formalized through a signed long-term licence agreement known as Sustainable Forest Management Licence Agreements (SFMLA). Under this FMU system, the SFMLA holders carry out their forest management activities based on a 10-year Forest Management Plan (FMP). The plan details how the FMU areas can be sustainably managed through the multiple-use forest management concept where social, economic and environmental requirements are taken into consideration. Recently, the concept of Managed Retention towards No Net Loss/Net Gain as an offset strategy is implemented. A HCV map will be produced in 2019 to aid the Sabah government in decision-making on future land development while keeping their protected areas target of 30% State land by 2025. The map will also guide the consolidation of forest management plans into a strategic state-wide forest management plan which considers the connectivity of conservation or protected areas based on ecological functions. Table 9 shows the forest class by function in Sabah.

Table 9: The Forest Classes in Sabah under the Forest Enactment 1968.

Class	Functions
Class I (Protection)	Maintenance of forest essential on climatic or physical grounds
Class II (Commercial)	For the supply of timber and other produce to meet the general

	demands of trade
Class III (Domestic)	For the supply of timber and other produce for local consumption
Class IV (Amenity)	For local amenity and arboretum work
Class V (Mangrove)	For supply of mangrove timber or other produce to meet the general demands of trade and for ecotourism activities
Class VI (Virgin Jungle Reserve)	For forest research purpose
Class VII (Wildlife)	For the protection of wildlife

Note: The Sabah State Government separates the Totally Protected Area (TPA) calculation from the PRF area. The column in green represents the TPA.

Notably, the Deramakot Forest Reserve (DFR) in Sabah has been recognized as the model forest for best forest management practices. It was certified by the Forest Stewardship Council (FSC-C009139) (SGS-FM/COC-000065) in September 1997 and has maintained its 5th certification period which expires in October 2019, making it the longest certified tropical rainforest in the world. The management has continuously collaborated with various international wildlife research experts to conduct biodiversity research. DFR has since generated income from the growth in ecotourism activities due to wildlife watching.

In Sarawak, the Forest is classified as the Permanent Forest Estate (PFE, which includes Forest Reserves, Protected Forests and Communal Forests) and Totally Protected Areas (National Parks, Wildlife Sanctuaries and Nature Reserves) and State Land Forests. Since early 2000, the Sarawak State Government has adopted a policy for expanding its PFE area to six (6) million ha and TPA to one (1) million ha. Also, the State Government of Sarawak approved Forest Management Certification (FMC) Policy in

August 2015. The State Government has also made it mandatory for all long-term forest timber licensees within the PFE to obtain Forest Management Certification by 2022. A Conservation Internship Programme (CIP) implemented in collaboration with the timber industry is also carried out to enhance sustainable forest management practices in Sarawak. The programme has trained 27 interns who have since been employed by the timber industry.

In addition, several steps have been taken to ensure that forestry operations are socially responsible, particularly to local communities by incorporating appropriate social programmes into the FMUs planning and management. In Peninsular Malaysia, it is a common practice that the ILCs are consulted prior, during and after forest harvesting commences. The ILCs are also given opportunities to be involved in forest management activities, these include, consultation process with ILCs is carried out with free, prior and informed consent (FPIC), awareness programmes on the implementation of FMUs, the participation of local communities in social forestry activities, and creation of job opportunities for local communities. Currently, the Ministry (KATS) is in the process of drafting the National Roadmap for Social Forestry, which is expected to be finalized by 2019. Social Forestry initiatives have advanced in Sabah and Sarawak and are being overseen by respective forest departments. To further ensure forest operations are socially responsible, the National Roadmap on Social Forestry is finalized and will be published in 2019.

Indicator 4.1: By 2025, 100% of all timber and timber products are sustainably managed (i.e. certified under schemes such as MTCS, FSC, etc.).

Status: On track to achieve target

The sustainability certification for timber and timber products are largely voluntary. At present, timber certification in Malaysia includes two components: Forest Management Certification (FMC) and Chain-of-Custody (CoC) certification[17]. For FMC, the total area of certified natural forests under the Malaysian Timber Certification Scheme[18] (MTCS) increased from 4.00 million ha in 2016 to 4.205million ha as of September 2019, against the Malaysian Criteria and Indicators for Forest Management Certification (Natural Forest) [MC&I (Natural Forest)]. Additionally, a total of 109,025.06 ha of forest plantations have been certified against the MC&I Forest Plantation.v2. Under the Forest Stewardship Council (FSC), thirteen (13) forest management certification holders of more than 765,405 ha were certified as of July 2019. At the same time, a total of 363 companies have been certified under the PEFC CoC, and a further 17,285 companies were awarded the FSC CoC certificate.

[17] The FMC assures credibly managed forest source while the CoC certifies that timber products derived from a forest that has been certified.

[18] The Malaysian Timber Certification Scheme (MTCS), started operation in 2001 and was endorsed by the Programme for the Endorsement of Forest Certification (PEFC) in 2009.

The rare and elusive collared mongoose seen in a forest reserve in Sabah. Photo credit: Sabah Forestry Department.

BOX 3

Matang Mangrove Forest Reserve – A model for sustainable mangrove forestry and conservation

Mangrove forests in Peninsular Malaysia are found mainly on the sheltered coasts, estuaries, rivers and near-shore islands. These forests are important breeding grounds for a vast array of organisms. Mangroves also act as a natural barrier against coastal erosion and tsunamis.

The Matang mangrove forest reserve lies between the administrative districts of Kerian, Larut & Matang and Manjung in Perak, with a latitude of 4^{o}N – 5^{o}N and longitude of $100^{o}2'$E – 45^{o}E. The entire forest reserve measures approximately 13 km in width at the middle and about 52 km in length, forming a crescent shape. This coastline stretches from Kuala Gula in the north to Pantai Remis in the south. The Matang mangrove forest reserve spans 40,537.6 ha which include the Kuala Sepetang forest range, Kuala Trong forest range, and Sungai Kerang forest range.

The Matang Mangrove Forest Reserve hosts a diverse range of wildlife. The forest predominantly comprises of bakau minyak (*Rhizophora apiculate*) and bakau kurap (*Rhizophora mucronata*) but is also home to several true mangrove species and associate mangrove species. In terms of fauna, the forest reserve is home to mammals such as the Long-tailed Macaque (*Macaca fascicularis*), Leopard Cat (*Felis bengalensis*), Smooth Otter (*Lutra perspicillata*) and the Indopacific Humpback Dolphin (Sousa chinensis); as well as various species of fish, stingrays, crabs, prawns and shrimps. At least 155 species of birds are found here, including the Great Argus Pheasant (*Argusianus argus*), Buffy Fish Owl (*Ketupa ketupu*), the rare Bronzed Drongo (*Dicrurus aeneus*) and the Mangrove Whistler (*Pachycephala grisola*). It is also an important site for coastal migratory water birds and a portion of migrant forest birds with between 43,000 to 85,000 birds during the migration period.

The initiation for forest gazettement began in 1902 with the mangrove forest reserve being fully gazetted in 1906. During the initial stage, gazettement was driven by economic use for fuelwood and charcoal. Since then, the Matang Mangrove Forest Reserve has undergone a sustainable logging program, whereby the region has continued to produce timber while retaining sufficient forest cover. After more than 100 years of management, the forest is still intact, providing sustainable goods and services. Special emphasis to the protection of the mangrove forests is enshrined in the National Forest Policy 1978 (revised in 1992) and duly recognized in the National Forestry Act 1984 (revised in 1993). The mangrove forest management system has undergone changes from management for wood production, to a management system that incorporates protection and conservation.

At present, sustainable forest management practices are implemented. Within the management zones there are four different categories which are: productive forest, restrictive productive forest, unproductive area, and protective forest; under which a 30-year rotational period is practiced. Yield regulation is carried out with the objective of ensuring a constant supply of greenwood as raw material for the local charcoal manufacturing industry.

Silvicultural practices, which involve thinning methods and based on an ecological approach, are carried out within the Matang Mangrove Forest Reserve with the objective of producing a fully stocked forest holding the desired species for the next rotation. To ensure environmental protection, felling coupes are allocated to minimize the impact of clear felling on the environment and wildlife. The provision of buffer zones minimize the impact of clear felling on the environment and wildlife. The provision of buffer zones protects marine life and contains coastal or bank erosion through the retention of a continuous strip of trees along the bank/shoreline.

An educational centre – the Matang Mangrove Nature Education Centre - was established within the forest reserve to support outreach and ecotourism while replanting of saplings of Rhizophora and Lenggadai trees under the reforestation programme is continuously carried out. Matang Mangrove Reserve has been recognized as one of the best managed mangrove forests in the world where needs of the surrounding community is balanced with conservation.

Figure 10: The Matang Mangrove Forest Reserve in Perak, is one of the world's best-managed sustainable mangrove ecosystems and home to various mammals, bird and fish species.

Photo credit: The New Straits Times (left) Perak State Forestry Department (right).

Action 4.2: Strengthen Agricultural Planning and Improve Practices

The agriculture sector is one of the major industries in Malaysia, contributing 8.2% or RM 96.0 billion to the Gross Domestic Product (GDP) in 2017. Figure 11 shows the major crops produced in Malaysia. The agriculture sector is divided into two main subsectors: commodity and agro-food. For the commodity subsector, the National Commodity Policy (2011–2020) provides a specific thrust to guide the development of the oil palm sector towards a more sustainable industry. In the oil palm sector, the smallholders (private owners with plantation of < 100 acres or 40.46 ha) account for 40% of production while larger companies produce the remaining 60%.

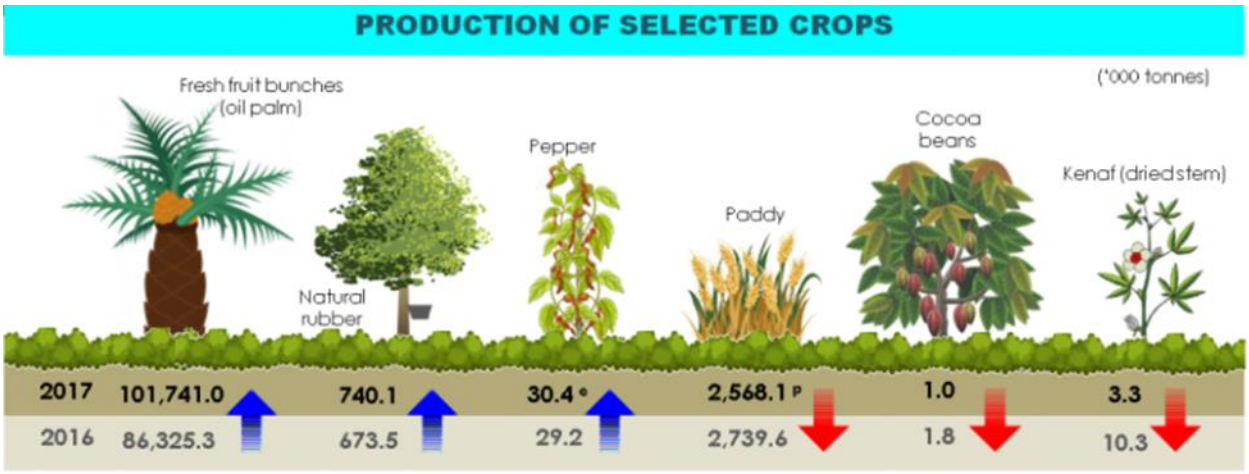


Figure 11: Production of selected crops in Malaysia in tonnage. Source: Selected Agricultural Indicators, 2018. Department of Statistics Malaysia.

Being the major commercial commodity, the drive for sustainable agricultural certification has focused on oil palm. As part of the efforts towards increased sustainability in palm oil production, Malaysia launched the Malaysian Sustainable Palm Oil (MSPO) scheme in 2015. The MSPO Certification Scheme is operated by the Malaysian Palm Oil Certification Council (MPOCC). In 2019, the MSPO scheme has been made mandatory for both plantation industries and smallholders. As of September 2019, 54.6% of the 5.85 million ha oil palm planted areas are certified as sustainable under the Malaysian Sustainable Palm Oil (MSPO). Incentives have been provided to improve the certification rate of independent smallholders.

The oil palm industry is also working on forest conservation initiatives and improving plantation practice. Major oil palm players like Sime Darby, IOI Group, and Wilmar have contributed funding for nature conservation and species protection. These plantations also establish HCV areas within the estate for biodiversity conservation purposes. For example, the Sime Darby Plantation has set aside 5,779 ha of HCV area for biodiversity protection. Additionally, the Malaysian Palm Oil Council (MPOC) administered the Malaysian Palm Oil Wildlife Conservation Fund (MPOWCF) to support projects and studies on wildlife, biodiversity and environmental conservation within the plantation. In 2017, the Palm Oil NGO (PONGO) Alliance, a coalition of industry stakeholders and NGOs, was established to enhance collaborative efforts to protect orangutans and their habitats within oil palm landscapes.

For the agrofood sector, the focus is largely on food security and improving productivity and revenue generation under the National Agrofood Policy (2011-2020). However, Malaysia has established the Malaysian Good Agricultural Practice (myGAP) certification scheme in 2013, which covers crops, aquaculture, and livestock sector. As of now, the myGAP certification remains voluntary, and it covers practices that are mainly aimed at preventing or minimizing the risks in four areas of production, namely food safety, animal health and welfare, environmental integrity, and socio-economic aspects.

Emphasis is also given to sustainable land development, upgrading agricultural infrastructure, adopting modern technologies, as well as increasing food safety and quality. The Pesticides Act of 1974, which provides a comprehensive framework to regulate pesticides in Malaysia, has been amended to include heavier penalties importation control of pesticides, the control of possession or use of unregistered

pesticides and unapproved use of pesticides, and the requirement for the pesticide offender to pay for the pesticide disposal charges. Further, the Integrated Pest Management (IPM) approach has been adopted, which emphasizes the growth of crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. Various IPM programmes were established for new crops, pesticide risk reduction programme by the Pesticides Board, certification of farms with myGAP, and zero burning policy during the replanting of major crops. Since 2000, the government has actively promoted organic farming to small scale farmers. The organic certification for food crops was also launched (myOrganic) in 2007.

The Malaysian Standard on GAqP (MS1998:2017-Good Aquaculture Practice-Aquaculture Farm) has been amended and aligned to the requirements listed in ASEAN Guidelines for Good Aquaculture Practices on Food Fish (GAqP) since 2015. The myGAqP certification in the fisheries sector is important in ensuring the level of pollution, including the use of antimicrobials and chemicals from aquaculture industries are reduced, to protect the environment and the risk of a disease outbreak are minimized and contained, to protect epidemic issues in the wild. There are ongoing efforts and measures done to promote and encourage farmers to be certified under myGAP.

Indicator 4.2: By 2025, 50% of all agricultural areas are sustainably managed (i.e. certified under schemes such as MSPO, RSPO, myGAP, etc.).

Status: On track to achieve target
The government has made the Malaysia Sustainable Palm Oil (MSPO) certification mandatory for all the oil palm plantations. As of September 2019, 54.6% or 3.192 million ha has been certified by MSPO. A significant effort is being dedicated to support the certification of smallholders.

The myGAP and myOrganic initiatives regulate the sustainability of the agrofood subsector. As of September 2019, 4,540 food crop farms, 440 aquaculture premises, 2,121 swiftlet farms, and 480 livestock farms have been certified myGAP. For myOrganic, 233 food and 8 livestock farms have been certified. This signifies Malaysia's efforts to provide financial incentives for farmers to increase sustainability in their agricultural practices.

Action 4.3: Implement the Ecosystem Approach to Fisheries Management (EAFM)

The marine capture fisheries comprise of inshore and deep-sea fisheries. The Fisheries Act of 1985 is the main legislation detailing the management, conservation and development of maritime and estuarine fishing, and the protection of large marine species. In addition, the Act contains provisions for the establishment of marine parks and marine reserves.

Conservation strategies are embedded within fisheries management. These include technical measures [i.e., closed fishing area, fishing zones based on vessel gross tonnage, type of gears and ownership (See Figure 12), conservation of marine habitat, technical specification on trawl nets], input controls (i.e., control on fishing effort and fishing units, alternative livelihood support, registration of fishers), research and development as well as community-based fisheries management. These measures were documented in the National Plan of Action for the Management of Fishing Capacity in Malaysia (Plan 2) (NPOA II), to reduce the fishing capacity.

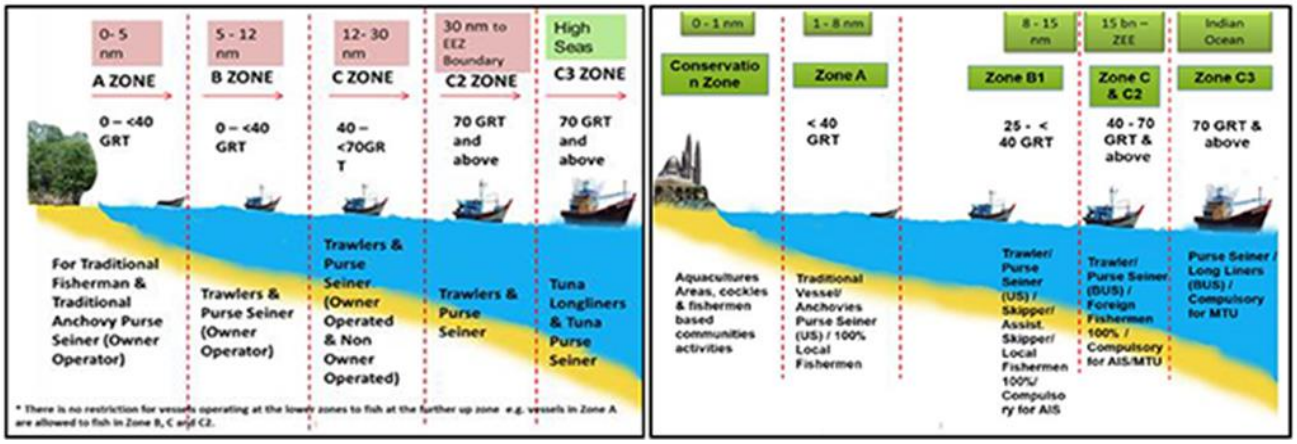


Figure 12: The old (left) and new (right) fishing zones in Malaysia. Source: DOF Malaysia.

*In 2014, a new zoning system (right) was introduced to reduce the number of trawlers and their encroachment activities in the traditional fishing areas and to enhance the protection of coastal areas to protect juvenile fishes. Currently, the new zoning systems were adopted only in the states of Perak, Selangor, Penang, Perlis, and Kedah.

In 2017, the latest marine fish stock assessment has been completed. Undertaken from April 2013 – July 2016, the survey comprised four main components demersal fish, prawn, small pelagic fish, and tuna. The preliminary findings indicate the overall overexploitation of the demersal fish resources. The fish stock assessment is complemented by production (capture fisheries and aquaculture) data that has improved in the level of details and consistency. The stock assessment findings are expected to inform the preparation of a new fisheries management system shifting from the traditional gear-based approach to a more holistic approach focusing on species-based fisheries management plans (FMPs). The new system entails decentralization of fisheries management to regional fisheries management centres tasked to oversee the implementation of specific FMPs[19]. With the new system, fisheries will be managed based on the species-area stock unit. The FMPs are expected to guide the shift towards targeting species and avoiding non-target species/ bycatch.

To complement efforts to improve fisheries management, DOFM embarked on the ASEAN Catch Documentation Scheme (ACDS), a regional initiative under the ASEAN- Southeast Asian Fisheries

[19] The FMPs, scheduled to be made available in 2019, will focus on management by target species.

Development Centre (SEAFDEC[20]) Strategic Partnership Mechanism (ASSP) toward enhancing the traceability of marine capture fisheries and curbing IUU Fishing. From 2014 till 2017, five (5) Technical Consultation and expert meetings have been organized by SEAFDEC for deliberation on the concept of ACDS. The ACDS was endorsed at the 25th Meeting of the ASEAN Sectoral Working Group on Fisheries (25ASWGFi) in May 2017 and subsequently adopted by the SOM-AMAF in the same year. Under the system, the export of fish and fishery products, caught by ASEAN Member States (AMS) flagged fishing vessels within their EEZs, or that of other AMS and/or the High Seas, should be accompanied by an ACDS[21]. The ACDS also provides a unified framework to enhance the traceability of fish and fishery products to improve effective marine fisheries management and promote economic cooperation in the region. Apart from that, DOFM also issues Catch Certificates for wild-caught fishery products intended for export to EU, as well as for tuna resources as part of obligation towards IOTC requirements. In 2018, DOFM has received US TED Certification for shrimp harvested in the East Coast Peninsular Malaysia, a certification system to ensure that all captured prawns exported to the US are sourced from sustainable fishing practices.

The National EAFM Steering Committee and EAFM Technical Working Group have been established to facilitate and oversee the achievement of EAFM implementation in Malaysia. Other initiatives include incorporation of EAFM element in the National Agrofood Policy (2011-2020), DOFM Strategic Fisheries Plan (2011-2020) and DOFM Capture Fisheries Management Strategic Plan (2015-2020). In addition, initiatives towards community-based resource management through EAFM was carried out in some areas such as Sabah, Sarawak, Perak, Kedah, Selangor, and Terengganu. DOFM also established two (2) refugia sites under the SEAFDEC/UNEP/GEF Project for the management of lobster in Tg. Leman, Johor and tiger prawn in Kuala Baram, Sarawak through the EAFM process. Other initiatives include a series of human resource development programmes to build capacity for ecosystem-based fishery resource management.

Indicator 4.3: By 2025, 20% of fish catch are through sustainable fisheries programmes (i.e. certified under schemes such as GAP, MSC, etc.).

Status: Progress toward target but at an insufficient rate

Malaysia has practises various management measures that contribute towards sustainable fisheries management, which are in line with the FAO Code of Conduct for Responsible Fisheries. The Code sets out principles and international standards of behaviour for responsible practices to ensure the effective conservation, management, and development of living aquatic resources. A questionnaire system has been developed by FAO to assess the level of implementation of the code by Member Country and the status is reported to the Committee of Fisheries (COFI). This assessment could be used as part of the measurement to achieve the targets.

[20] The Southeast Asian Fisheries Development Centre (SEAFDEC) is an autonomous inter-governmental body established in 1967. The mission of SEAFDEC is "To promote and facilitate concerted actions among the Member Countries to ensure the sustainability of fisheries and aquaculture in Southeast Asia." SEAFDEC comprises eleven Member Countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. Source: http://www.seafdec.org/about/

[21] Siriraksophon, S, Rukjai, P, Konphet, P and Imsamrarn, N. 2017. Automating Marine Fisheries Catch Documentation Schemes: the eACDS. Fish for the People vol. 15 no. 3.

Apart from that, the Malaysia Fish Stock Sustainability Index (MFSSI) has been developed to measure the level of each of the 53 fisheries areas according to species and areas (Fisheries Management Plans). This index is used to determine the level of sustainable catch. Initiatives are being undertaken to implement Catch Certification system to address the illegal, unreported, and unregulated (IUU) fishing and ensuring sustainable practices. The efforts for the implementation of ACDS are on-going which include the development of an electronic system (eACDS) in collaboration with SEAFDEC. The system is currently being tested in Brunei Darussalam and Malaysia will be part of the testing process with Selangor and Kelantan as the selected sites.

Action 4.4: Rationalise incentives that are harmful to biodiversity

Agricultural subsidies have become an integral part of Malaysia's agricultural policy to achieve socio-economic objectives. In Malaysia, the paddy and rice subsector command the largest share of the agricultural subsidies. There are various types of paddy subsidies and incentives such as fertilizers, seed, price, production, hill paddy (fertilizers and pesticides) aimed to improve the productivity and livelihood of farmers.

A study conducted by the Institute of Democracy and Economic Affairs (IDEAS) on rice farmers concluded that input subsidies in the form of fertilizers and pesticides have led to the continued dependence on chemical-based inputs, which leads to the degradation of soil quality and dependency on a higher amount of fertilizer to maintain yield[22]. The study also found that rice production has been stagnated despite increasing cost on subsidies with minimal gain in productivity and little improvement in the income of farmers. The Ministry of Agriculture and Agro-based Industry (MOA) and Ministry of Economic Affairs (MEA) are in the initial stage of reforming the incentive structure including, subsidy and incentive mechanisms, programs and projects, regulations and institutional structure, and rice imports, and social obligations and duties. In addition, performance-based incentives (measured by outputs) have been implemented to encourage farmers to adopt sustainable agriculture practices especially by complying with the Malaysian Good Agricultural Practices (myGAP) and myOrganic certification.

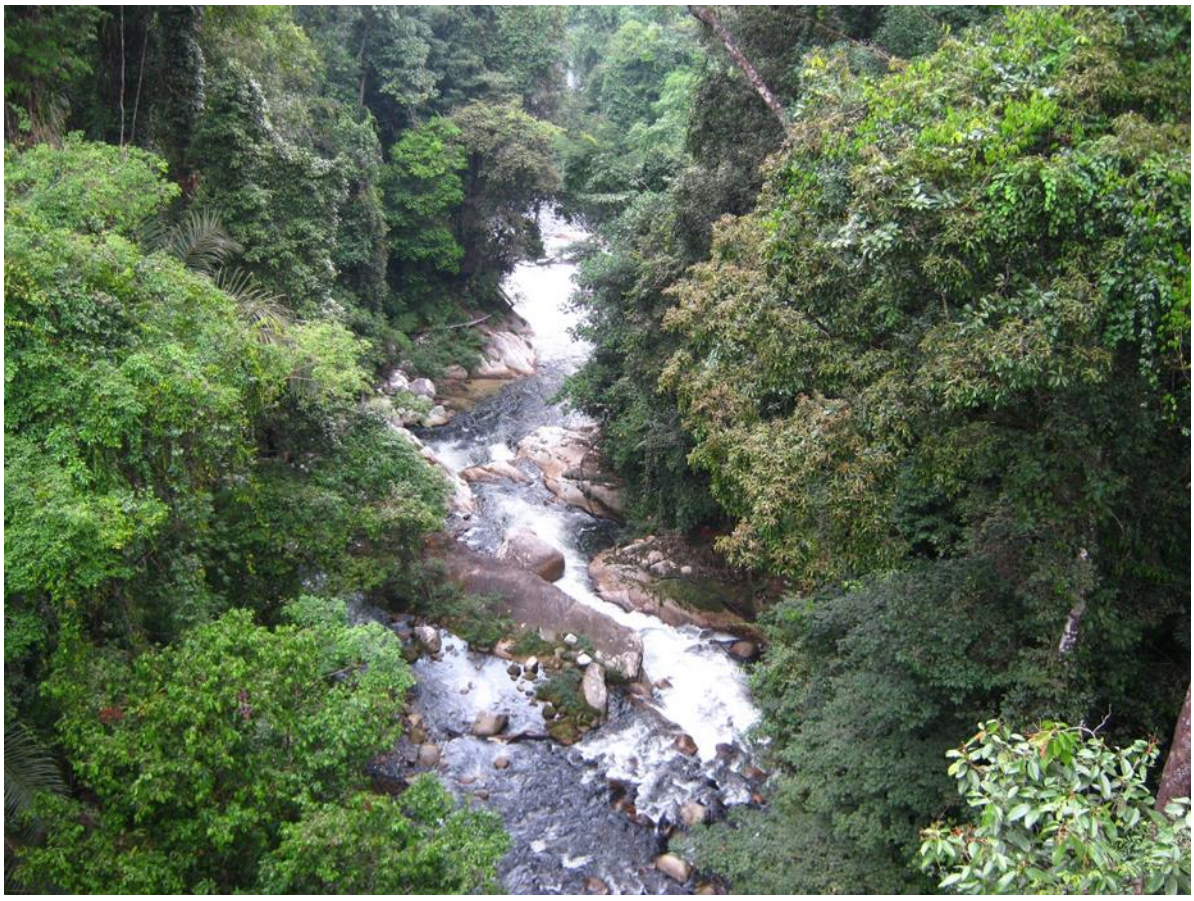
In the fisheries subsector, the Fisheries Development Authority Malaysia (FDAM) is responsible to encourage fisheries industry development in Malaysia. Among others, support is given to improve the livelihood of fishermen include infrastructure facilities and financial incentives such as fish landing jetties, catch incentives, fuel subsidies, living allowance, and life insurance. Studies to improvise and rationalize the current programme implementation are under way.

[22] Kari, F. 2018. Evaluation of Agricultural Subsidies and the Welfare of Rice Farmers. Institute of Democracy and Economic Affairs (IDEAS). ISBN: 978-967-16674-0-8.

Indicator 4.4: By 2021, perverse subsidies in the agriculture, forestry, and fisheries sectors have been identified and rationalized.

Status: Progress towards target but at an insufficient rate

While agricultural subsidies are important to address socio-economic objectives, there is a need to balance between agricultural production and environmental conservation. There are currently efforts to study the impact of agricultural and fisheries subsidies and incentives. A review of the subsidy and incentive schemes has been announced by the government to optimize resources and ensure better socio-economic and environmental outcomes.



The river catchment of Sungai Chamang, Pahang. Photo credit: FDPM.

Target 5: By 2025, tourism is sustainably managed and promotes biodiversity conservation.

In Malaysia, tourism contributes significantly to the national economy. Target 5 aims to ensure tourism is carried out through sustainable practices through the identification and mitigation of tourism impacts on biodiversity, promotion green guide certification, and engagement indigenous peoples and local communities.

Action 5.1: Identify and Mitigate Impacts of Tourism on Biodiversity

The Ministry of Tourism, Arts and Culture (MOTAC) has reviewed, updated, and published the current National Ecotourism Plan (NEP) 2016-2025. The NEP recognizes the importance of ecotourism to drive the economy while providing direction, strategies, and actions pertaining to a thriving ecotourism sector in Malaysia. The policy also emphasizes the need for collaborations between the Government, private sector and local communities, the synergy between ecotourism and conservation, marketing and promotion, and development of ecotourism clusters.

At the site level, FDPM is in the process of preparing the management plan for forest reserves and the State Park Forests. This will include details of permissible hiking activities within PRFs, and guidelines for hazards, risk assessment and risk control in forest reserves and State Park Forests. Since 2014, a total of four (4) training courses on ecotourism within forest reserves have been conducted for forest officers and personnel of state park authorities.

In the marine environment, the majority of tourism impact mitigation programmes concentrate on coral reefs areas which are major tourist attractions. Among programmes implemented in Malaysia include Green Fins which aims to regulate and monitor marine recreational activities to minimize coral damage. Trainings for tourism operators, snorkel guides, and local boatmen were given to instill care and reduce damage caused by their operations. In 2016, a rapid survey within marine parks was conducted to identify areas with human-caused damage. Coral reef rehabilitation nurseries were established adjacent to marine parks in Payar Island, Perhentian Island, Redang Island, Tioman Island, Tinggi Island and Rusukan Besar Island in 2017. Fragments that have grown to viable size are used for the rehabilitation of degraded areas.

Other initiatives include the deployment of decommissioned vessels to create alternative dive sites that reduce pressure on natural reefs. In 2017, the marine park conservation fee was revised to control visitation and activities as well as to improve facilities within marine parks. In areas of high demand, the introduction of higher user fees coupled with visitor quotas is used to control and prevent degradation of the pristine ecosystem. In Pulau Sipadan Marine Park, off the east coast of Sabah, a permit quota system was introduced to limit the number of divers per day to 120. This is to control the impact of tourism on the coral reef ecosystem. A levy is also collected from all visitors to the twelve (12) island resorts adjacent to Sipadan. Dive marshalls were appointed to monitor snorkeling, diving, and boating activities on Sipadan and surrounding islands.

Conservation fees and quota systems are also applied to curb the impact of tourism for several UNESCO World Heritage Sites, e.g. the Mount Kinabalu National Park in Sabah and the Mulu National Park in Sarawak. To expand recognized natural areas, two additional sites Royal Belum State Park in Perak and

the Forest Research Institute Malaysia (FRIM) Selangor Forest Park have been nominated for UNESCO recognition.

For areas which have been severely impacted by tourism activities, a more intensive measure – area closure – has been employed. Parts of the Endau Rompin National Park in Johor and Pulau Sembilan off the coast of Perak, both sites which have received high tourism pressure were closed by respective state governments in 2017. The Endau Rompin National Park reopened in August 2018.

Indicator 5.1: By 2025, 50 tourism sites/resorts have been certified under Global Sustainable Tourism Criteria (GSTC) or similar schemes.

Status: On track to achieve target

The Global Sustainable Tourism Criteria (GSTC) is originally espoused by the National Ecotourism Plan 2016-2025. In practice, Malaysia has adopted the equivalent standard in Malaysia Tourism Quality Assurance (MyTQA) and the ASEAN Green Hotel Standard. The former is a national initiative taken by MOTAC, while the latter is an ASEAN-wide certification to encourage environmentally friendly and energy conservation in the accommodation industry. The standard will establish a professional Green Hotel Operation, environmental plan, green product, human resource, and environmental management. As of 2018, twenty (20) hotels have been certified under ASEAN Green Hotel Standard. Additionally, twenty (20) ecotourism sites have been certified under MyTQA.

Action 5.2: Promote Green Guide Certification

Since 1996, the Nature Guide Certification Programme (Level 2) was initiated by MOTAC to provide nature guide training courses in Peninsular, Sabah, and Sarawak. Also known as the green badge programme, the course aims to encourage greater participation of ILCs in ecotourism to improve their livelihood in line with the National Ecotourism Plan and the Rural Tourism Plan. The Nature Guide Course is open to all interested Malaysians who meet the basic educational requirement[23]. Thus far, funding to implement the green badge programme is supported by donor agencies and state agencies and CSOs.

Currently, a new National Occupational Skills Standard (NOSS) module to update and replace existing nature guide training modules has been developed by the Department of Skills Development (JPK) under the Ministry of Human Resource (MOHR), in collaboration with MOTAC, the Forestry Department of Peninsular Malaysia (FDPM), Association of Malaysian Tourism Training Institutes (ATTIM) and Malaysia Nature Guide Association (MANAGA). The course for the year 2019 has adopted the new NOSS to be recognized as Malaysia Skills Certificate. Certified tour guides are also required to undertake "Continuing Tourism Related Education" to ensure that the Guides acquired updated and better knowledge of tourism products. In response to increased demand in niche tourism, MOTAC has begun discussion on birdwatching courses and certification with major industry players on zoning, birding activities, specialized

[23] A minimum of Primary Certificate of Education (SRP) or Lower Secondary Assessment (PMR) or recommended by relevant authorities (Ministry of Tourism, Arts and Culture / local authority / district officer / headmaster / inner crafts etc) of indigenous groups. Source: MOTAC.

birding module to boost the small-scale industry operated by indigenous and local communities in rural areas.

In Sarawak, guiding within the national parks or nature reserves requires a license issued under the National Parks and Nature Reserves Ordinance (1998). As of December 2018, a total of 302 park guides were trained through the Park Guide Training and Licensing System. SFC conducts the training as a certificate course with Universiti Teknologi MARA (UiTM), which emphasizes nature and conservation-related subjects.

Indicator 5.2: By 2018, all tourism guides for nature-based attractions have been certified as green guides.

Status: On track to exceed target
As of 2018, there are 3,098 certified guides in Malaysia with Green Badge operating in major ecotourism sites. The certification requires renewal after two years. There will be continuous effort to train green guides to promote ecotourism.

Action 5.3 Engage Indigenous Peoples and Local Communities in Nature Tourism and Promote Volunteerism

Community-based tourism enables the participation and engagement of the ILCs in the tourism sector to enhance the experience. The Malaysian Homestay Programme (MHP)[24] was initiated at the national level in 1995 by MOTAC in collaboration with the Ministry of Rural Development Malaysia (MRDM), the Ministry of Agriculture and Agro-based Industry (MOA) and the respective state governments. The MHP offers a wide multiplier socio-economic effect by stimulating other ancillary tourism activities such as eco-tours, agro-tours, and cultural tours. As of 2017, there are a total of 201 homestay clusters or villages across every state in the country including in East Malaysia and has garnered RM 27.7 million in revenue.

ILCs are often found living in adjacent to protected areas. In Taman Negara National Parks, Royal Belum State Park and Endau Rompin Johor National Park, ecotourism development is carried out with engagement of ILCs as well as empowerment through relevant trainings. In these places, the park authorities work closely and communicate with the ILCs. This has allowed the ILCs to preserve their customs and traditions while providing opportunities to participate in the local economy. For example, in Terengganu, the forestry department has appointed 35 ILCs as the guide for the Mount Berembun since 2014.

In the marine parks, capacity building and alternative livelihood support programmes have been carried out since 2011 for local communities living on marine park islands. Courses that have benefitted the local communities include Emergency First Response and Water Rescue, language courses, SCUBA Diving courses, Basic Safety Training, Nature Guide, and Hospitality courses. These programmes also introduce avenues where local communities can be involved in the ecotourism industry.

[24] Female participation rate in homestay and the cottage industries are high and it has fostered confidence through entrepreneurship, new skillsets, income, and foster social cohesion among the local communities.

Outside of PAs, community involvement in co-management can lead to empowerment and improved quality of life. Some of these bottom-up efforts are demonstrated by the Penang Inshore Fisheries Welfare Association (PIFWA) and the Setiu Women Entrepreneurs (PEWANIS). Global Environment Centre (GEC) initiated Friends of the Peatland/ Mangrove Programme, which has led to the establishment of a network of "Friends of Peat and Mangrove" in multiple localities that are recognized and supported by the government. Among others, the community-based organizations (CBOs) contributed through setting up nurseries to supply saplings for tree planting activities, operating eco-tourism activity, as well as developing local handicraft products using resources that are derived from the mangrove/peatland areas. The CBOs also participate in various outreach events such as tree planting activities, public talks, roadshows, exhibitions, and other awareness programmes.

In Sabah, the model in Batu Puteh Village, Lower Kinabatangan floodplain, is widely regarded as a success. The communities established MESCOT (Model Ecologically Sustainable Community Based Conservation and Tourism) since 1998 with support from Sabah Ministry of Tourism, Culture and Environment. One of the major activities of MESCOT is the Miso Walai homestay, which offers an experience of the Sungai tribe's lifestyle and customs along with ecotourism activities along the Kinabatangan Wetlands. The Cooperative has continuously sustained tourism revenue by preserving nature, developed sustainable livelihood around tourism, and supporting training development for local communities. In addition, there are a series of communities involved in the ECOLINC Project at the foothill of Mount Kinabalu as well as communities participating in the Social Forestry initiatives. In Sarawak, the eBario project implemented for the Kelabit Community in Bario village has seen a rising standard of living of the communities through improved tourism associated with the adoption of ICT. Other CBTs can be found in Maludam National Park and Mulu National Park.

Indicator 5.3: By 2025, the number of indigenous peoples and local communities actively participating in ecotourism has doubled compared to the 2016 level.

Status: On track to achieve target

In 2018, 4,071 local communities participated in the Malaysia Homestay Programme compared to 3,653 in 2016. Additionally, initiatives to involve indigenous peoples have empowered them to engage in ecotourism. For example, in 2018, MOTAC implemented the Bateq Jungle Hut Dedari Project with the participation of 38 Bateq tribe members living near Taman Negara National Park to provide *orang asli* style accommodation facilities.

The karst features of the Mulu National Park, a UNESCO World Heritage Site for nature. Photo credit: Sarawak Forestry Corporation

Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures.

Protected areas have existed in Malaysia since 1903 (Chior Wildlife Reserve, Perak). Since then, the number of protected areas established and managed by various governance structures have increased. Recognizing that PAs are an indispensable tool in preserving the rich biodiversity and ecosystems, Malaysia has been committed to increasing the coverage and ecological representativeness of the existing PAs. The focus is also given to improve the management effectiveness of the PA authorities. Target 6 is designed to expand the terrestrial and marine PA coverage, facilitate the recognition of Community Conserved Areas and improve the management.

Action 6.1: Expand the extent and representativeness of our terrestrial PA network

As of June 2016, the total terrestrial and inland water areas gazetted for protection comprises 13.2% of the total land area of Malaysia. This translates to approximately 4.35 million ha (1.84 million ha in Peninsular Malaysia, 1.80 million ha in Sabah[25], and 0.71 million ha in Sarawak). This figure takes into considerations i. National parks, state parks and nature reserve under the relevant park/ forestry law; ii. Areas reserved under the land laws; iii. Protection Forests under the forestry policy and laws; and iv. wildlife sanctuaries or wildlife reserves under the wildlife laws. The study also provided a list of potential PAs which are being protected but not currently listed as PA.

Since then, continuous efforts to increase the coverage of terrestrial PAs are ongoing. For example, the Terengganu State Government has recently passed Terengganu State Park Enactment 2017 and proceeded to set up the Terengganu State Park Unit. As a result, two new state parks were gazetted - Setiu Wetlands (432.4 ha) and the Kenyir State Park. In November 2018, the size of the gazetted Kenyir State Park was expanded from the original 10,386 ha to 30,000 ha. The concepts of OECM are currently being explored.

In addition to gazetted protected areas, other examples of conservation measures driven by international recognition are the UNESCO World Heritage Sites (Mulu National Park and Kinabalu National Park), UNESCO Man and Biosphere Programme sites (Tasik Chini Biosphere Reserve and Crocker Range Biosphere Reserve); and UNESCO Global Geopark of Langkawi Island. Several other identified potential conservation areas include the international Important Bird and Biodiversity Area (IBAs) promulgated by the Malaysian Nature Society (MNS) as a partner of Birdlife International[26]. There are 55 sites across Malaysia named as IBAs. In addition, under the cross-border partnership of the East Asian-Australasian Flyway Partnership (EAAFP), Bako Buntal Bay in Sarawak has been identified as an important flyway for migratory water birds. Similarly, Malaysia has seven (7) Ramsar sites denoting wetlands of international importance, with a total area of 134,182 ha (See Table 10).

[25] The Sabah State Government has announced the aim to increase protected area coverage to 30% of Sabah's land area by 2025. Source: Sabah Forestry Department, 2017. "Landmark Science Project to Expand Sabah's Protected Forests". Accessed 30 Jan 2019 at: http://www.forest.sabah.gov.my/media-centre/broadcast/press-release/654-landmark-science-project-to-expand-sabah-s-protected-forests

[26] Source: https://www.birdlife.org/

Table 10: List of Ramsar Sites in Malaysia.

No	Ramsar Site	Size (ha)	Designation date
1	Kota Kinabalu Wetland, SABAH	24.2	22 Oct 2016
2	Kuching Wetlands National Park, SARAWAK	6,610.0	8 Nov 2005
3	Lower Kinabatangan – Segama Wetland, SABAH	78,803.0	8 Sept 2008
4	Tanjung Piai, JOHOR	526.0	31 Jan 2003
5	Sungai Pulai, JOHOR	9,126.0	31 Jan 2003
6	Pulau Kukup, JOHOR	647.0	31 Jan 2003
7	Tasek Bera, PAHANG	68,446.0	10 Nov 1994

In the freshwater ecosystem, one of the main management measures being the establishment of freshwater protected areas that includes sanctuaries and fish estates by the Department of Fisheries Malaysia. These protected areas are categorized as fully protected (no-take-zones) or partially protected (open and close seasons). The list of freshwater protected areas are:

Fully Protected
a) Freshwater Sanctuary Timah Tasoh, Padang Besar, Perlis
b) Arowana Sanctuary in Bukit Merah, Perak
c) Freshwater Sanctuary Sungai Chiling, Hulu Selangor, Selangor
d) Freshwater Sanctuary Sungai Serau, Lipis, Pahang
e) Freshwater Sanctuary Sungai Sat, Jerantut, Pahang
f) Freshwater Sanctuary Ulu Kuantan, Kuantan, Pahang
g) Freshwater Sanctuary Sungai Pelong, Setiu, Terengganu
h) Mahseer Sanctuary Sungai Petang, Hulu Terengganu, Terengganu
i) Fisheries Biodiversity Park, Sungai Loh, Dungun, Terengganu
j) Freshwater Sanctuary Jeram Mengaji, Pasir Puteh, Kelantan

Partially Protected
a) Fish Estate Paya Cempaka, Lanchang, Pahang
b) Fish Estate Paya Lanar, Lanchang, Pahang
c) Fish Estate Bangau Tanjung, Temerloh, Pahang
d) Fish Estate Kubuk Kawah, Temerloh Pahang

Indicator 6.1: By 2025, 20% of the land surface and inland waters are conserved as protected areas or other effective area-based conservation measures

Status: Progress toward target but at an insufficient rate
As of June 2016, the terrestrial PAs coverage for Malaysia is 13.2% or 4.35 million ha. There has been an increasing trend of gazettement of state parks, most recently Segari Melintang State Park and Kenyir State Park. There is also the potential to achieve the target through formalization and gazettement of OECMs.

Action 6.2: Expand the extent and representativeness of our marine PA network

Marine Protected Areas (MPAs) are managed by the Department of Fisheries in Peninsular, Sabah Parks in Sabah, and SFC in Sarawak. In 2016, Malaysia's total coverage of gazetted MPAs[27] stands at 3.3% or 1.51 million ha. Notably, the gazettement of the 0.90 million ha Tun Mustapha Park (TMP) off the coast of Sabah is a culmination of more than a ten-year planning process between the Sabah Parks and WWF-Malaysia (See Box 2). A number of MPAs have been gazetted after 2016 which is not reflected in this report. This includes the 1.01 million ha Luconia Shoals off the Sarawak coast. At the time of reporting, three new marine parks are in the process of gazettement namely Lima Group of Islands in Mersing, Johor; Song Song Group of islands off Yan, Kedah; Tanjung Tuan, Negeri Sembilan/Melaka; and Besar group of Islands and coastal mangrove areas in Melaka.

Aside from MPAs, the internationally recognized marine conservation areas - Important Marine Mammal Area (IMMA)- a global initiative developed by the IUCN Marine Mammal Protected Areas Task Force to identify areas of habitat throughout the world's seas and oceans that are important for marine mammal management and conservation. IMMAs are potential sites for MPAs. In Malaysia, there are currently five IMMAs as of 2018 (See Table 11). Two more sites are being considered for recognition – Bay of Brunei and Lower Kinabatangan Estuarine and Coastal Area.

Table 11: The list of IMMAs in Malaysia.

No	IMMA Name	Size (ha)	Location
1	Satun-Langkawi Archipelago	549,300	Peninsular Malaysia
2	Matang Mangroves and Coastal Waters	238,600	Peninsular Malaysia
3	Mersing Archipelago	124,400	Peninsular Malaysia
4	Kuching Bay	(47,500)	Sarawak
5	Similajau-Kuala Nyalau Coastline	(123,500)	Sarawak
	Total	1.083 million ha	

Additionally, other existing conserved marine areas including fisheries prohibited areas, turtle sanctuaries, and sea cucumber protection zones comprise approximately 1.1% of the total Malaysian marine waters. One exemplary case of the marine conserved area is the transboundary Turtle Island Heritage Park (TIHPA), which was the result of the bilateral agreement between the government of Philippines and Malaysia signed in 1996. TIHPA area hosts a remarkable diversity of marine fauna, notably corals and fishes, as well as a number of species of terrestrial plants, birds and other reptiles. The experience and lesson-learned on transboundary governance subsequently have given rise to similar collaborative efforts such as the Sulu-Sulawesi Marine Ecoregion between Indonesia-Malaysia-Philippines ratified in 2006, the Coral Triangle Initiative (CTI) signed in 2009, and the South China Sea Fisheries Refugia Initiative which began in 2017. Efforts to recognize OECM in the marine environment is currently under way.

[27] According to Fisheries Act 1985, marine park is defined as *"a protected area in the sea zoned two (2) nautical nautical miles from the shore at lowest low tide, EXCEPT Kapas Island in Terengganu; Kuraman Island, Rusukan Besar Island and Rusukan Kecil Island in Labuan which are zoned one (1) nautical mile from the shore at lowest low tide."*

Indicator 6.2: By 2025, at least of 10% of the coastal and marine territories are conserved as marine protected areas or other effective area-based conservation measures.

Status: Progress toward target but at an insufficient rate
As of June 2016, the MPA coverage for Malaysia is 3.3% or 1.51 million ha. There has been an increasing trend of gazettement of marine parks, most recently being Luconia Shoals Marine National Park off the coast of Sarawak. There is also the potential to achieve the target through formalization and gazettement of OECMs.

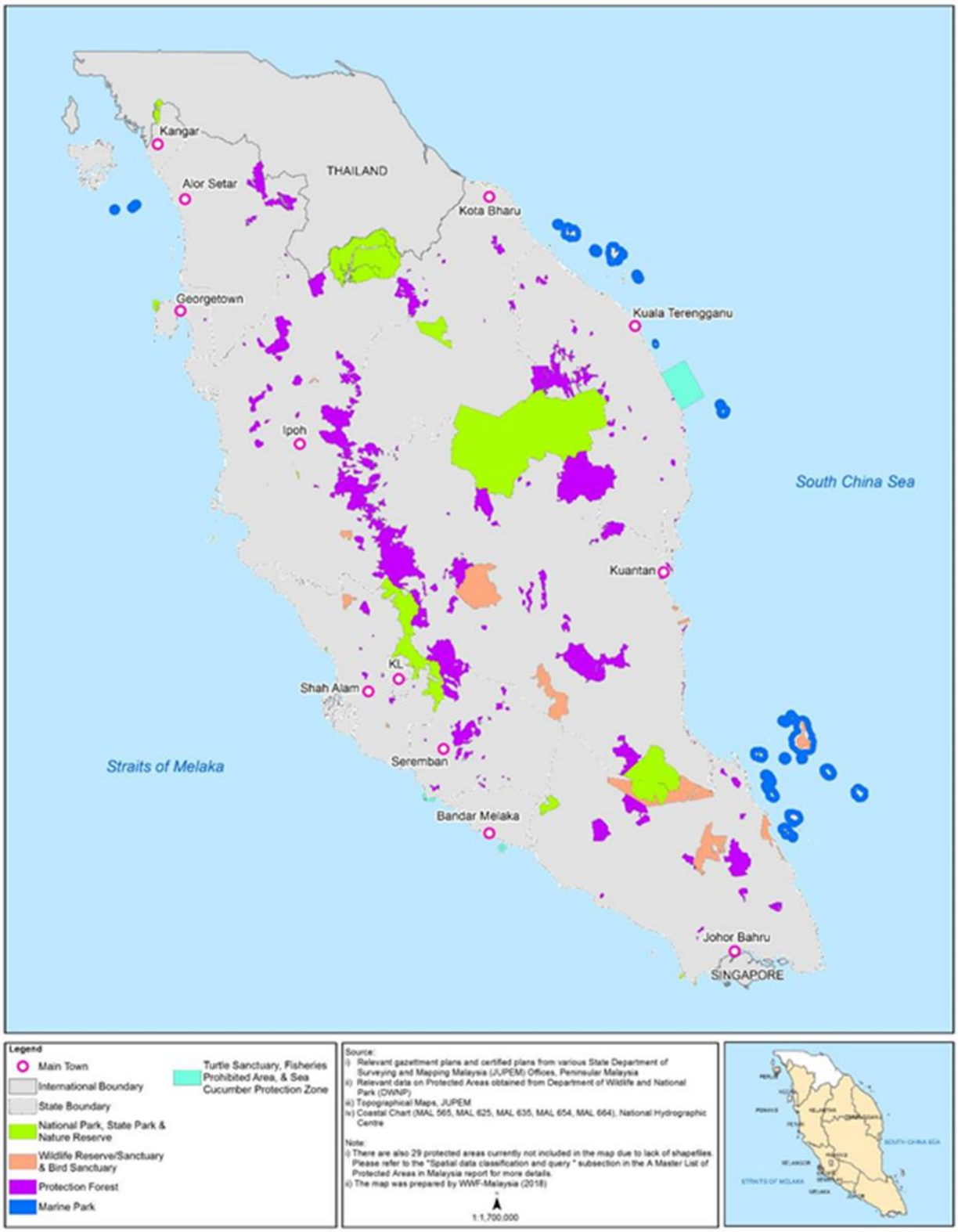


Figure 13: Distribution of Protected Areas in Peninsular Malaysia based on National Categories.

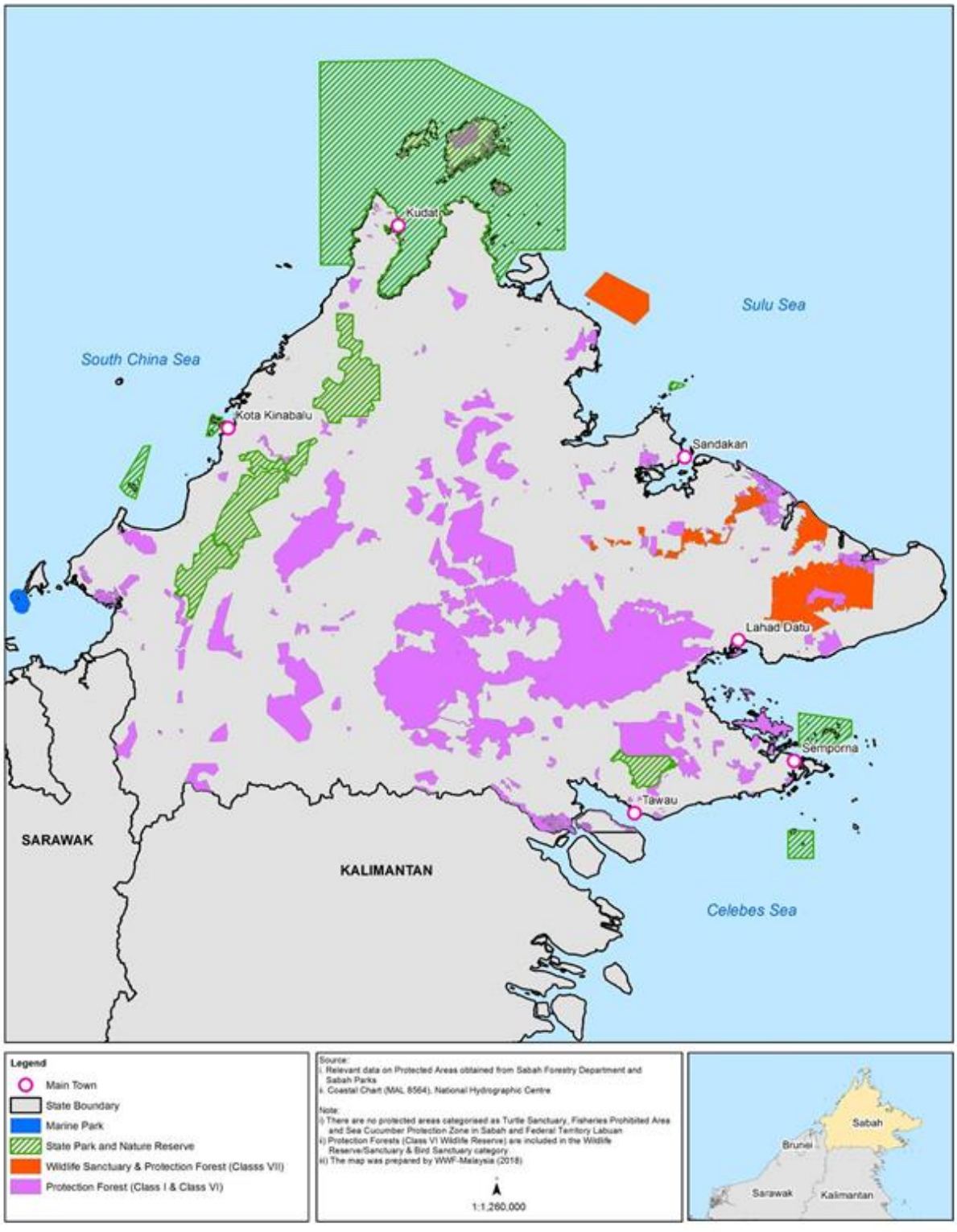


Figure 14: Distribution of Protected Areas in Sabah and Federal Territory of Labuan based on National Categories.

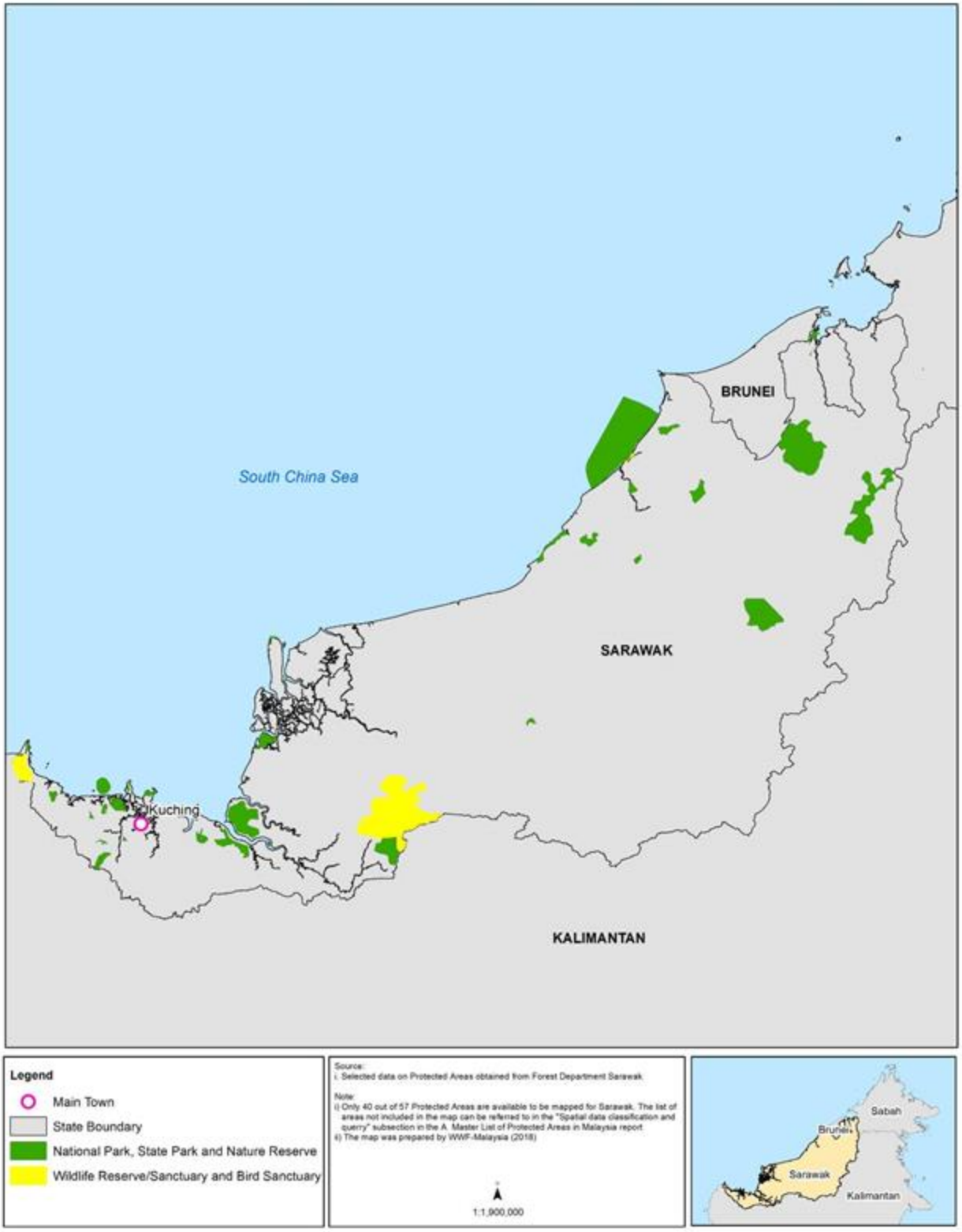


Figure 15 : Distribution of Selected Protected Areas in Sarawak based on National Categories.

Action 6.3 Develop community conserved areas as an integral part of the PA network

Community conserved areas, or CCAs, represent an alternative form of conservation that involves indigenous and local communities (ILCs) voluntarily conserving an adjacent natural area with significant biodiversity, ecological, and cultural values. The conservation objectives are achieved through sustainable use of the ecosystem guided by traditional knowledge and customary laws. As CCA, or ICCAs (indigenous people and communities conserved areas) is a new concept in Malaysia, efforts to define and create a framework for the management of ICCAs are at the early stage. However, policy recognition or the principles of ICCA can be found in a number of national and state documents including The National Physical Plan 3 (2016–2020), the Sabah Biodiversity Strategy (2012–2022), the Heart of Borneo Strategic Plan of Action (2014–2020) as well as the NPBD (2016–2025).

The majority of discussions on ICCAs currently take place in Sabah, where ILCs are organized and represented in the local government. An ICCA review was first undertaken in 2011 to document the connection between the ICCA concepts and the existing community governance of biodiversity in Sabah[28]. In December 2018, a national multi-stakeholder consultation workshop on ICCAs was held by PACOS Trust and GEF-SGP. The workshop aimed to form an ICCA Working Group and work toward developing a national ICCA strategy. The established examples include the Community Use Zones (CUZ) within the Crocker Range Park (CRP). These CUZs are co-managed by both Sabah Parks and the local communities. The legal framework for the establishment of CUZs was approved by the State Legislative Assembly in the 2007 amendment to the Parks Enactment 1984. Additionally, Sabah Parks and the Sabah Wildlife Department (SWD) have been recruiting ILCs as 'Honorary Park/ Wildlife Rangers' to monitor and patrol their areas.

There are a number of ongoing projects from international agencies dedicated to support ICCAs development and to promote the role of ILCs in conservation. This includes the EU-REDD+ Tackling Climate Change through Sustainable Forest Management and Community Development Project which has a component to support the community-based restoration of degraded habitat and sustainable agriculture within CCAs in the Kinabalu ECOLINC region. A similar initiative, the Community Conservation Resilience Initiative (CCRI) is being undertaken by PACOS Trust. The initiative aims to increase the resilience of Indigenous peoples' customary institutions and natural resource stewardship systems through constructive engagements with the decision-making processes.

In the urban setting, the Ara Damansara Ecopark and the Kota Damansara Community Forest located in Selangor are good examples of community-driven CCAs. More recently, the Malaysian Nature Society (MNS) has established the Urban Community Forest (UCF) Network to rally local urban communities in support of conserving the Federal Hill, which lies in the heart of the city. The UCF Project complements the green network of the Perdana Botanical Gardens and the new Taman Tugu Park in forming the green lung of Kuala Lumpur.

Indicator 6.3: By 2025, the number/size of community conserved areas has doubled compared to the 2016 level.

[28] Majid Cooke, F. and Vaz, J. (2011) A Review of Indigenous and Community Conserved Areas in Sabah. Global Diversity Foundation for the Sabah Biodiversity Centre, Bornean Biodiversity and Ecosystem Conservation Project II, Kota Kinabalu.

Status: Progress toward target but at an insufficient rate
Community Conserved Areas (CCA) have yet to be defined and inventorized. There are currently limited legal frameworks to enable the establishment of ICCAs. The Biodiversity Baseline Study has identified 86 conservation projects that involved ILCs, of which 29 are ICCA Projects while the other 57 are community outreach, tree-planting, and habitat restoration projects. The majority of the identified projects take place in Sabah and Sarawak.

Action 6.4 Improve the effectiveness of PA management

To streamline the management of PAs, KATS has adopted the National Framework for Protected Areas (NFPA). Through the NFPA, a national definition for PA is made available by adapting IUCN and CBD definitions into a local context. This new standard definition expands opportunities to view PA designation beyond legal gazettes to include alternative regulatory mechanisms like OECM. In addition, the NFPA also provides a uniform classification of PAs in Malaysia. A set of prioritized strategies and actions were specified to achieve six objectives: Strengthen and streamline PA governance; ensure ecological representativeness of the PA network; ensure effective PA coverage; enhance conservation of biodiversity resources and PA management; empower stakeholders' participation; and diversify funding sources. Notably, three distinct PA Working Groups have been suggested to undertake the action plans for the regions of Peninsular Malaysia, Sabah and Sarawak respectively.

For marine parks, assessments of marine park management effectiveness were carried out for all marine parks using the Management Effectiveness Assessment Tool (MEAT) developed by the MPA Technical Working Group of Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF). All marine parks in Peninsular Malaysia achieved the highest ranking of 4 (Established) under the assessment except for Tioman Island Marine Park, Pahang, and Kuraman Island Marine Park, Federal Territory Labuan that achieved rank 3 (Sustained Level) while Payar Island Marine Park has yet to be assessed. The assessment has enabled the department to analyze gaps in marine park management and make improvements using the information garnered from the studies.

Indicator 6.4: By 2018, the national Protected Area framework has been established.

Status: On track to exceed target
The National Framework for Protected Area has been established to provide, among others, a standard definition for PAs, a uniform classification for PAs and the coordination structure for PAs in Malaysia.

Action 6.5 Protect and maintain biodiversity in urban areas

PLANMalaysia which has a mandate over land use planning, development and conservation at the federal, state and local level launched the National Urbanization Policy 2 (NUP) in 2017 to guide and coordinate sustainable urban planning and development in Malaysia. In terms of biodiversity protection, the Policy calls for an increase in the proportion of green space and the protection of water bodies as part of urban development planning. PLANMalaysia's function on urban biodiversity has been strengthened by the establishment of the Public Park Supervision and Coordination Division in 1990, which acts as an advisory

body to the state governments, local governments, and other government agencies with regard to planning, and also provides services such as landscape design to various other governmental bodies. Additionally, the Town and Country Planning Act 1976 and the Town and Country Planning (Amendment) Act 1995 highlights the importance of urban parks, which was captured as open space[29]. According to PLANMalaysia's Planning Guideline for Open Space, the target is to achieve 2 ha of open space for every 1000 people by 2020.

Urban biodiversity protection has been undertaken via the National Landscape Policy (NLP) 2011-2020, implemented by the National Landscape Department (NLD). The NLP aims to transform Malaysia into The Beautiful Garden Nation by 2020. Among others, the strategies and action plans include the requirement of having 30% of development areas maintained and kept green. In 2014, the National Landscape Department (NLD) initiated the Urban Landscape Programme with the objective to revitalize the urban features and conditions to ensure a sustainable and vibrant atmosphere. Currently, NLD has developed and maintained 53 public parks nationwide with a total of 1,671.31 ha. To encourage the use of local endemic trees for landscaping, the 'Malaysian Threatened and Rare Tree Species Guideline for landscaping' was published. In addition, NLD runs the Rakan Park community programme where local communities are given the responsibility to be guardians of their community parks. By 2017, 62 Rakan Taman groups have been formed nationwide.

Since 2017, a new entity - the Forestry Department Federal Territory (FDFT) has been established under the FDPM to coordinate the forest resources in federal territories of Putrajaya, Kuala Lumpur and Labuan. FDPM has also supported the conservation of urban biodiversity through various initiatives including the planting of 26 million trees. As of 2018, more than 90 million trees have been planted covering an area of 121,724 ha throughout Peninsular Malaysia. This is in addition to the establishment of KL Forest Eco Park, ten (10) arboretums, and the distribution of seedlings for urban planting in collaboration with NGOs and local communities. An urban biodiversity survey was also piloted in the administrative capital of Putrajaya. The study analyzed roadkill species, factors affecting roadkill, pathogens in arthropod vectors and bat species richness. The results of this survey will contribute to the formulation of more urban biodiversity management plans in Malaysia.

Within the state of Selangor, a number of urban green areas have been gazetted under land enactments. One example is the Bukit Gasing "Green Belt" reserve gazetted under the National Land Code, which is managed by the Petaling Jaya City Council with active support from local residents. Similarly, the Batu Caves Reserve ("a reserve for the purpose of public recreation") was designated using the Selangor Land Enactment. More recently, the Malaysian Nature Society (MNS) has established the Urban Community Forest (UCF) Network in 2018 to provide a network for urban communities in conserving urban green areas in the Klang Valley like Bukit Persekutuan, Bukit Kiara, Bukit Cerakah and Bukit Gasing. Bukit Persekutuan is the biggest last remaining green area in the KL City Center which forms a green corridor with the adjacent Perdana Botanical Gardens, Taman Tugu Park, Bukit Tugu and Parliament areas.

Malaysia has maintained dedicated training programmes to cultivate and enhance the capabilities of arborists in the country. Currently, there are 120 certified arborists in Malaysia recognized under the International Society of Arboriculture.

[29] "open space" means any land whether enclosed or not which is laid out or reserved for laying out wholly or partly as a public garden, park, sports and recreation ground, pleasure ground, walk or as a public place. Source: Town and Country Planning Act 1976.

Indicator 6.5: By 2018, the national action plan for the conservation of urban biodiversity has been formulated.

Status: On track to achieve target

In Malaysia, the National Landscape Policy 2011-2020 serves as the guide to conserve urban biodiversity.

BOX 4

Piasau Nature Reserve (PNR) – A relinquished camp gazetted as totally protected nature reserve in the urban area of Miri, Sarawak

The Piasau Nature Reserve (PNR) sits on a site originally known as Piasau Camp. Piasau Camp was built in the 1950s to house Sarawak Shell Berhad (SSB) employees. Since then, the sighting of nesting pairs of Oriental Pied hornbills has drawn public interest for the protection of the site. Subsequently, the Sarawak state government made a decision to gazette PNR in 2014 following the transfer of land rights from Sarawak Shell Berhad to the management authority - Sarawak Forestry Corporation (SFC) in 2015.

Located about 5 km north of Miri City Centre in the suburb of Piasau, the 88.50 ha park consists of inland coastal forest and sandy beach vegetation. Despite being located in an urban area, PNR hosts variety of protected fauna species and 107 plant species. More than 20 Oriental pied hornbills are residents of PNR. Piasau Nature Reserve is intended as the green lung for Miri city with recreational, scientific and educational values for the public.

The State Government, via the Ministry of Urban Development and Natural Resources (MUDeNR), began park redevelopment works by phases - building demolitions, enrichment planting, landscape restoration and biodiversity protection. The demolition work was completed with the support from Shell, and current ongoing initiatives include 'Bring Back the Rainforest' Project launched in September 2016. The Project aims to bring back the rainforest landscape to Piasau Nature Reserve (PNR) through enrichment planting and adoption programme by corporates or individuals.

Currently, five gardens, namely, Piasau Garden, Mixed Species Garden, Fruit Tree Garden, Ficus Garden and Herbal Garden have been established, located in Zone 2 (Visitors Use) and Zone 3 (High Density Use) based on the zoning specifications described in the Masterplan for Piasau Nature Reserve. Concurrently, the adoption programme has been developed to provide a platform to engage stakeholders for financial contributions and conservation activities. An Endowment Fund has also been set up to fund the operation and maintenance of Piasau Nature Reserve.

The demarcation of PNR is an example of excellent cooperation between the community, private sector and relevant authorities for a community-based urban park. Through the process, the Piasau Camp Miri Nature Park Society (PCMNPS) was established to contributes towards the conservation and appreciation of the environment at PNR. The society works closely with the relevant authorities such as the Forest Department Sarawak (FDS), Sarawak Forestry Cooperation (SFC), Malaysian Nature Society (MNS), universities, schools and the local community to carry out various projects and programmes.

Figure 16: The presence of Oriental pied hornbill rallied residents of Piasau to call for protection of PNR. Photo: Sarawak Forestry Corporation

Target 7: By 2025, vulnerable ecosystems and habitats, particularly limestone hills, wetlands, coral reefs and seagrass beds, are adequately protected and restored.

Examples of vulnerable ecosystems in Malaysia include mangrove, coral reefs, seagrass beds, limestone forest, caves, riverine habitats peat swamp, and wetlands. These ecosystems harbour valuable biodiversity, some of which have a narrow distributional range, demonstrate high site-affinity and are highly endemic. Despite its ecological importance, there might be an inadequate representation of such vulnerable ecosystems in the current protected area network. Target 7 was established to identify and map these vulnerable ecosystems, enhance its management and rehabilitation, and also call for better protection of peatlands via strengthened implementation of the National Action Plan on Peatlands.

Action 7.1: Identify, map and protect all vulnerable ecosystems

Vulnerable ecosystems include limestone caves and forests, inland river basins and coastal and marine ecosystems such as mangroves, coral reefs, and seagrass beds. Periodic mapping of vulnerable ecosystems is essential for monitoring change and impacts on critical habitats as well as to inform conservation efforts. The Eleventh Malaysia Plan (11MP) and the National Physical Plan 3 has specified the need to identify and map these vulnerable ecosystems.

Spatial mapping for mangrove areas in Malaysia using remote sensing and geographic information system (GIS) have been conducted by Forest Research Institute Malaysia (FRIM). The study identified mangrove coverage and tracked the rate of loss over more than three decades since 1990 – 2017[30]. Figure 16 shows the percentage of mangrove coverage across Peninsular, Sabah, and Sarawak. In addition to mangroves, two major limestone studies are being carried out; i) a nation-wide mapping of limestone hills to create the first Malaysian limestone karst (MYKARST) database by Universiti Malaysia Sabah (UMS); ii) A project to document plant biodiversity in limestone ecosystems of Kelantan and Perlis by FRIM. The projects will be used to formulate future policies for limestone hills. Aside from limestone in existing protected areas, limestone habitats are also protected through the gazettement of geoparks by respective state governments. In 2018, two national geoparks were gazetted; the Kinta Valley Geopark by the Perak Government and the Jerai Geopark by the Kedah State Government. In Sarawak, a large portion of the limestone mountains and hills are protected as part of National Parks such as Gunong Mulu, Niah, Derid Kerian, Kejin Tugang, and Gunung Buda and nature reserves such as Wind Cave and Fairy Cave.

[30] Omar, H. Misman, MA, and Musa, S. 2019. GIS and Remote Sensing for Mangroves Mapping and Monitoring. Available at: https://www.intechopen.com/online-first/gis-and-remote-sensing-for-mangroves-mapping-and-monitoring

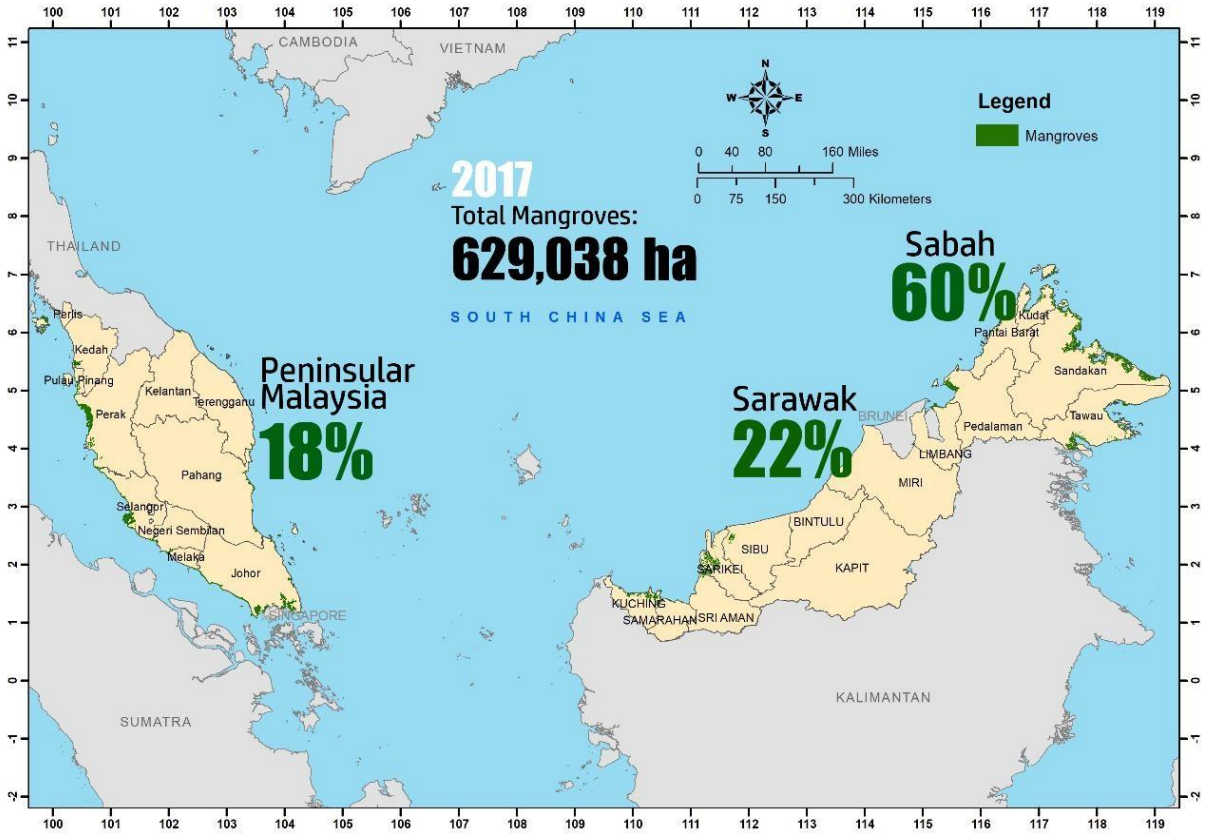


Figure 17: Distribution of mangroves in Malaysia in 2017. Mangroves are found mainly along the west coast of Peninsular Malaysia, west coast of Sarawak and the east coast of Sabah. (Source: FRIM, 2017)

Other forms of vulnerable ecosystems are water catchments and river basins essential for water supply. The state government is gazetting forested water catchment areas under respective Forest Enactments. Between 2016-2020, 25 Integrated River Basin Management Plans (IRBM) are expected to be completed under the Eleventh Malaysia Plan to ensure coordination between stakeholders to enhance protection, conservation, and integrated approach to river basin management in Malaysia.

In the marine realm, annual national reef surveys have been conducted by ReefCheck in close collaboration with government and non-government partners. ReefCheck has also undertaken a local impact study of critical coral reefs areas in Malaysia. DOFM has mapped areas of coral reefs within MPAs and identified potential coral reef areas outside of MPAs that may be gazetted. The seagrass coverage of Malaysia has been established through a GEF funded project in 2006. On a smaller scale, Universiti Putra Malaysia (UPM) conducted seagrass mapping off the coast of Kelantan, Terengganu and Lawas, Sarawak, to examine the spatio-temporal changes in seagrass habitat between 1988-2014. In the waters off Sarawak, 26 permanent sampling plots were set up along the Lawas coastal waters to monitor the seagrass spatial-temporal distribution and abundance pattern. In Sabah, WWF Malaysia has conducted seagrass assessments in the Semporna Priority Conservation Area.

Indicator 7.1: By 2020, all vulnerable ecosystems have been mapped and by 2025, 50% of these ecosystems are legally protected.

Status: Progress towards target but at an insufficient rate
Vulnerable ecosystems particularly limestone hills, wetlands, coral reefs, and seagrass beds have yet to be fully mapped and studied. To some extent, these ecosystems are already protected under the protected area network. Additional protection will require knowledge of the full extent of these ecosystems. Other vulnerable ecosystems not identified in the NPBD (freshwater swamps, heath forest, quartz montane forest, estuaries, tidal marshes, mudflats and seamounts) have yet to be fully understood and mapped.

Action 7.2: Improve management and rehabilitation of vulnerable ecosystems

Rehabilitation for degraded forest ecosystems have been implemented through the Restoration, Reclamation and Rehabilitation of Degraded Forest Area Project in Peninsular Malaysia under the 11th Malaysia Plan which is expected to rehabilitate 1,604 ha of forest. In the coastal area, thirteen (13) coastal erosion prevention and rehabilitation projects (through mangrove replanting) were implemented in critical areas, particularly in Johor, Pahang, Perak, Sarawak and Terengganu. In addition, coastal replanting of mangrove and other species has contributed to the planting of a total of 6.62 million seedlings covering an area of 2,874 ha by 2018. Coastal rehabilitation programmes have been instituted at the national level with a Steering Committee and Working Committees to ensure long term implementation. A spatial tool named "e-Pesisiran" has been developed by the Remote Sensing Agency Malaysia to give an overview of progress made in various states. To stabilize the coastal region, Integrated Shoreline Management Plans (ISMPs) was instituted to provides a large-scale assessment of the risks posed by sectoral activities that affect the coastal areas and present a policy framework to address these risks. The objectives of an ISMP include re-appraisal of the erosion status of the coastline and evaluation of coastal erosion control options.

Further, for the freshwater ecosystem, conservation and management programmes include restocking of threatened and endangered freshwater species such as golden carp *(Probarbus jullieni),* catfish *(Pengasius* spp) and mahseer (*Tor spp.*) are ongoing. Regular restocking programmes were also carried out for other economically important indigenous species such as the giant freshwater prawn, tinfoil barb, marble goby and climbing perch as part of conservation initiatives. In 2017, a total of nine (9) million fingerlings were restocked in the inland public water bodies all around Malaysia.

For the marine environment, a total of eight (8) National Plan of Actions were developed with the objectives of sustainable fisheries management and restoring vulnerable habitats. Each NPOA has specific management measures that promote rehabilitation such as closed seasons, reduce fishing capacities, and promote environmentally friendly gears. Artificial reefs and fish aggregating devices to rehabilitate marine biodiversity and boost marine productivity are also periodically implemented.

In Sabah, mangrove rehabilitation is implemented largely under a collaborative effort between the Sabah Forestry Department (SFD) and the International Society for Mangrove Ecosystems (ISME). The

collaboration initiated in 2011 has led to the replanting of an area of 351.5 ha on selected highly degraded mangrove areas within forest reserves throughout Sabah. The construction of a permanent mangrove nursery under the project was also completed in September 2017 in addition to the establishment of Long-Term Ecological Research sites in Sabah on sites located in Sepilok Laut (Sepilok Mangrove) and Terusan Duyong (Elopura Forest Reserve) respectively. Various partnerships with NGOs were established to among others, undertake the restoration of degraded forest ecosystems, identification of new wildlife corridors to enhance wildlife habitat, and establishment and operation of riparian patrol unit at Kinabatangan. The Bukit Piton Project at Segama has been successful forest restoration, resulting in the return of orangutans in a previously degraded and burnt habitat[31].

The Sarawak Reefball Project started in 1998 and has deployed 7,000 units of Reef Balls™ in Sarawak's marine protected areas to date. Due to tremendous benefits for turtle conservation, coral reefs restoration and fishery resources protection and enhancement, in 2018, Sarawak has made a further commitment to a deploy 16,800 more Reef Balls™ along the Sarawak coastal waters.

Indicator 7.2: By 2025, 20% (compared to the 2020 level) of all identified degraded vulnerable ecosystems are under rehabilitation programmes.

Status: Not Assessed
Efforts to identify degraded vulnerable ecosystems for rehabilitation are ongoing.

Action 7.3 Support the implementation of the National Action Plan on Peatlands

A major characteristic of peat swamp forests is that they are permanently waterlogged, leading to reduced decomposition of organic matter from plant litter. In Malaysia, peat swamp forests account for 75% of all wetlands. They are mostly found in the states of Selangor, Johor, Perak, Pahang, Sabah, and Sarawak, with the largest area found in Sarawak (See Figure 18).

[31] Mah, EC. 2018. "Bukit Piton: A Case of Reforestation Success." 26 January 2018. Available at: http://www.wwf.org.my/media_and_information/front_line_stories/?25145/Bukit-Piton-A-Case-of-Reforestation-Success

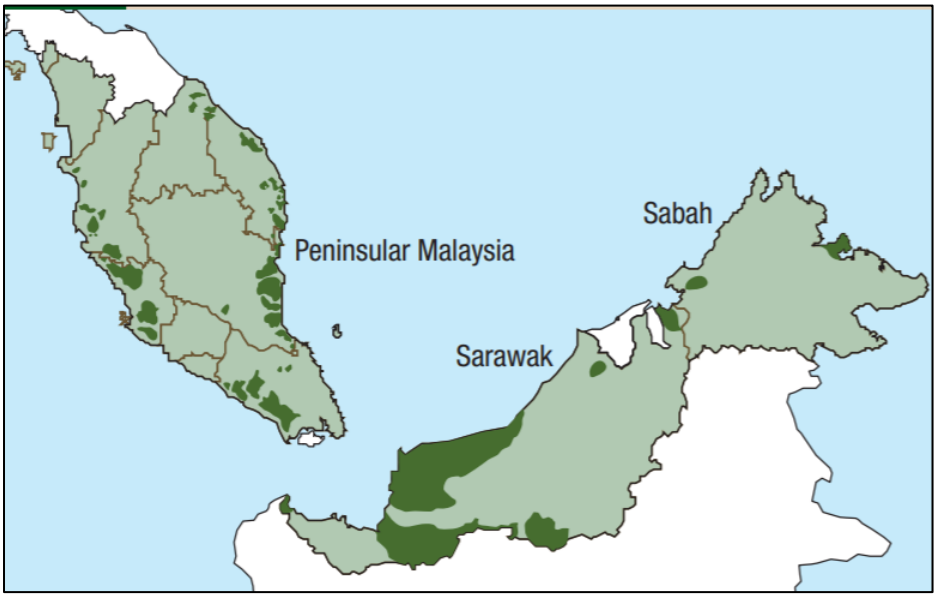


Figure 18: Distribution of Peat Soils (dark green) in Malaysia (Source: FDPM, 2017)

At the national level, Malaysia has established the National Peatland Steering Committee (NPSC) and its National Peatland Working Committee (NPWC) with state-level counterparts to lead the implementation of the National Action Plan on Peatlands 2011-2020 (NAPP). NAPP sets targets to support the implementation of peatland conservation and restoration as well as aligning to the ASEAN Peatland Management Strategy 2006-2020 (APMS). The APMS promotes biodiversity conservation, sustainable peatland management and community livelihoods. Some of the achievements of NAPP include an inter-agency management and monitoring System for Peat Swamp Forest between FDPM and the Malaysia Remote Sensing Agency. Among others, FDPM has produced Guidelines for the development of Integrated Management Plan for peat swamps in Selangor and Pahang, while Fire Management Plans were developed for Kuala Langat North and South Forest Reserves in the state of Selangor.

Apart from the National Action Plan on Peatlands (NAPP), Malaysia has begun implementing the multi-stakeholder Peatland Fire Prevention Programme as a disaster risk reduction measure to protect peatland since 2009. The programme helps prevent haze occurrences and reduce greenhouse gas emissions – with peatland rehabilitation programmes being carried out in state land and Permanent Reserved Forest of Johor, Kelantan, Negeri Sembilan, Pahang, Sabah, Sarawak, Selangor, and Terengganu to reduce the risk of peatland fires during dry seasons. Other fire prevention, control, and monitoring measures include the Fire Danger Rating System maintained by the Malaysian Meteorological Department (MMD), construction of water retention ponds, construction of tube wells and installation of piezometers. In 2015, the Standard Operating Procedure for Prevention of Peatland Fires was adopted.

Malaysia participated in the regional ASEAN Peatland Forests Project (APFP) in 2009-2014 funded by GEF. As part of the APFP, Forest Research Institute of Malaysia (FRIM) completed a study in 2014 to document experiences and lessons learned from peatland management in Malaysia. The study identified examples of Best Management Practices (BMPs) of peatlands from five sites, i.e., the Kuala Langat and North Selangor peat swamp forest in Selangor, the South East Pahang peat swamp forest in Pahang, Loagan Bunut National Park in Sarawak and Klias Peninsular in Sabah. FRIM also collaborates with FDPM to conduct research on peatland management and conservation in North Selangor Peat Swamp Forest. The

research encompasses carbon stock assessment, peat profiling, hydrological assessment and fire-prone assessment.

Indicator 7.3: By 2025, 10,000 ha of degraded peat swamp forests have been rehabilitated

Status: Progress towards target but at an insufficient rate
In the 4-year period from 2014 to 2017, a total of 275.35 ha of degraded peat swamp forests were rehabilitated.

Mangrove at Pulau Tanjung Surat, Johor. Photo credit: GEC.

BOX 5

Multi-stakeholder Partnership and Local Communities Empowerment in the Rehabilitation of North Selangor Peat Swamp Forest (NSPSF), Selangor

The NSPSF encompasses 73,592 ha on the northwest of the Selangor state. Comprising Sungai Karang Forest Reserve (50,106 ha) and the Raja Musa Forest Reserve (23,486 ha). The NSPSF is the largest remaining peat swamp forest on the west coast of Peninsular Malaysia. The peatland is critical for biodiversity, water resources and carbon storage values. The Selangor State Forestry Department manages the NSPSF guided by the Integrated Management Plan (IMP-NSPSF 2014-2023), with five key management strategies ie. hydrology restoration/ rewetting; fire prevention and control; encourage natural regeneration; assisted re-vegetation; and enrichment planting. This is in addition to the enforcement of Selangor state-wide moratorium on logging introduced in 2010.

A multi-stakeholder partnership was established to work alongside the state forestry department in the rehabilitation of FNSPSF. In 2012, a Community Based Organization (CBO) known as "Friends of North Selangor Peat Swamp Forest (FNSPSF)" was established to galvanize the local community in the rehabilitation of the peatland and provide a platform for partnerships between the private sector, civil society, local communities and authorities to restore peatland. The FNSPSF supported the state authorities in patrolling and monitoring the buffer zone area, participating in the restoring activities and peat firefighting operations. The CBO participation in NSPSF has improved their livelihood as the community member also run small business activities related to peatland (e.g nursery, handicrafts and ecotourism activities).

The Selangor State Forestry Department, in collaboration with Ministry of Education and Global Environment Centre (GEC), initiated the Peatland Forest Ranger Programme with support from private corporations. Under the Programme, the FNSPSF participated in various CEPA activities and is involved in organizing peat awareness events for schoolchildren. A Centre of Excellence for Peatland Awareness and Conservation and a Centre of Excellence for Peat Fire at Fire Station were also established in the area to raise awareness on the importance of conserving and rehabilitating the degraded peatlands. Routine tree replanting activities were organized as part of the GEC collaboration with the forestry department to rehabilitate 1,000 ha of forest in Raja Musa Forest Reserve.

Recognizing these successes, The Raja Musa Forest Reserve was conferred the Queen's Commonwealth Canopy in 2017, a Commonwealth network of forest conservation projects, as well as selected as the pioneer site for the Peat Swamp Forest Rehabilitation and Conservation Project in Southeast Asia in the same year. The FNSPSF has given rise to other CBO initiatives to conserve peatland in Kuala Langat, Selangor; Kampung Tajung Kelapa, Pahang; and several Friends of Mangroves initiatives in Kuala Gula, Perak; Lekir Setiawan, Perak; Kampung Dato Keramat, Selangor and Tanjung Surat, Johor supported by local authorities and GEC.

Target 8: By 2025, important terrestrial and marine ecological corridors have been identified, restored and protected.

To mitigate the effects of rapid development, projects to restore ecological connectivity restoration of landscapes and seascapes were put in place. In Peninsular Malaysia, the National Physical Plan (NPP) (which guides spatial planning) prioritized ecological connectivity through the Central Forest Spine (CFS) Initiative. In Sabah and Sarawak, the trilateral Heart of Borneo (HoB) Initiative aims to connect the forests of Borneo through sustainable land use. In the marine environment, Malaysia is a part of the Coral Triangle Initiative (CTI), a network of transboundary collaboration among six countries within the Coral Triangle for coral reef preservation and marine ecological connectivity. Target 8 aims to amplify the initiatives by strengthening ecological corridor implementation.

Action 8.1: Strengthen the implementation of the CFS Master Plan in Peninsular Malaysia

The Central Forest Spine (CFS) Master Plan was conceived and formulated in 2009 to connect four major forest complexes in Peninsular Malaysia (See Figure 19). Under the CFS Master Plan launched by PLANMalaysia, a series of Primary Linkages (PLs) and Secondary Linkages (SLs) is used to reconnect the forest complexes allowing the free movement of wildlife, and thus facilitating breeding and gene flow. The forest complexes will be connected through a network of 37 linkages – seventeen (17) are known as Primary Linkages (PLs) which are forest complexes that directly link previously disconnected forests, while another twenty (20) are Secondary Linkages (SLs) that refers to small patches of greens acting as stepping stones to connect forested areas. The CFS has been identified in the National Physical Plan (NPP) as the backbone of Peninsular Malaysia's environmentally sensitive areas.

The four main elements of the CFS are: (i) maintaining and increasing forested areas; (ii) sustainable forest management practices; (iii) forest connectivity; and (iv) forest rehabilitation. The CFS Master Plan is supported by a set of implementation plans, land use planning guidelines as well as funding options and instruments. Since the development of the CFS Master Plan, various initiatives have been implemented by government agencies and organizations. The Public Works Department has constructed a total of ten (10) viaducts along highways to facilitate wildlife crossings. In addition to the construction of smart green infrastructure and land gazettement, the implementation of CFS extends to wildlife and floral distribution assessments, habitat restoration, and enrichment, PRF boundary demarcation exercises, socio-economic surveys, infrastructure development such as observatory decks and awareness signboard construction.

As of 2018, the Federal and State level CFS implementation has been successful in nine (9) PLs and five (5) SLs, contributing to the gazettement of 28,032.63 ha of ecological corridors as Permanent Reserved Forest (PRF) across the states of Perak (18,866.00 ha); Kedah (4,398.00 ha); and Pahang (4,768.63 ha). In addition, boundary demarcation of PRFs and the installation of warning signboards for public notice are carried out to protect habitats better and enhance the conservation of its wildlife.

To complement the implementation of the CFS Master Plan, a GEF funded "Improving Connectivity in Central Forest Spine (IC-CFS) Project" was initiated in 2014 to increase federal and state-level capacity in executing the CFSMP through sustainable forest landscape management plans in three pilot sites of the proposed linkages. The IC-CFS among others, targets strengthening the Federal and State government's

institutional capacity to enhance CFS connectivity and law enforcement. The IC-CFS also prioritizing the setting up sustainable financing mechanisms for CFS conservation to mainstream biodiversity into development plans. Other initiatives include the MyCFS Platform created by NGOs active in the CFS landscape to foster greater civic participation.

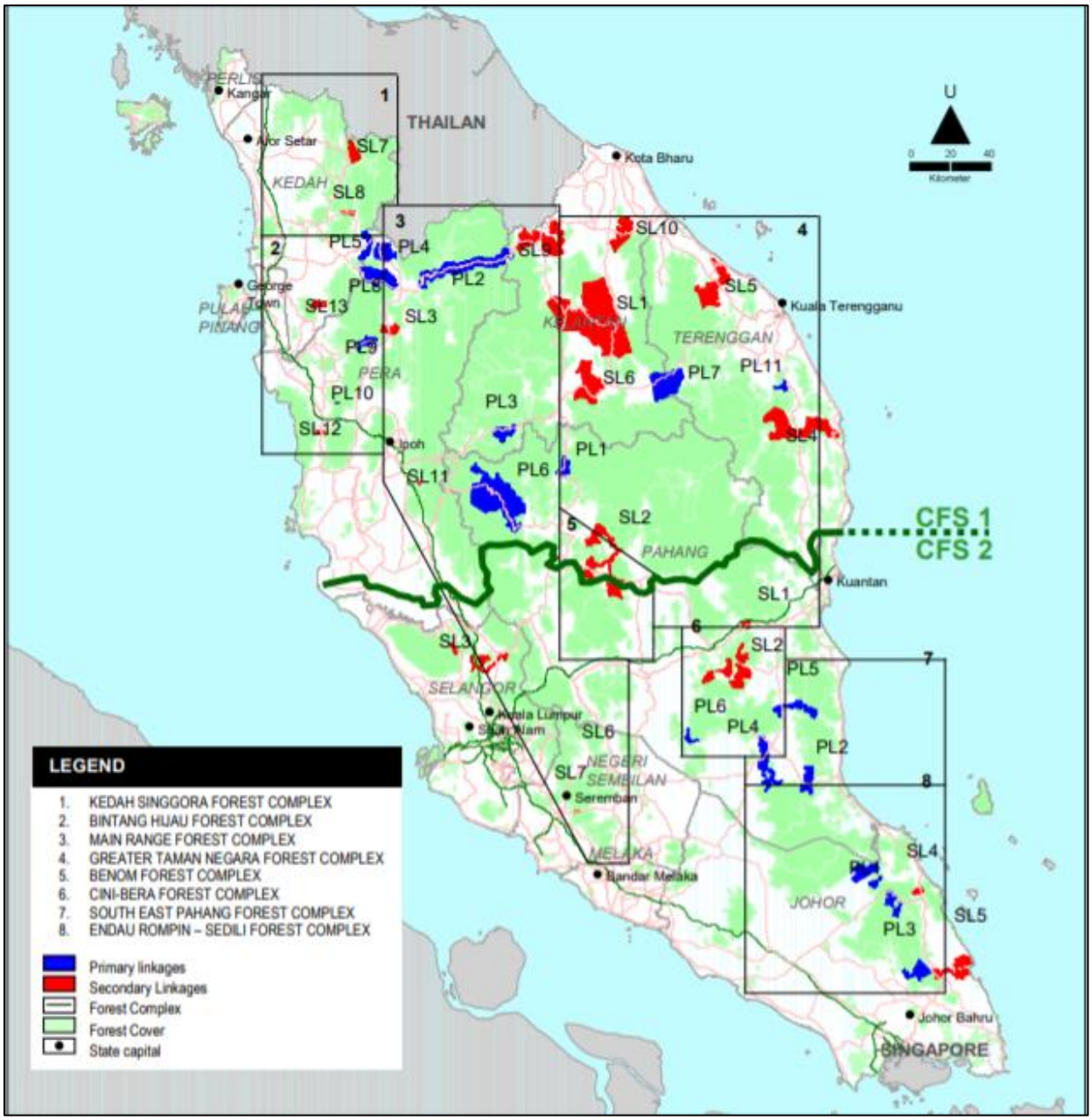


Figure 19: Primary and Secondary Linkages to Central Forest Spine.

Indicator 8.1: By 2025, 10 primary corridors under the CFS initiative have been fully implemented.

Status: Progress toward target but at an insufficient rate
As of December 2018, implementation of the Central Forest Spine (CFS) activities have taken place in nine PLs and five SLs to varying degrees. However, full implementation as defined in the Master Plan – maintaining or expanding existing permanent forest reserve areas; ensuring the adoption of best forest management practices among all forest stakeholders; rehabilitating or re-greening barren and lost wildlife corridors; and building viaducts for wildlife crossings to reconnect fragmented forested areas remain a challenge.

Action 8.2: Strengthen the implementation of terrestrial connectivity under the HoB Initiative

The Heart of Borneo (HoB) Initiative is a transboundary collaboration between Brunei, Indonesia, and Malaysia to enable conservation and sustainable development of the landscape[32] launched in 2007. The Malaysian section of the HoB includes Sabah (4 million ha) and Sarawak (2.7 million ha in 2018) (See Figure 20 and Figure 21). The additional areas that contributed to the expansion in Sarawak cover Batang Ai National Park to the western tip of Sarawak - Tanjung Datu National Park. The Sabah and Sarawak portions of the HoB are directed by the Strategic Plan of Action (SPA) and the Project Implementation Framework (PIF), respectively.

The HoB comprises five (5) programmes - transboundary management, protected areas management, sustainable natural resource management, ecotourism development, and capacity building. From 2008 until 2020, approximately RM 100 million was allocated for the implementation of HoB in Sabah and Sarawak through the 9th, 10th, and 11th Malaysia Plans. In Sabah, the allocation has been used to conduct scientific expeditions and social baseline surveys to inform the conservation management plans for the landscape. A decade after the first Strategic Plan of Action (SPA) was produced, HoB implementation in Sabah has contributed to an increase in protected area coverage from 12.7% of state land in 2008 to 26.0% in 2017. Further, the Sabah State Government has pledged to expand TPA to 30% by 2025. Other efforts include reforestation and restoration efforts in over 150,000 ha; the application of Reduced Impact Logging (RIL) practices in all commercial forest reserves; the development of new funding mechanisms to protect the rich biodiversity of the state; as well as the development of State Action Plans (SAPs) for three iconic totally protected species: the Orangutan, Bornean pygmy elephant, and Sumatran rhino. In 2014, the Sabah State Government launched the revised Strategic Plan of Action of HoB 2014–2020.

To strengthen community involvement in the HoB, the Kinabalu ECOLINC Project was initiated. The project aims to improve ecological connectivity between Kinabalu Park (KP) and Crocker Range Park (CRP) and establish a network of community conserved areas (CCAs) by empowering and involving ILCs. Programs include the community-based restoration of degraded habitats, development of sustainable agriculture and enhanced land management, and development of forest-related community tourism options. As a result, the Kinabalu ECOLINC site was recognized and selected as the demonstration site for the European

Union Project: 'Reducing Emissions from Deforestation and Forest Degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (EU-REDD+)'. Another similar effort is the Kinabatangan Corridor of Life Initiative, which guides the conservation of the biodiversity-rich floodplain and preserves the river as an ecological corridor. Additionally, a GEF funded project to support connectivity between the three globally significant conservation areas within the interior of Sabah (Imbak Canyon, Maliau Basin, and Danum Valley) through restoration and protection of secondary forests, and by integrating biodiversity concerns into plantation management is at the final stage of implementation.

To share scientific findings and sustain the momentum of the HoB partnership, SFD has organized the annual HoB international conference since 2009. This conference provides a platform for new conservation partnerships, enable science-policy interfaces, and facilitate community engagement within the HoB landscape. An annual trilateral meeting is also held involving senior officials representing Brunei, Indonesian, and Malaysian Governments to cover issues such as trans-boundary protected area management, institutional arrangements, biodiversity conservation, green ecotourism, research and development, and local community involvement in the sustainable development and conservation of the HoB.

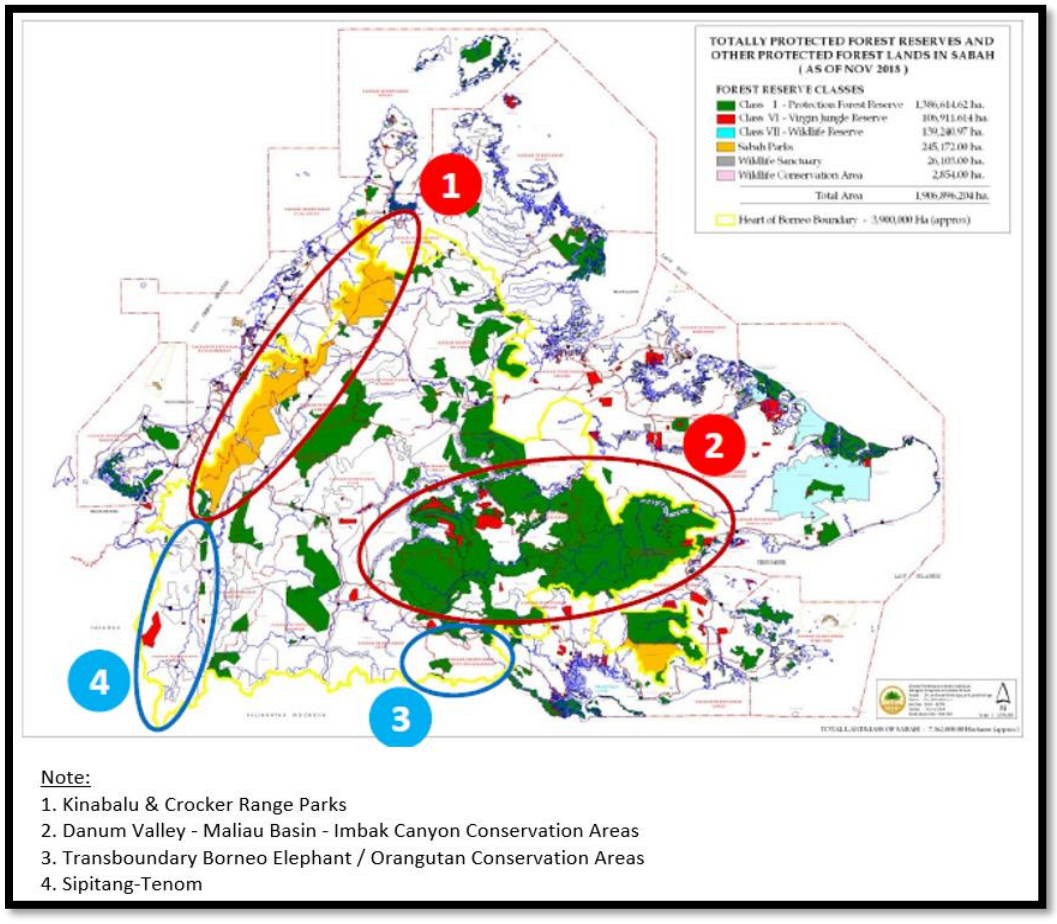


Figure 20:Corridors established for HoB implementation in Sabah.

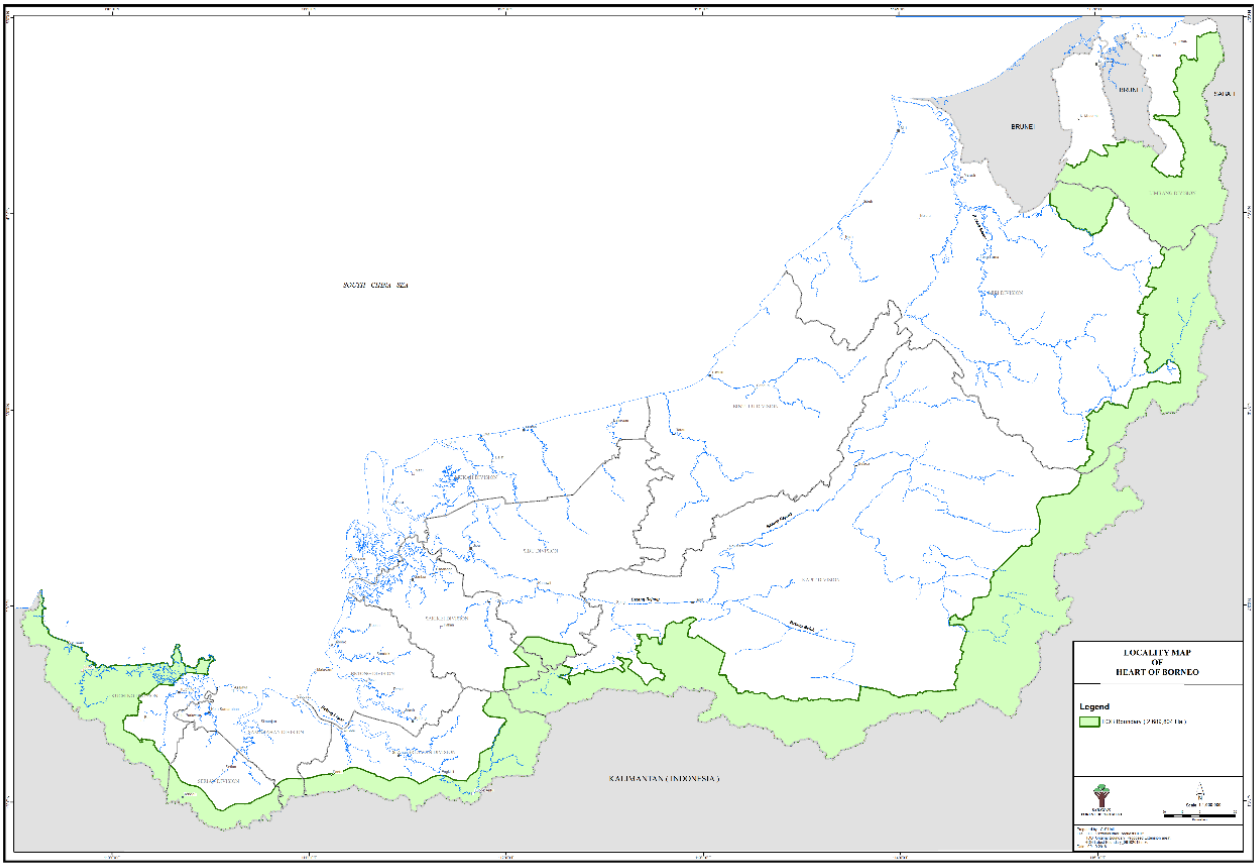


Figure 21: HoB landscape in Sarawak. HoB Corridor Project Implementation plot.

In Sarawak, the State Government has collaborated with WWF Malaysia to develop a green economy pilot programme under the HoB International Climate Initiative Project. The project site is located in the Kapit and Sri Aman Divisions, which hosts two significant biodiversity-rich areas in Sarawak – Lanjak Entimau Wildlife Sanctuary and Batang Ai National Park. The initiative aims to develop a green economy management concept that will among others, promote land use and green economy action plans, raise awareness, and empower local communities to co-manage natural resources in HoB areas. Other achievements in Sarawak include the development of the HoB Project Implementation Framework (PIF) in 2009; increased collaboration with NGOs in projects; Forest Management Certification obtained for five Forest Management Units (FMUs) equivalent to 478,168 ha within the HoB area of Sarawak; and the expansion of HoB areas in Sarawak. For future progression, the HoB PIF will be reviewed, and broader involvement from government agencies and stakeholders is planned. The State Government is also in the preliminary stage of linking orangutan corridors through the Sedilu-Sebuyau-Lesong National Parks. There are two transboundary protected areas - Lanjak Entimau Wildlife Sanctuary and Betung-Kerihun National Park (Indonesia) and the Pulong Tau National Park and Kayan Mentarang National Park (Indonesia). The management of these two transboundary areas is based on specific management plans. Additionally, corridors linking the forest landscape through Mulu National Park, Pulong Tau National Park, concession areas, and other development in the north-eastern part of Sarawak have been identified for protection.

Indicator 8.2: By 2020, the ecological linkage master plan for the HoB has been completed and by 2025, 3 priority corridors have been fully implemented.

Status: On track to achieve target
Within the Heart of Borneo (HoB) landscape, two priority corridors have been identified while the third is in progress. The first priority corridor is the 261,264 ha landscape connecting landmass to the globally significant Maliau Basin Conservation Area, Danum Valley Conservation Area and Imbak Canyon Conservation Area. In this landscape, land use is subjected to a common and integrated management strategy to mainstream biodiversity, ecosystem functions, and enable sustainable uses. The second priority corridor is the Forest Management Unit 25 (FMU 25) - a joint initiative with WWF Malaysia - of transboundary Bornean elephant and Orangutan landscape between Sabah and North Kalimantan, Indonesia. The HoB states in Malaysia have respective HoB Project Implementation Frameworks as guidance on the implementation of ecological connectivity.

Action 8.3: Identify, map and protect marine ecological corridors

The Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) is a multilateral partnership between Malaysia and five other countries (the Philippines, Indonesia, Papua New Guinea, Timor-Leste, and the Solomon Islands) located at the global centre of marine biodiversity (See Figure 22). Formed in 2007, the CTI-CFF aims to sustainably manage fisheries, provide climate change adaptation measures, improve the status of threatened species, as well as establish and effectively manage priority seascapes and marine protected areas (MPAs)[33]. The CTI member countries adopted the 10-year Regional Plan of Action (RPOA) for CTI-CFF 2010-2020, which prioritizes MPAs and is focused on initiating a region-wide Coral Triangle MPA System (CTMPAS). In 2013, the CTMPAS Framework and Action Plan were launched to guide CTI countries to expand the MPA network and promote conservation in their own waters, collectively contributing to a regional network of MPAs[34].

Conservation efforts through CTI are critical because this area encompasses the largest green turtle nesting sites in Southeast Asia; hosts the migratory route for a variety of fish species that include whale sharks and endangered marine mammals such as the dugong; and is home to diverse coral reef fish which sustain the livelihood of coastal communities. The Malaysia CTI-CFF National Plan Action focuses on the development and implementation of innovative management approaches to overcome climate change risks and overexploitation of marine resources.

[33] European Union. 2017. Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) Case Study Summary Report. Accessed 3 Feb 2019 at: https://publications.europa.eu/en/publication-detail/-/publication/3cd88112-45ad-11e7-aea8-01aa75ed71a1

[34] Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF), 2013. Coral Triangle Marine Protected Area System Framework and Action Plan. CTI-CFF, United States Agency for International Development Coral Triangle Support Partnership and US National Oceanic and Atmospheric Administration, Cebu City, Philippines. 75 pp.

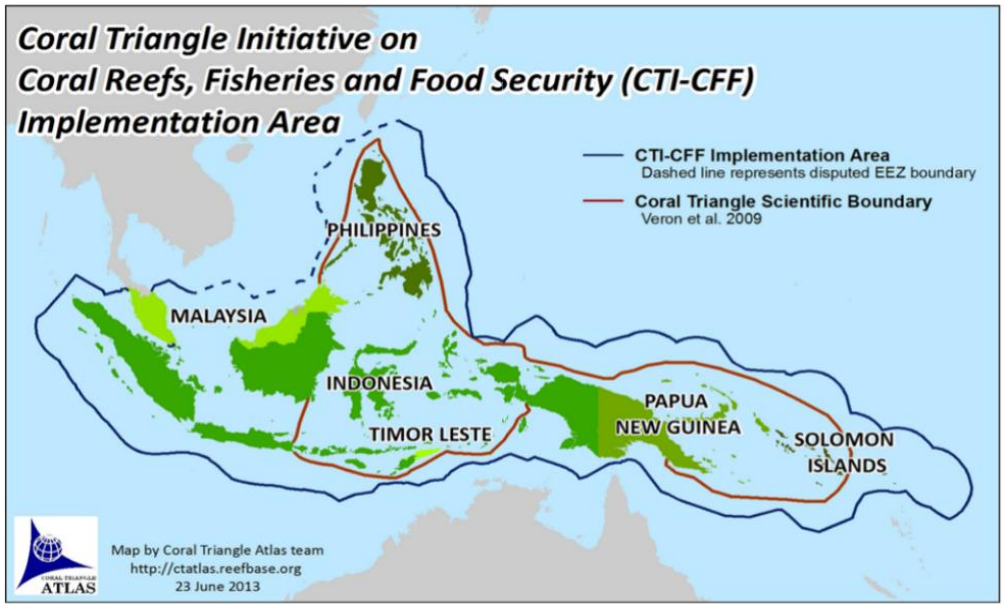


Figure 22: The six Coral Triangle countries, with their estimated national jurisdiction (solid and dotted line representing their approximate and non-official Exclusive Economic Zones) and the scientific boundary (solid red line) determined as the area of highest marine biodiversity. (Source: CTI-CFF,2013).

Other marine ecological corridors have also been identified. PlanMalaysia has identified the East Coast of Peninsular Malaysia as an important ecological corridor through the 3rd National Physical Plan. This is due to biological connectivity among the Southern islands of Johor for dugong populations and the Northern islands of Terengganu for commercially important fish species and endangered marine species. The Plan calls for greater protection of these areas.

Key regional projects are being implemented by Food and Agriculture Organization of the United Nations (FAO) to improve the governance of the fishery resources, and conservation of the critical habitats and its connectivity in the area includes the 'GoTFish: Promoting sustainable use of the Gulf of Thailand fishery resources through the Blue Economy and the Ecosystem Approach to Fisheries' and the 'Sustainable Management of the Bay of Bengal Large Marine Ecosystem Programme' Project. Similarly, efforts to identify the migratory routes, spawning, breeding and feeding areas especially for the endangered and heavily exploited species are ongoing. This includes genetic studies undertaken on several stock species including spotted Sardinella (*Amblygaster sirm*), the Indo-Pacific Mackerel (*Rastrelliger brachysoma)* and Longtail Tuna (*Thunnus tonggol*) to inform management decisions.

Indicator 8.3: By 2020, a national master plan for marine ecological linkages has been completed.

Status: Progress towards target but at an insufficient rate
As of 2018, there is only one transboundary MPA which was established in 1982 between the Government of Malaysia and the Government of Philippines - the Turtle Islands Protected Heritage Area. This area has been identified as important ecological corridors for two sea turtles: green turtle (*Chelonia mydas*) and the hawksbill turtle (*Eretmochelys imbricata*). However, efforts to identify and map other important marine ecological corridors have garnered attention among government agencies and research

institutions. PlanMalaysia has identified and mapped two marine ecological corridors namely the Northern Terengganu Marine Park Islands-Setiu Wetlands (Figure 23) and the Sibu Island- Tinggi Island-Besar Island Marine Parks (Figure 24). These recommendations have led to discussions and initiatives to establish a Marine Protected Area Network on the East Coast of Peninsular Malaysia through the Gulf of Thailand Project.

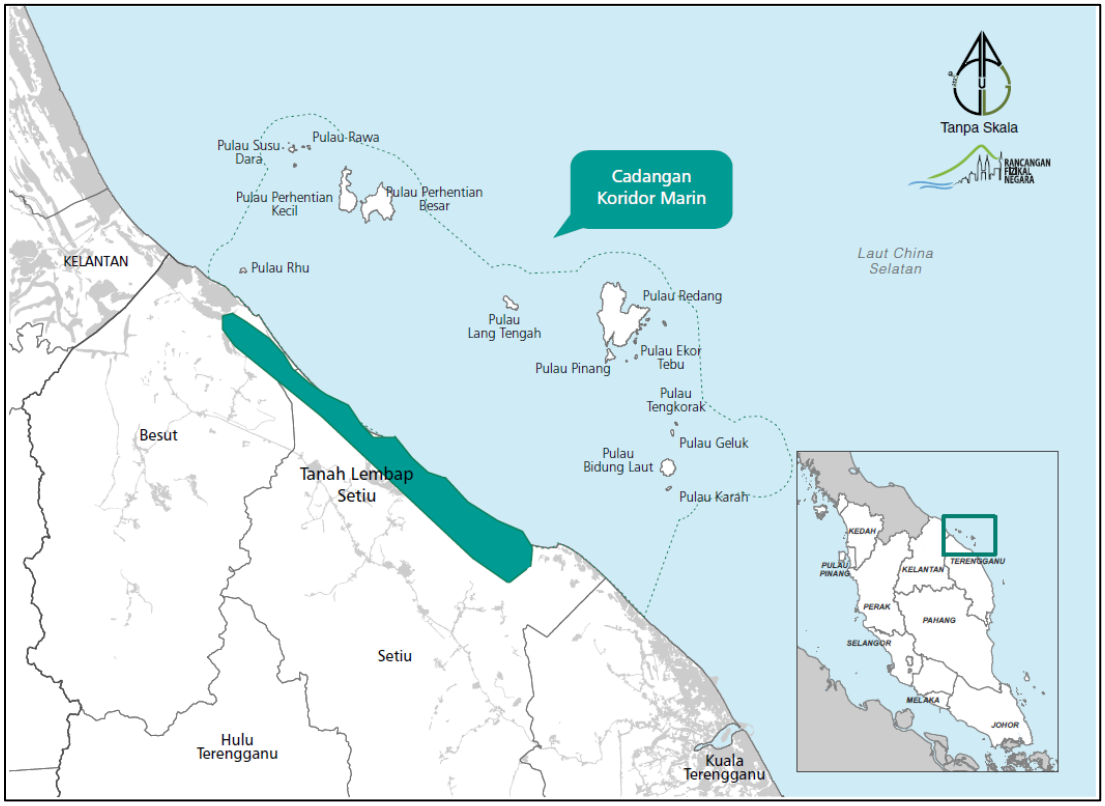


Figure 23: Northern Terengganu Marine Park Islands-Setiu Wetlands Ecological Corridor (Source: 3rd National Physical Plan)

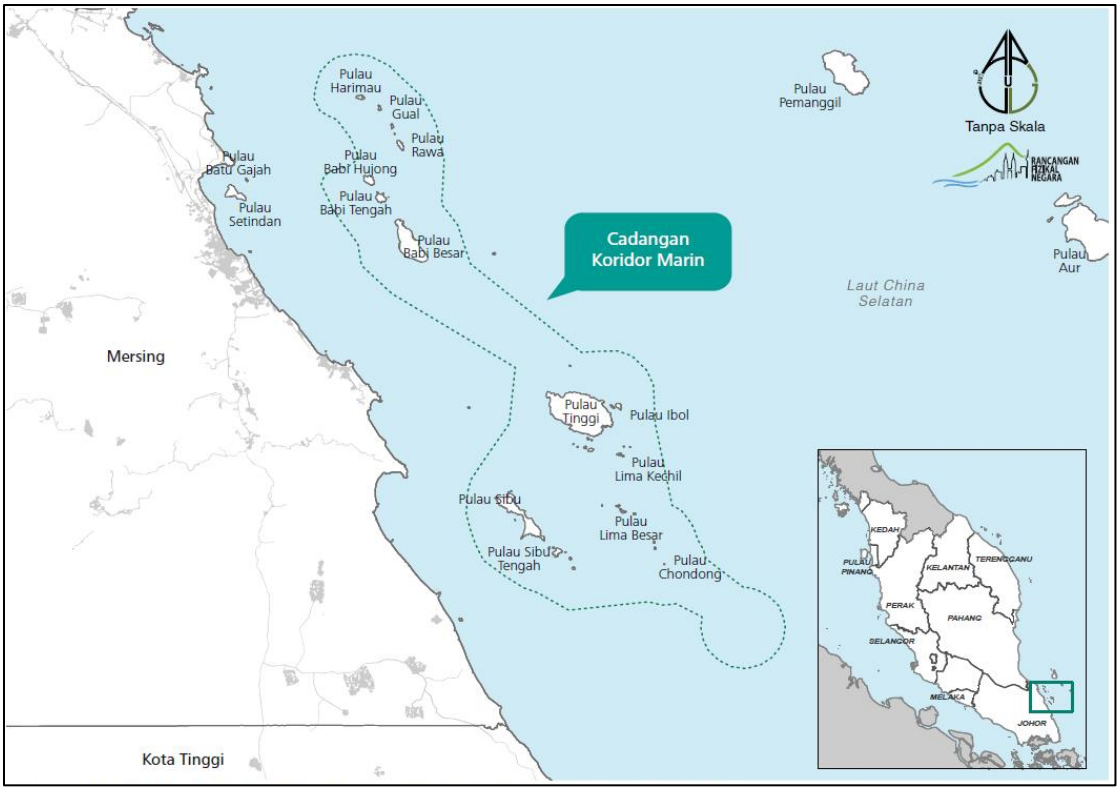


Figure 24: Sibu Island- Tinggi Island- Besar Island Marine Parks Ecological Corridor (Source: Dr Louisa Ponnampalam, ReefCheck Malaysia, Department of Marine Parks Malaysia)

Target 9: By 2025, the extinction of known threatened species has been prevented and their conservation status has been improved and sustained

A combination of scientific data, legislation, enforcement, and conservation efforts are needed to address species loss. Target 9 aims to safeguard the future of threatened species through continuous assessments of conservation status, enhancement of flora and fauna protection, and ex-situ conservation programmes to restore populations.

Action 9.1 Conduct conservation assessments for plant and animal species

Malaysia adopts the categories and criteria used in taxon assessments espoused in the IUCN Red List Categories and Criteria version 3.1 to develop national Red Lists[35]. In Malaysia, the national Red List of Threatened Species was published for Mammals (DWNP, 2010; 2017), Plants - Dipterocarpaceae (Chua et al. 2010, Julia et al., 2014, 2016) and Freshwater Mussels (Zieritz and Lopez-Lima, 2018). Of the 222 mammal species assessed for Peninsular Malaysia, there is one(1) extinct species (the Javan rhinoceros), four(4) species are categorized as critically endangered, twelve(12) are considered as endangered, fourteen(14) are classified as vulnerable, 33 species are near threatened (NT), 83 species identified as species of least concern (LC), and the remaining 76 species are listed as being data deficient (DD).

In Peninsular Malaysia, routine inventory is conducted throughout major protected areas every three (3) to five (5) years to monitor and manage the biodiversity as well as update the Malaysia Red List for Mammals. This inventory project has been financed under the Malaysia Plan since 2006. Wildlife surveys have also been conducted in wildlife habitats outside the protected areas to monitor and study the distribution of wildlife in Peninsular. Since 2005, the Flora of Malaysia Project in Peninsular Malaysia has been implemented and has produced a series of publications.

In 2010, the National Red List for selected plants - Dipterocarps, was published. A total of 405 indigenous species of Peninsular Malaysia were assessed during the reporting period (2014-2018), of which 32 species are Critically Endangered (CR), 49 are Endangered (EN) and 51 are Vulnerable (VU). This comprised 4% of the known flora of Peninsular Malaysia. The process also led to the discovery of at least 43 new species of plants. To date, 1420 species have been assessed, of which 4 species are Extinct (EX), 124 are CR, 168 are EN and 183 are VU. The Red List compilation for Plants for Peninsular Malaysia is ongoing.

In Sabah and Sarawak, a similar project called "The Tree Flora of Sabah and Sarawak Project"[36] was initiated in 1990 to produce eight volumes of detailed and up-to-date botanical and ecological information on tree resources. Currently, five (5) volumes have been published. On a separate note, ongoing efforts are undertaken by the Sabah State Government to carry out IUCN Red List Conservation Assessment specifically for Dipterocarps, which is the dominant species in forest reserves. The assessment of threatened and rare plants is expected to be incorporated into the Sabah forest management plans, and

[35] The IUCN Red List Categories and Criteria version 3.1 applies five criteria in the assessment of threats on taxa: population decline, geographic range in the form of extent of occurrence or area of occupancy, small population size and decline, very small or restricted population, and quantitative analysis. Source: IUCN (2001). IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge.

[36] The Tree Flora of Sabah and Sarawak Project which was officially launched on 18 November 1991, is executed jointly by the Forest Research Institute Malaysia (FRIM), the Sabah Forestry Department and the Sarawak Forestry Department with the collaboration of other research institutions and universities.

aid in the identification of High Conservation Value (HCV) forests. To date, Sarawak has published two volumes of Sarawak Plant Red List – Dipterocarpaceae.

For aquatic biodiversity, updated inventories and stock status of marine aquatic resources in Malaysia are obtained through fish stock surveys and annual catch data. In Peninsular Malaysia, there are ongoing efforts to inventorize freshwater fish, in which DOFM has conducted 51 surveys from 2014 until 2017. This effort is complemented by an international assessment of freshwater fish conservation status in Southeast Asia[37].

For sea turtles, a total of 78 nesting sites have been identified throughout Malaysia (See Table 12).

Table 12: Number of turtle nesting sites in Malaysia.

States	No of Nesting Sites
Terengganu	36
Melaka	12
Pahang	6
Sabah	6
Sarawak	10
Penang	4
Johor	2
Perak	1
Negeri Sembilan	1
Total	78

In Sabah, similar freshwater fish inventories have been conducted by State Government-NGO collaboration. The inventory found 166 fish species, of which 150 are native and 16 introduced. From this assessment, 36 species were endemic to Sabah. The inventory shows that the majority of the fish (103 species) have yet to be assessed for the IUCN Red List. In Sarawak, conservation projects and monitoring surveys have been conducted for marine mammals, especially dolphins and dugongs. In collaboration with Universiti Malaysia Sabah (UMS) and Universiti Malaysia Sarawak (UNIMAS), aerial and boat surveys of Irrawaddy dolphins have been undertaken offshore and along Sarawak coastal waters. The dolphin population survey also included four big rivers in Sarawak, namely the Saribas, Lupar, Lassa, and Rajang rivers.

Indicator 9.1: By 2020, the National Red Data list on plants and animals is completed.

Status: On track toward target but at an insufficient rate

Given the high species diversity and resource constraints, conservation assessments have traditionally focused on selected groups such as large mammals and commercial tree species. Particularly, the National Red List of Mammals for Peninsular Malaysia version 2 was completed in 2017 as an update to the 2010 version. For plants, a compiled and updated version of the Peninsular Malaysia Plant Red List will be

[37] Khew, C. 2016. "International effort led by Singapore researchers is under way to assess conservation status of freshwater fish in South-east Asia". The Straits Time Singapore dated 29 April at: https://www.straitstimes.com/singapore/environment/fishing-for-information

published in 2020. In addition, the Sabah Red List on Plants is currently being formulated. Other ongoing efforts include the compilation of the National Red List of Amphibians that is scheduled to be completed in 2020. Other important fauna groups such as birds, reptiles, insects have yet to be assessed.

Action 9.2 Protect our threatened species

Key wildlife legislations for species protection include the Wildlife Conservation Act 2010 for Peninsular Malaysia, the Wildlife Conservation Enactment 1997 in Sabah and the Wild Life Protection Ordinance 1998 in Sarawak. The International Trade in Endangered Species Act 2008 has been implemented in compliance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) obligations to prevent illicit international wildlife trade. For aquatic species, the Fisheries Act 1985 is the key legislation.

Species protection is also guided by specific conservation action plans which include:

i. National Tiger Conservation Action Plan (NTCAP) (2008-2020);
ii. National Elephant Conservation Action Plan (NECAP) (2013-2022);
iii. National Tapir Action Plan 2003 (in the process of updating)
iv. National Plan of Action for Conservation and Management of Sea Turtles in 2009-2012 - under review;
v. National Plan of Action for the Conservation and Management Plan of Shark (Plan 2) 2014-2018 – under review;
vi. National Plan of Action for the Conservation and Management of Dugong 2011-2014 – under review
vii. Sabah Orangutan Action Plan (2012-2016) – under review;
viii. Sabah Elephant Action Plan (2012-2016) – under review;
ix. Sabah Rhinoceros Action Plan (2012-2016) – under review;
x. Sabah Sunda Clouded Leopard Action Plan (2019-2028);
xi. Sabah Proboscis Monkey Action Plan (2019-2028);
xii. Sabah Banteng Action Plan (2019-2028);
xiii. Sun Bear Conservation Action Plan – in the process of development
xiv. Sarawak Management Plan for Estuarine Crocodile (2016-2020)
xv. Sarawak Conservation Action Plan for Marine Turtle (2016-2020).
xvi. Sarawak Orangutan Conservation Action Plan

In Peninsular, active programmes to conserve larger mammals are implemented and led largely by DWNP. For the CR Malayan tiger (*Panthera tigris jacksonii*), the implementation of the National Tiger Conservation Action Plan (NTCAP) is ongoing with four main objectives through 60 actions until 2020. The Malaysian Conservation Alliance for Tigers (MYCAT[38]) was established in 2003 to coordinate tiger conservation efforts, including institutional support, surveys and monitoring, enforcement and awareness programmes. DWNP is working in collaboration with NGOs to carry out the First National Tiger Survey to assess the wild tiger population in Malaysia. The survey will conclude in 2020, and the latest figures show that fewer than 200 tigers remain in the wild. To further protect tigers, a moratorium on the hunting of

[38] MYCAT which is a coalition of four NGOs namely WWF-Malaysia, Wildlife Conservation Society, TRAFFIC Southeast Asia and Malaysian Nature Society (MNS)

two key tiger prey species – the sambar deer (*Rusa unicolor*) and barking deer (*Muntiacus muntjac*) has been imposed until 2021. Within the DWNP, routine patrolling is supplemented by all year long anti-snare programmes. At the site level, the Royal Belum State Park in Perak is the first protected area in Southeast Asia registered for "Conservation Assured|Tiger Standards"[39] (CA|TS) in 2017, an accreditation scheme that ensures effective site-based management for wild tigers.

This effort runs in tandem with studies on the distribution and ecology of big and small mammals like tapirs, sambar deer, serow and forest birds under the DWNP wildlife inventory programme operations. In 2015, the National Wildlife Forensic Laboratory (NWFL) was established. The lab performs forensic DNA testing for species identification, genetic population determination, individual identification, and DNA sexing as part of wildlife conservation efforts and to provide evidence for court cases. The NWFL also regularly collaborates with international forensic organizations such as TRACE Wildlife Forensics Network UK, US Fish and Wildlife Service Forensics Laboratory and is part of the Society of Wildlife Forensic Science (SWFS). In addition, NWFL is an active member of the ASEAN Wildlife DNA Forensic Technical Working Group; and under this, regular capacity building programmes on forensic analysis and new technologies have been acquired. A separate lab, the Wildlife Genetic Research Laboratory is dedicated to genetic research studies. At present, there are more than twenty research projects involving species such as the tiger, elephants, gaur, sambar deer, pangolin, and primates. To date, the Wildlife Genetic Resource Bank collection consists of 17,720 samples from 418 species of wildlife. Findings from these research projects scientifically informed the management and conservation of wildlife in Malaysia.

In Sabah, one key species initiative focused on the Bornean banteng (*Bos javanicus ssp. lowi*), the rarest subspecies of banteng. The Bornean Banteng Programme (BBP) is a research and conservation initiative between Danau Girang Field Centre and the state wildlife and forestry department. In 2016, a four-year state-wide survey of bantengs was completed. Between 2016 and 2017, the team established biological baseline information for a Population and Habitat Viability Analysis (PHVA) of bantengs in Sabah. Research on population density, ecology and distribution, foraging behaviour, movement in relation to forest management were carried out. Additionally, the Bornean Rhino Alliance (BORA) has worked closely with the Sabah Wildlife Department (SWD) and several international organizations to conserve the Sumatran Rhinoceros in Borneo. Continuous efforts are under way to secure the survival and viability of the Sumatran Rhino through Advance Reproductive Technology in collaboration with Indonesian counterparts.

For tree species genetic conservation, a plant genetics lab has been maintained by FRIM since 1986. The Lab also conducts research to determine areas of high genetic diversity to inform forest harvest policy. Research findings have continuously been generated by FRIM, which include information to guide the establishment of High Conservation Value Forest (HCVF). Examples include the HCVF in Kledang Saiong Forest Reserve for the protection of hyper-endemic Resak Gajah (*Vatica abdulrahmaniana*) and Kanching Forest Reserve for the hyper-endemic Merawan Kanching (*Hopea subalata*).

[39]Conservation Assured (CA) is a new conservation tool to set standards for effective management of target species. CA fulfils the requirement for protected area management effectiveness in international agreements such as the Convention on Biological Diversity's Conservation Assured | Tiger Standards (CA|TS), a partnership between TRCs, NGOs and TCAs began a process to build on existing knowledge of protected area and wild tiger conservation to define and implement area-based best practice management standards with the aim of providing the safe havens or wild tigers needed to achieve double of tiger population (Tx2). Source: Conservation Assured, 2018. Conservation Assured|Tiger Standards 2018-2022 Business Plan. Singapore. Available at: http://www.conservationassured.org/files/resources/cats-business-plan-final.pdf

For marine species, a Task Force and Technical Committee for the Management and Conservation of Threatened Marine Species has been established by DOFM. The specific marine species working groups are for sharks and rays; sea turtles; marine mammals; corals, giant clams and seahorses respectively. The establishment of the Turtle Excluder Device (TED) Implementation Task Force at the national level has led to four Malaysian States' (Kelantan, Terengganu, Pahang, and Johor) adopting TED as a mandatory condition to the monsoon shrimp trawling licenses. Plans are under way these rules to be applicable nationwide. In addition, the global Dugong and Seagrass Conservation Project was initiated in Malaysia in 2015 to conserve dugongs and their associated seagrass ecosystems in the islands of Pulau Sibu, Pulau Tinggi and Lawas waters in Sarawak. The Project aims to operationalize the national action plan for dugong through engaging local communities and establishing a dugong sanctuary off the coast of Mersing, in east Johor. The marine mammal conservation effort is carried out in collaboration with MareCet who conducts research, conservation and outreach programmes. Other than the Dugong project, MareCet also carries out marine mammal research projects: Langkawi Dolphin Project and Matang Dolphin Research (MDR).

For sea turtle protection, a total of six (6) Turtle Conservation and Information Centres have been established and administered by DOFM in collaboration with state governments with a total of 28[40] turtle hatcheries across Terengganu, Pahang, Johor, Melaka, Perak, and Pulau Pinang (Sarawak and Sabah have 5 established hatcheries each)[41]. The Turtle and Marine Endangered Species Research Division in Rantau Abang and the Marine Fisheries Research Development and Management Department (MFRDMD) has conducted continuous research on the migration pattern of sea turtles using satellite technology.

Indicator 9.2: By 2025, all endangered and threatened species are protected by Federal and/or State legislation.

Status: Progress toward target but at an insufficient rate

As of 2018, the schedule Wildlife Conservation Act 2010 has been reviewed twice to update the Protected Species Schedules and relevant Regulations. Endangered and threatened wildlife are also protected under Schedule 3 of the International Trade in Endangered Species Act 2008. Endangered wildlife is protected by the Wildlife Conservation Enactment 1997 and Wild Life Protection Ordinance 1998 in Sabah and Sarawak respectively. Most recently, the 2019 amendments to Fisheries Regulation (Control of the Endangered Fish Species) 1999 have added six (6) species of sharks and rays as endangered. There are on-going efforts to update the list under the act to include more aquatic endangered species.

[40] This figure includes the 2 turtle hatcheries on the MPA of Redang Island Marine Park Centre and Rusukan Besar Marine Park, which was established by the Department of Marine Parks Malaysia (DMPM) before its incorporation into the DoFM.

[41] The Department of Fisheries Malaysia (DOF) as the federal agency has no jurisdiction on the development of turtle landing or nesting beaches, since terrestrial areas are under the State's authority. Clause (1)(b) of Article 76 of the Federal Constitution Parliament may make laws with respect to any matter enumerated in the State List for the purpose of promoting uniformity of the laws of two or more States, and whereas turtles and riverine fishing are matters enumerated in the State List under item 12 of List II of the Ninth Schedule of the Federal Constitution. However, States can delegate power to DOF to enforce and implement States' legislation pertaining to turtle protection, conservation and rehabilitation.

Action 9.3 Develop a national strategy for ex-situ conservation

The purpose of captive breeding programmes, implemented by DWNP, is to rehabilitate threatened species and wildlife rescue. These programmes are conducted mainly through the establishment of Wildlife Conservation Centres (WCCs) and Wildlife Rescues Centres (WRCs). At present, DWNP maintains a total of eleven (11) WCCs and two (2) WRCs, with the former playing a role in captive breeding and reintroduction to the wild and the latter serving as a rescue centre for wildlife. Breeding and reintroduction programmes run by DWNP have involved:

i. Sambar Deer (*Rusa unicolor*);
ii. Gaur (*Bos gaurus hubbacki*);
iii. Common Barking Deer (*Muntiacus muntjac*);
iv. Malayan Tapir (*Tapirus indicus*);
v. Malayan porcupine (*Hystrix brachyura*);
vi. Mountain peacock-pheasant (*Polyplectron inopinatum*);
vii. Great argus (*Argusianus argus*);
viii. Malayan peacock-pheasant (*Polyplectron malacense*);
ix. Green peafowl (*Pavo muticus*);
x. River terrapin (*Batagur affinis*);
xi. Malayan tiger (*Panthera tigris*);
xii. Sun Bear (*Helarctos malayanus)*

The captive breeding programme also includes the Wildlife Reproductive Biotechnology Programme to develop a technical team in 'advance reproductive technology', to preserve wildlife genetic material and to conduct research on wildlife reproductive biology. Currently, the programme is in the stage of optimizing semen collection and cryopreservation protocol in few species such as the Sumatran rhinoceros, Malayan tiger, sun bear, tapir, Asian elephant, long-tailed macaques, Sunda pangolin, binturong, and gaur. DWNP also manages the Kuala Gandah National Elephant Conservation Centre in Pahang.

In Sabah and Sarawak, breeding and reintroduction programmes are exemplified by efforts to conserve the iconic orangutan. The orangutan was listed as critically endangered by IUCN in 2016. The Sepilok Rehabilitation Centre situated in Sandakan, Sabah, was founded in 1964 to rehabilitate young orphan orangutans. The centre nurses rescued orangutans and releases them into the 4,300 ha site at the edge of Kabili Sepilok Forest Reserve. In Sarawak, Semenggoh Wildlife Centre currently has 31 free-roaming semi-wild orangutans while the Matang Wildlife Centre houses 31 orangutans, including thirteen (13) semi-wild and two (2) juveniles undergoing rehabilitation. Other wildlife sanctuaries include the Bornean Sun Bear Conservation Centre in Sepilok, Sabah which serves as a rescue and rehabilitation centre for rescued sun bears in Sabah which has to date released seven sun bears into the Tabin Wildlife Reserve.

For plants, Malaysia is a member of Asia Pacific Forest Genetic Resources Programme (APFORGEN[42]), and is guided by the 'APFORGEN Strategy 2018 – 2022: Implementing the Global Plan of Action on Forest Genetic Resources in Asia and the Pacific'. The strategy is aligned with the Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources of the Food and Agriculture Organization of the United Nations (FAO). Ex-situ conservation areas for cultivated and domesticated plant species and their wild relatives such as field and seed genebanks are elaborated in Target 13 on agro-biodiversity conservation.

For marine species, Malaysia has a nationwide turtle conservation programmes with 28 hatcheries (in-situ and ex-situ incubation) where more than 800,000 – 1,000,000 turtle eggs are incubated annually. Out of the 28 hatcheries, 4 (four) are in-situ hatcheries, which are the Pulau Pinang, Mak Kepit and Cagar Hutang nesting beaches of Redang Marine Park Island in Terengganu and Pulau Rusukan Besar in the Federal Territories of Labuan.

For ex-situ conservation activities of aquatic genetic resources of farmed aquatic species and the wild relatives, DOFM has established in vitro collections and gene banks of gametes, embryos, and tissue of indigenous freshwater and marine species in addition to fish sperm cryo-bank and freshwater fish repository. As for marine species, there are large collections preserved at ISMAT, Terengganu and some small collections in Pulau Pinang and Bintawa.

Indicator 9.3: By 2025, a network of national botanical gardens has been established.

Status: On track to achieve target

The Malaysian Botanic Gardens Network (MYBGNet) has met three times since 2016. MYBGNet aims to foster cooperation among botanic gardens in Malaysia and support botanic garden activities beneficial to its members. While the coalition awaits formalization from KATS, the 21 members and collaboration activities (species collection, garden landscape and management, staff training and exchange, education and public awareness, and research and plant conservation) have been identified.

[42] APFORGEN is a network founded in 2003 that specifically focuses on the conservation and sustainable use of the genetic diversity of tree species. Being a part of this network fosters the country's abilities to preserve forest genetic resources

Target 10: By 2025, illegal harvesting and illegal trade of wildlife, fish and plants are under control and significantly reduced

Malaysia's rich biodiversity is threatened by the compounding effects of habitat loss, poaching, and illegal wildlife trade. Federal legislation that governs the import and export of wildlife are the International Trade in Endangered Species Act 2008 and the Customs Act 1967. Target 10 seeks to reinforce the monitoring, enforcement and public awareness programmes to reduce poaching and demand for threatened wildlife.

Action 10.1 Strengthen enforcement to eradicate poaching, illegal logging and illegal trade in wild animals, fish and plants

Launched in 2014, the Malaysian Biodiversity Enforcement Operation Network (MBEON) programme gathered key enforcement agencies including the Royal Malaysian Customs Department, Immigration Department of Malaysia, Royal Malaysian Police Department and the Malaysian Army, to expand the scope of wildlife enforcement activities. MBEON organized annual integrated forest enforcement activities. Since its inception, MBEON has provided a platform for various enforcement teams to learn new techniques, improve enforcement methodologies and enhance the efficacy of wildlife crime enforcement.

As the major wildlife authority in Peninsular Malaysia, DWNP has embarked on various initiatives to strengthen monitoring and enforcement. Since 2013, several new units had been established within the Enforcement Division (Intelligence Unit, Forensic Unit, Import/Export Unit and the Prosecution Unit). A Cyber Crime Unit was set up to tackle online wildlife trade and sales. The Department has also enhanced all the Standard Operating Procedures related to law and enforcement activities under the department particularly related to search, investigation, and arrest. Further, DWNP has integrated SMART[43] into their routine patrolling. Between 2013 and 2018, efforts by DWNP in collaboration with several local NGOs have destroyed more than 3,500 snares. The development in forensic capacity complements enforcement and patrol efforts.

Similarly, FDPM employs a combination of ground patrols, aerial surveillance, and satellite imagery to enforce the Forestry Act. This is supplemented by a DNA profiling database on key commercial timber species established to strengthen the evidence for court cases regarding forestry crime. The data profiling will also be used to evaluate and conserve the genetic structure of the species of timber within Peninsular Malaysia.

In Sabah, the Sabah State Government launched its first armed enforcement squad – Protection Tactical Enforcement Team (PROTECT) in July 2015. This is supported by the appointment of Honorary Forest Rangers and Honorary Wildlife Rangers recruited from the public and trained to be the informants to the

[43] The Spatial Monitoring and Reporting Tool, is an open source software which aid in the identification of poaching hotspots, improving rapid response measures and calculating the impact of anti-poaching efforts in order to maximize results. Since its launch in 2011, SMART has been adopted by 147 conservation areas in 31 countries. SMART has also been adopted at a national level by 8 countries including Thailand, Bhutan, and Madagascar. Source: Conservation International. 2017. "SMART" Patrolling for Better Protection of Forest Area. Available at: https://www.conservation.org/global/indonesia/tentang/Pages/SMART-Patrolling.aspx

authority. Also, the State Committee on Illegal Logging Crackdown has been established at the Chief Minister's Department. On the site level, a partnership between the Sabah Forestry Department (SFD), Yayasan Sabah and the NGO Sabah Environment Trust was formalized in 2017 to initiate, establish and operationalize a dedicated patrolling team to conduct enforcement and monitoring in the globally important Danum Valley – Maliau Basin – Imbak Canyon (DaMaI) core conservation areas. The multi-year Global Park Defense Programme receives funding from international donors to support training for park rangers, ground and aerial surveillance equipment including drones, communication, and wildlife monitoring equipment, detailed mapping of DaMaI forests and ecosystems, and planning for tourism and improved park management.

To stem cross border smuggling of wildlife, efforts have been made to reinforce cooperation among wildlife enforcement agencies and other border enforcement agencies such as the Malaysian Armed Forces, Malaysia Maritime Enforcement Agency (MMEA), Royal Malaysia Police, Royal Malaysian Customs Department and airport authorities to the implement of the International Trade in Endangered Species Act 2008. At the international and regional level, enforcement collaboration and exchanges are supported by Interpol, United Nations Office on Drugs and Crimes (UNODC), CITES Secretariats and ASEAN Wildlife Law Enforcement Network (ASEAN-WEN), ASEAN Working Group on the Convention on International Trade in Endangered Species of Wild Fauna and Flora and Wildlife Enforcement (AWG CITES and WE), ASEAN Working Group on Illicit Trafficking in Wildlife and Timber (AWG ITWT) under the Senior Official Meeting on Transnational Crimes (SOMTC). This has further improved the cross-border cooperation and capacity of Malaysian wildlife enforcement authorities.

In the marine environment, DOFM is implementing a number of National Plan of Actions (NPOAs) to strengthen EAFM, these are the NPOA for Illegal, Unregulated and Unreported (IUU) Fishing (DOF, 2013), the NPOA - Fishing Capacity (DOF, 2015) as well as action plans for endangered species including turtles, sharks, and dugong. In addressing IUU fishing, Malaysia upholds the principles of FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (FAO-IPOA-IUU) which form the basis of Malaysia's NPOA-IUU and has established the inter-agency National IUU Committee on IUU Fishing. Malaysia is also an active party to the Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing in the Region (RPOA-IUU) in promoting cooperation at the regional level to combat IUU fishing in particular through the implementation of port state measures. Malaysia also supports the regional initiative through the establishment of the Regional Fishing Vessels Record (RFVR) for Vessels 24 Meters in Length and Over (RFVR-24m) under ASEAN-SEAFDEC mechanism to deter dual flagging. Such an effort could facilitate participation in the FAO Global Record of Fishing Vessel in the future.

Other regional measures include the FAO RAP Bangkok under the FAO Technical Cooperation Programme Facility (TCPF) to assist in identifying and analyzing the policy, legislative framework and operational gap for Malaysia to explore the possibility of becoming a party to Port State Measure Agreement and UN Fish Stock Agreement. As part of the effort to bolster the monitoring, control, and surveillance (MCS), Malaysia has made the use of Automatic Identification System (AIS) and Mobile Tracking Unit (MTU) mandatory for certain categories of vessels to increase safety at sea, reducing conflict between commercial and small-scale fisheries as well as to prevent local fishing vessels from fishing illegally outside national waters. In coastal

waters, the '*Rakan Park'* or Friends of the Park Programme was launched to train and engage coastal communities to become eyes and ears for the authorities.

Indicator 10.1: By 2020, resources for enforcement are doubled compared to the 2016 level.

Status: On track to achieve target

The Biodiversity Baseline Study surveyed major biodiversity enforcement agencies in 2017 to assess the level of available resources. The survey gauged resources allocated via seven different aspects of enforcement, i.e. enforcement activities, enforcement agencies effectiveness, forensic technology, legislation basis, compatible sentencing and engagement with the judiciary. Results showed that the majority of enforcement agencies reported inadequate but gradually increasing financial resources and manpower. At the time of writing, DWNP is working together with the Royal Malaysian Police Force through Ops Bersepadu Khazanah to curb poaching activities and fortify protected areas. In the recently announced Budget 2020, the government has further allocated RM 20 million to hire retired army officers and indigenous and local communities to protect biodiversity.

Action 10.2: Reduce demand through public awareness and behavioral change

Awareness campaigns play an important part in reducing poaching at the local scale. Most wildlife conservation programmes have incorporated elements of behavioral change campaigns. Examples include the species and wildlife day celebrations; the nationwide 'My Fin My Life' campaign organized WWF-Malaysia; human-wildlife conflict mitigation programmes conducted by DWNP, and MYCAT Malaysia tiger conservation programmes. TRAFFIC Southeast Asia has also been conducting market research, investigations and analysis to compile the evidence on illegal wildlife trade in Malaysia and in the region. TRAFFIC Southeast Asia has supported enforcement agencies to monitor the illegal online wildlife trade and implement behavioral change programmes to curb wildlife consumption.

A toll-free hotline for the public to report wildlife crimes (1-800-88-5151) is being operated by DWNP. There is also a separate 24-hour Wildlife Crime Hotline operated by MYCAT (+6019 356 4194). A Wildlife Witness app was also launched and maintained by TRAFFIC Southeast Asia to gather information on the illegal wildlife trade within Southeast Asia.

To curb poaching through religious teachings, WWF Malaysia has collaborated with the Institute of Islamic Understanding to release a handbook on "Islam, Wildlife Conservation and You". The book promotes environmental and wildlife awareness and protection based on Islamic principles. In 2015, the Terengganu State Government issued the country's first '*fatwa*'[44] against poaching with the support of Rimba. The fatwa, or legal decree for the Muslims, decreed that the illegal hunting of an endangered species is forbidden under the principles of Islam.

Malaysia has an ongoing IUU Fishing awareness programme which includes the National Workshop on International and Domestic Framework to Combat Illegal, Unreported and Unregulated (IUU) Fishing

[44] A fatwa is a legal decree, applicable to all Muslims, that relates to a certain issue. Source: Actman, J. 'Muslim Council Issues Fatwa Against Poaching'. 16 December 2015. Available at: https://news.nationalgeographic.com/2015/12/151216-fatwa-terengganu-malaysia-poaching/

involving 24 agencies and ministries. Besides active enforcement, DOFM also carries out education and awareness programmes targeted to fishermen. Such programmes are aimed at increasing compliance to the Fisheries Act 1985, in particular, Section 43 and 44 that pertains to marine parks and illegal use of weapons. DOFM also has conducted awareness and inspection programmes at all related outlets, especially at ornamental fish outlets to curb the illegal trade of aquatic endangered species and invasive alien species.

Indicator 10.2: By 2021, outlets involved in the trade and/or sale of illegal wildlife, parts and derivatives have been identified and legal action taken.

Status: Progress toward target but at an insufficient rate

Market surveys are regularly conducted by TRAFFIC Southeast Asia, targeting Traditional Chinese Medicine outlets and game meat restaurants across Malaysia. TRAFFIC works closely with DWNP to provide information on wildlife law infringements. DOFM conducts regular monitoring and surveillance on outlets that sell live aquatic species such as ornamental fish outlets, exhibitions centres, farms, and importing and exporting premises.

A herd of dugongs. Photo credit: MareCet

Target 11: By 2025, invasive alien species and pathways are identified, priority species controlled, and measures are in place to prevent their introduction and establishment

Invasive alien species (IAS) are plants, animals, pathogens and other organisms that are non-native to an ecosystem which may cause economic or environmental harm or adversely affect human health. Increasing travel, shipping, and tourism associated with globalization and expansion of the human population have facilitated the intentional and unintentional movement of species beyond natural biogeographical barriers. In Malaysia, IAS control is focused mainly on the agriculture and commodity sector with a limited emphasis on ecological impacts. Target 11 strives to control the establishment and spread of IAS through an integrated approach of research, education and awareness, as well as to strengthen inspection and control at the border.

Action 11.1 Improve our understanding and public awareness of IAS

A National Committee on IAS was formed to undertake the implementation of the National Plan of Action for Prevention, Eradication, Containment, and Control of Invasive Alien Species 2014-2018. The four main strategies of the Action Plan are to strengthen the legal framework in relation to IAS prevention, detection and monitoring, eradication, containment and control; intensify capacity building for the implementation of the action plan; enhance research and development of IAS, and increase public awareness of IAS. The Committee meets twice a year and is coordinated by the Department of Agriculture (DOA).

In 2018, the "Invasive Alien Species in Malaysia 2018" book was completed. The book documents key IAS present in the agriculture and forestry sector, wildlife and animal transmitted diseases, fisheries, and marine sector in Malaysia. Some of the important IAS that have been established in Malaysia are Peacock Bass (*Cichla spp.*), Red Claw Crayfish (*Cherax quadricarinatus*), Red-eared Slider (*Trachemys scripta elegans*), Diamondback Moth (*Plutella xylostella*), Cocoa Pod Borer (*Conopormopha cramerella*), Beet Armyworm (*Spodoptera exigua*); Apple snail (*Pomacea spp.*), Water Hyacinth (*Eichhorrnia crassipes*), Parthenium weed (*Parthenium hysterophorus*), Kariba weed (*Salvinia molesta*), red palm weevil (*Rhynchophorus ferrugineus*), and highly pathogenic Avian influenza. The IAS identified have caused significant damage to the agriculture sector affecting crop production, livestock, fisheries and ultimately biodiversity.

Malaysia acceded to the International Maritime Organization Ballast Water Management Convention 2004 (BWM 2004) in September 2010 and is currently preparing the national legislation to fulfil the obligations. In the context of IAS, the Ballast Water Convention requires vessels to install a ballast water treatment system or to adhere to the prescribed ballast water exchange procedures. A national action plan towards preparing for the BWM 2004 has been established. This entails the national baseline surveys, risk assessment of ships coming to Malaysian ports, and to establish ballast water exchange based on regional initiative/cooperation. Progressive achievements have been made under the national action plan with ballast water sampling activities focusing on ships calling to the Kertih Port, Kuantan Port, Port Klang, Port of Tanjung Pelepas, and the Penang Port. The Marine Department of Malaysia undertakes this study in cooperation with local scientists from the university. Standardized methods based on the Australian Centre for Research and Marine Pests (CRIMP) Protocol has been deployed at the national level to ensure standardization towards building the national baseline data system. Port baseline studies and risks

assessment are currently being planned. Further, the Ministry of Transport participates actively in the ASEAN Working Group on Coastal Marine Environment to foster cooperation and capacity building on addressing coastal and marine IAS in the ASEAN region with the focus on ballast water management measures.

Within forest plantations in Peninsular Malaysia, a checklist on native pests and diseases of selected forest plantation species has been compiled to provide the baseline information. An IAS assessment on selected forest timber plantation species is ongoing to enhance IAS vigilance and monitoring. Within the oil palm sector, the sector-specific Biosecurity Plan was launched in 2018 as a result of the partnership between the Malaysian Palm Oil Board (MPOB) and the Department of Agriculture (DOA). The Biosecurity Plan identifies key IAS threats in the palm oil industry. A smartphone application - *SawitSecure* has been developed as a reference platform for comprehensive resources and information of more than 600 exotic pests, diseases, and weeds of oil palm from 44 oil palm growing countries.

IAS in Malaysia is classified as a new and emerging issue in the agriculture sector. Since 2017, an annual seminar regarding legislations, policies, and research relating to IAS has been organized to promote awareness and disseminate information. For aquatic species, the list of top 10 priority aquatic IAS[45] was released. Posters on aquatic IAS were distributed to educate the public (Figure 25). These species could be potentially invasive to the ecosystem and some may introduce or spread new diseases and could affect native species in their natural habitat, causing species loss. DOFM conducts continuous public engagement throughout Malaysia which includes dissemination information, Standard Operating Procedures, talks and seminars on IAS. In Sabah, the State Government has collaborated with local communities (Koperasi Pelancongan Mukim Batu Puteh Kinabatangan (KOPEL)) to eradicate *Salivinia molesta,* the Kariba weed, which has infested oxbow lakes in the Kinabatangan region.

[45] Department of Fisheries Malaysia. 2018. Invasive Alien Species in Malaysia. National Committee on Invasive Alien Species Malaysia 2018.

Figure 25: A list of non-native fish prohibited from release into water bodies. Source: DOFM.

Indicator 11.1: By 2025, the level of awareness of the public regarding IAS has doubled compared to the 2016 level.

Status: Progress toward target but at an insufficient rate

The Biodiversity Baseline Study found an overall low public understanding of IAS. Notably, 87% of the population has a low comprehension of IAS. Respondents were also limited in their abilities to cite examples and cases of IAS in Malaysia.

Action 11.2 Conduct risk assessment on all introduced exotic species before their release

A risk assessment framework has yet to be developed and response on IAS predominantly follows the prevention, detection and monitoring, containment and eradication hierarchy. However, risk assessments in Malaysia are carried out with the focus on IAS which causes disease to agricultural commodities and human health. Examples of IAS that affect agriculture include the red palm weevil in oil palm and coconut plantations, bacterial panicle blight (*Xanthomonas oryzae pv oryza*e) in rice crops, Fall Armyworm (*Spodoptera frugiperda*) affecting the corn, and South American Leaf Blight (SALB) affecting the rubber plantation. Research to understand IAS biology and establishment, as well as impact, is prioritized.

The procedure on Import Risk Analysis (IRA) has been established to determine whether live aquatic species (or derivatives) intended for import pose a threat to aquatic biodiversity. Between 2014 to 2018, IRA was conducted for pacific oyster (*Crassostrae gigas*) and giant barb (*Catlocarpio siamensis*) and permits to import both species were denied due to high risk of disease. However, permits were granted for Amur Sturgeon (*Acipenser schrenckii*) and Mississippi Paddlefish (*Polyodon spathula*) farming in Tanjung Malim, Selangor after import risk assessment evaluation.

Indicator 11.2: By 2018, a risk assessment framework for invasive alien species has been established.

Status: On track to achieve target
The risk of IAS is assessed with the focus of addressing agricultural productivity and food safety. Currently, there is no dedicated risk assessment framework for IAS. IAS is mainly tackled from the agriculture perspective as alien invasive insect pests, pathogens and weeds, which has an economic impact on crop and aquaculture production. Risk assessments are carried out to comply with international sanitary and phytosanitary requirements.

Action 11.3 Strengthen quarantine inspection and enforcement at entry points and international borders

The Department of Malaysian Quarantine Inspection Services (MAQIS) was established under the purview of MOA in 2011 to enforce quarantine regulations. In Sabah and Sarawak, inspection and enforcement at the entry points and quarantine regulation are carried out by Department of Agriculture (DOA) Sabah and Sarawak.

MAQIS, DOA Sabah and DOA Sarawak quarantine functions include integrated services by enforcing all plant, animal and fisheries quarantine laws (Plant Quarantine Act 1976, Plant Quarantine Regulation 1981 (plant); Fisheries Act 1985 (fisheries); and Animal Act 1953 and Animal Feed Act 2009 (animals) at the entry points, quarantine stations, and quarantine premises. This is to ensure that plants, animals, carcasses, fish, agricultural produce, soils, microorganisms and food which are imported into and exported out of Malaysia are safe and free from any risk of IAS.

Preventing the entry and spread of noxious plants, plant pests, and other products that harbour the invasive pest are crucial not only to the agriculture industry but also to the local biodiversity. Implementation of Plant Health certification via Phytosanitary certificate (PC) and Import Permit (IP) are two important

documents to ensure the movement of agriculture products in compliance with the Sanitary and Phytosanitary (SPS) requirements. For aquatic IAS, the enforcement of the Fisheries Act 1985 is not only focused on the prevention of entry, but also on provisions to control or eradicate dangerous pests found in Malaysia.

Indicator 11.3: By 2021, the National Action Plan for the Prevention, Eradication, Containment and Control of Invasive Alien Species has been fully implemented.

Status: On track to achieve target

The National Action Plan for the Prevention, Eradication, Containment, and Control of Invasive Alien Species ended in 2018. MOA is in the process of reviewing the performance of the Action Plan and a new Plan will be developed in 2020. A National Working Committee on IAS meets twice a year to coordinate efforts in controlling IAS.

Target 12: By 2025, a comprehensive biosafety system inclusive of a liability and redress regime is operational to manage potential adverse impacts of modern biotechnology on biodiversity and human health.

Malaysia ratified the Cartagena Protocol on Biosafety (CPB) in September 2003 and has immediately taken steps to ensure that a regulatory framework for biosafety is in place to undertake all the other obligations encompassed within the CPB. The Malaysian Biosafety Act 2007 was approved with the main objectives to protect human, plant and animal health, the environment and biological diversity, by regulating the release, importation, exportation and contained use of Living Modified Organisms (LMOs) or Genetically Modified Organisms (GMOs), and the release of products of such organisms. The Act came into force on 1 December 2009. This was followed by the Biosafety (Approval and Notification) Regulations 2010 passed on 1 November 2010 to implement the Act.

Action 12.1 Enhance inspection and biosafety compliance

The regulatory scope of the Biosafety Act is limited to modern biotechnology, and the Department of Biosafety is the implementing agency for this Act. Within modern biotechnology (that covers LMO and its products), the regulatory range of activities covered is wide. There are five categories of activities involving LMOs that are regulated by the Biosafety Act. These are the release, contained use, importation for release, importation for contained use, and exportation of LMOs. Release activities involve research and development (R&D) purposes in all field experiments, placing in the market, offer as a gift, prize or free item, disposal, and remediation purpose. Contained use involves any operation including research and development, production or manufacturing involving LMOs, or storage of LMOs, undertaken within a facility, installation or other physical structure such that it prevents contact and impact of the LMOs on the external environment.

The Biosafety Act 2007 provides for the establishment of the National Biosafety Board (NBB) and the Genetic Modification Advisory Committee (GMAC). The NBB is responsible for making decisions on the release, importation, exportation and contained use of any living modified organism (LMO) derived from modern biotechnology. It also monitors activities relating to LMO and products of such organisms as well as promote the research, development, educational and training activities relating to biosafety, and facilitate the collection, storage, and dissemination of data relating to LMO and biosafety. The NBB is supported by the GMAC, whose function is to provide scientific, technical, and other relevant advice to NBB for decision-making.

The corresponding regulations and guidelines complement the national biosafety regulatory framework, the Biosafety (Approval and Notifications) Regulations 2010 contains specific information about:

- The establishment of an institutional biosafety committee (IBC)
- The procedures for application of approval and fees
- The matter related to the certificate of approval
- Notification procedures for the export of LMO and contained use
- Contained Use Activities that are exempted under the Biosafety Act

- Incorporation of socio-economic considerations in decision making

In 2018, two new regulations were gazetted to strengthen the implementation of the Biosafety Act. The Biosafety (Sampling Procedures) Regulations 2018 establishes specific procedures to be followed when taking sampling for research, whereas the Biosafety (Compounding of Offences) Regulations 2018 allows compounding of certain acts of non-compliance under the legislation. DOB has completed the Standard Operating Procedure for sampling but the SOP for enforcement is still in progress.

DOB undertakes enforcement and monitoring activities. This includes the sampling and analysis of products suspected of being or containing LMOs, the conduct of searches for suspected non-compliance, and enforcement of NBB decisions on all approvals and notifications. Under the Biosafety Act, enforcement officers from other related agencies have been empowered to implement the Act as well been provided training to do so. In 2014, a handbook entitled "Development and implementation of Integrated Enforcement Matrix among Government Agencies (GMO/Non-GMO Enforcement)" was published to outline the roles and jurisdictions of enforcement agencies and their respective legislation. In 2017, a Technical Committee chaired by the Secretary-General of KATS for Monitoring of Living Modified Organism (JKTP-LMO) was formed. JKTP-LMO is an integrated committee at the administrative/officer level to coordinate and implement LMOs monitoring and enforcement. Between 2018-2019, the DOB collaborated and enhanced the enforcement capacity of the Department of Agriculture Sabah and the Department of Agriculture Sarawak.

The Department of Chemistry Malaysia has the expertise and accreditation for the detection and identification of LMOs and has been appointed as an analyst under the Biosafety Act to process the samples obtained for enforcement. By 2018, laboratories involved in the detection and identification of LMOs included the National Public Health Laboratory, the Forest Research Institute of Malaysia (FRIM) and Food Safety and Quality Division Laboratory. In Sabah and Sarawak, the Miri Health Laboratory provides similar services for samples taken in the region.

All institutions and universities involved in research and development dealing with LMOs are required to set up an Institutional Biosafety Committee (IBC) that is responsible for monitoring modern biotechnology activities and ensure compliance with the Biosafety Acts and the Regulations at the institutional level. There are currently fifty (50) registered IBCs in Malaysia (including Sabah and Sarawak) that report their monitoring activities by submission of an Annual Report to the DOB.

The Malaysian Biosafety Handbook series was published, which comprised of a collection of five biosafety guidelines and a user guide produced. The set includes:

a) User's Guide to the Biosafety Act and Regulations
b) Guidelines for Institutional Biosafety Committees
c) Contained Use Activity of Living Modified Organism
d) Confined Field Trial of Living Modified Plants in Malaysia
e) Risk Assessment of Genetically Modified Microorganisms
f) Environmental Risk Assessment of Genetically Modified Plants in Malaysia

The Guidelines for Labelling Biotechnology Food that was published by the Ministry of Health in 2013 is still used as a guide to food industries, consumers and authorized officers on this requirement. Biosafety components were also incorporated into the National Food Safety Action Plan 2010-2020 with regard to

GMO testing for imported agricultural produce and requirements of only using approved GM (Genetically-modified) materials for animal feed production.

Indicator 12.1: By 2020, a systematic procedure for the safe handling, transport, packaging and identification of Living Modified Organisms (LMOs) is operational.

Status: On track to achieve target
Malaysia has created a systematic procedure to enable compliance to the Cartagena Protocol on Biosafety and is continuously strengthening the local biosafety legislation for monitoring and enforcement to ensure modern biotechnology is handled in a safe manner to protect human, plant and animal health, the environment and biological diversity.

Action 12.2: Assess impacts of LMOs on biodiversity and human health

Risk assessment, risk management, and emergency response plan are a pre-requisite for activities related to modern biotechnology. The GMAC, as well as the NBB, will review these to ensure that all risks associated with the activities are assessed and addressed with appropriate risk management strategies. In addition, Biosafety Training Workshops to increase awareness about compliance to the national biosafety regulatory framework and build capacity in the areas of risk assessment, risk management and developing emergency response plans are conducted in collaboration with IBCs. An annual Institutional Biosafety Committee Seminar is organized by the DOB to increase the competence of IBCs in fulfilling their roles to ensure compliance with the Biosafety Act 2007.

Before a release of LMO, it is a requirement to conduct a risk assessment that takes into consideration the consequences and impact on the receiving environment. Thus, it is important to develop local data to support the risk assessments of LMOs. Detection of LMOs is also very important in regulating LMOs as an increasing number of new species and varieties are genetically modified and monitoring becomes increasingly difficult. Under the Eleventh Malaysia Plan, eight research studies were completed as follows:

1. Impact of genetically modified corn on the soil microbial communities;
2. Effect of genetically modified feed on egg layer performance and quality;
3. Unintended metabolic interactions in genetically modified plants with stacked events;
4. Risk of transforming endophytic bacteria/yeast;
5. Local environment impact assessment of genetically modified oil palm plant;
6. Equality nutrition food/nutrients for genetically modified foods (maize and soybean);
7. Development of detection method for genetically modified animals, i.e. fish; and
8. Detection and persistence of living modified organism products produced by synthetic biology in local environments.

Additionally, the biology documents for two commodities which are papaya (*Carica papaya*) and oil palm (*Elaeis guineensis*) have been developed by DOB which provides important information to strengthen the risk assessment of these two crops and for future reference. Pre-site inspection of selected cases that requires an additional assessment to make decisions is also conducted. To ensure compliance to Terms and Conditions imposed by the NBB to the Approved Person, post- site inspections are also conducted on a regular basis. These inspections are done together with a Sub-Committee of GMAC for Monitoring and

Enforcement. In addition, the IBCs also conduct inspections on premises used in their respective institutions.

Indicator 12.2: By 2020, the mechanism to incorporate socio-economic considerations into decision making on applications for release of LMOs is operational.

Status: Progress toward target but at an insufficient rate
Malaysia has increased our competency to make decisions by conducting capacity building activities in risk assessment as well as developing tools that assist in risk assessment. In addition, local biosafety data have been developed to strengthen the risk assessments further. However, the effort to develop a mechanism on the incorporation of socio-economic factors in decision making needs strengthening.

Action 12.3: Develop response to biosafety emergencies

With the increasing use of LMOs and their products, the damage that may arise from the transboundary movement of GM crops may occur. Liability issues may become more important as a result of economic loss or damage due to the unintentional release or adventitious presence of GM crops in other production systems. The objective of the Nagoya-Kuala Lumpur Supplementary Protocol (NKL-SP)[46] on Liability and Redress to the CPB is to provide clear rules to govern liability and redress in the event of any damage to biological diversity arising from the introduction of LMOs into the country.

In Malaysia, there are no existing provisions within the Biosafety Act 2007 that deals specifically with civil liability for damage resulting from LMOs. Opportunities for research, review, capacity development, and stakeholder engagement in this regard are continuously being explored. DOB has conducted preliminary studies to include liability and redress in local legislation to fulfil its responsibilities for the CPB. As this provision involves many stakeholders, thorough consultation and expert review are needed to ensure local needs are incorporated feasibly.

Indicator 12.3: By 2020, the legal framework to address liability and redress for damage caused by LMO has been established.

Status: Progress toward target but at an insufficient rate
The Biosafety Act 2007 does not have provisions to address liability and redress for damage caused by LMOs. DOB has conducted preliminary studies to include liability and redress in local legislation to fulfil Malaysia's commitments to the Cartagena Protocol on Biosafety (CPB). The process is ongoing. Most recently, an awareness workshop on Liability and Redress was conducted in September 2019 to explain to key stakeholders the possible liability and redress for damage caused by LMO.

[46] The NKL-SP establishes international rules and procedures to address response measures in the event of damage or sufficient likelihood of damage to the conservation and sustainable use of biological diversity resulting from LMOs.

Target 13: By 2025, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives is adequately conserved.

Agricultural biodiversity is a vital component of food security and sustainable agriculture. Malaysia is rich in agricultural biodiversity accompanying genetic resources. Malaysia has adopted the Global Plan of Action (GPA) for Plant Genetic Resources for Food and Agriculture (PGRFA) at the International Technical Conference on Plant Genetic Resources in 1996. Monitoring and periodical assessment of the implementation of GPA and its related activities are fundamental to conserve and sustainable utilization of PGRFA in the future. As a result, the National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation (NSAP-ABCSU) was launched in 2012 by MOA as a framework to protect the genetic diversity of cultivated plants; and farmed and domesticated animals as well as its wild relatives. The NSAP-ABSCU also includes arthropod and microbial genetic resources that contribute to the food and agriculture sectors. Target 13 is formulated to drive the implementation of the NSAP-ABCSU. The NSAP-ABCSU aims to create awareness among policymakers and the public, increase capacity building, enhance research and development on conservation and utilization, improve in-situ and ex-situ conservation and strengthen policy and regulations on the conservation of agricultural biodiversity.

Action 13.1 Support the implementation of the National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation.

In Malaysia, the promotion of agricultural biodiversity takes cognizance of commercial and food crops and tree species. In terms of crop genetic conservation, the Malaysian Agriculture Research and Development Institute (MARDI) is the major custodian of the nation's crop genetic resources. To preserve the genetic diversity of national food crops, MARDI maintains a genebank that holds the country's largest germplasm collection. The seed genebank mainly conserves rice and vegetables (19,135 accessions, of which approximately 13,190 are rice; 3579 accessions for fruits, herbs and vegetables. In addition to the seed genebank, MARDI also conserves genes in the field, to preserve underutilized fruit genetic resources[47]. The field genebank, with 3,643 accessions, includes fruits, herbs, medicinal plants, traditional vegetables, bio-pesticide plants and aromatic plants. Recently, a national genebank, MyGenebank with higher capacity, facilities, and resources, was established in 2015 to serve as the coordinating hub of germplasms exchange in the country. Characterization and evaluation of all the accessions are the main activities of the germplasm collections to promote further utilization. MARDI also maintains the Centre for Marker Discovery and Validation (CMDV) which serves as the one-stop centre for genotyping services for crops, livestock, and fisheries.

Capacity building, development, and training of human resources have become annual agendas. The staff of genebank attends the Genebank Operation Advanced Learning Master-class (GOAL workshop) which gathers practitioners from the Asia Pacific to learn and share experience on PGRFA implementation. Additionally, MARDI also developed the Agrobiodiversity Information System (AGROBIS), a centralized database system for storing data and information on genetic resources from research findings at MARDI. By 2018, there are five major clusters in AGROBIS namely plants, microbes, arthropods, livestock and biotechnology. Within the plant cluster, several components included are fruits, rice, traditional

[47] Salma, I. 2006. Conservation of Tropical Fruit Tree Genetic Resources in Malaysia. LOA No. APO/05/11, Consultant Report to IPGRI, Rome.

vegetables, herbs, medicinal plants, floriculture, palms and tuber groups. In total, there are 17,243 accessions registered.

For livestock, an ex-situ conservation of the local farm animal genetic resources involves the cryopreservation of semen, embryos and other generic materials in gene banks set up at National Institute of Veterinary Biodiversity in Jerantut, Pahang and the newly launched National Animal Embryo Centre (NAEC) at MARDI Research Station, Kluang, Johor. The development of strategic animal breeding programmes and the implementation of genetic management is important for sustainable livestock genetic resource diversity and conservation. Maintenance and breeding live animals will allow further diversification of the breeds while cryoconservation preserves the current genetic status. To further strengthen the management of the farmed animal genetic resources, a National Farm Animal Genetic Resources Technical Working Group has been established in 2015. A designated genebank for farm animals is maintained by the Department of Veterinary Services (DVS). A National Data Center for farm animal genetic resources is under The Malaysian Journal of Veterinary Research (MJVR) updates the research and knowledge base in veterinary medicine, animal science and livestock production.

MARDI supplies breeders with embryos and semen specifically for cows, goats, and *kampung* chicken. Live animals are maintained for conservation and research purposes (272 Kedah-Kelantan cattle, 113 Bali cattle, 433 Brakmas cattle, 25 Katjang goat and 3,718 kampung chicken). Aside from living animals, the National Animal and Embryonic Centre (NAEC) conserves local genetic material (14,014 semen and 173 embryones) and imported genetic material (2768 semen and 80 embryones) for animal genetic resources conservation. The MARDI museum collection hosts 31,500 insect and 2,175 microbial specimens associated with agriculture. The Collection of Functional Food Cultures (CFCC) is developed to conserve, manage and utilize functional food microbes consisting of bacteria, yeast and fungi. This collection facility currently houses 505 functional food cultures obtained from a range of indigenous fermented foods.

MARDI collaborates with Bioversity International to support local farmers for on-farm conservation of local fruits. The project was piloted in six conservation sites established across Peninsular, Sabah, and Sarawak to explore innovative in-situ conservation methods and improve productivity[48]. Currently, a project focusing on the 'Exploration of New Underutilized Fruits for Food Security, Nutrition and Climate Change' under the Eleventh Malaysia Plan is ongoing. The project has focused on new discoveries and the R&D of underutilized fruit species (rare fruits & wild relatives) as a potential source for commercialization in terms of planting technology, post-harvest technology planting materials, bio-based products, database as well as fundamental knowledge.

Underutilized crops have the potential to increase nutrition and food security and address livelihood for the poor in the face of climate change. To promote the diversity of crops in the agricultural sector, the Government has supported the set-up of the international research body - Crops For the Future[49] (CFF) to improve the development and production of underutilized crops. Among the crops which CFF focuses on is the Drumstick tree (*Moringa oleifera*); Bambara groundnut (*Vigna sublterranea*) and the vegetable Hummingbird (*Sesbania grandiflora*) due to fast-growing and resistant nature. Other programmes include the use of black soldier flies fed on sesbania for aquaculture feed. CFF has also built a global alliance on

[48] Lim, CY. 2015. MARDI Works to Protect Diversity of Fruit Crops. The Star Online 16 March 2015. Accessed 28 January 2019 at: https://www.thestar.com.my/lifestyle/features/2015/03/16/mardi-works-to-protect-diversity-of-fruit-crops/#1et3tepUK848qC0d.99

[49] Crops For the Future website: http://www.cffresearch.org/

underutilized crops called the Association of International Research and Development Centres for Agriculture with partners around the world. The Institute, situated within the compound of the University of Nottingham Malaysia campus, also focuses on cultivating young scientists for research and development on underutilized crops.

Many academic institutions and universities also hold significant germplasm collections. An example is the botanic garden of the Universiti Malaya - Rimba Ilmu. The Rimba Ilmu herbarium hosts the largest university collection in Malaysia, with 63,000 accessions, with several main show collections that include medicinal plants, palms, and citrus and citroid collections. Rimba Ilmu is the designated centre of the citrus and citroid collection for Southeast Asia by the International Plant Genetic Resources Institute (IPGRI). The conservatory's collection of plants and orchids include some rare and threatened species.

Under the ex-situ conservation, genetic resources of farmed aquatic species and wild relatives, DOFM has established in vitro collections and gene banks of gametes, embryones, and tissue of indigenous freshwater and marine species. DOFM has fish sperm cryo-bank and freshwater fish repository in the research centre in Negeri Sembilan, while the marine species collections are preserved at MRFDMD, Terengganu and small collections in the fisheries research centres in Pulau Pinang and Bintawa.

Table 13: Regional and/or international initiatives targeting the conservation and sustainable use of biodiversity for food and agriculture, and in particular, associated with biodiversity (PGR – Plant Genetic Resources; AqGR – Aquatic Genetic Resources; FGR – Forest Genetic Resources. Source: Malaysia's Country Report on the State of Biodiversity for Food and Agriculture, 2015.

No.	Name of Networks	Description
1	International Coconut Genetic Resources Network (COGENT)	PGR
2	Asian Network for Sweetpotato Genetic Resources (ANSWER)	
3	International Network For Bamboo And Rattan (INBAR)	
4	Banana Research Network for Asia Pacific (BAPNET)	
5	Asia-Pacific Seed Association (APSA)	
6	International Seed Testing Association (ISTA)	
7	International Rice Research Institute (IRRI)	
8	The World Vegetable Centre (AVRDC)	
9	Consultative Group on International Agricultural Research (CGIAR)	
10	International Society of Horticulture Science (ISHS)	
11	CABI	
12	International Tropical Fruit Network (TFNet)	
13	Bioversity International	
14	Crops for the Future Research Centre (CFFRC)	
15	Global Crops Diversity Trust (GCDT)	
16	Royal Botanic Gardens, Kew, United Kingdom	
17	Institut Pertanian Bogor (IPB), Indonesia	
18	Filipina Tropical Fruit Commissions	
19	Inter-governmental Science-Policy Platform of Biodiversity and Ecosystem Services (IPBES)	Assiociated biodiversity
19	WorldFish	AqGR
20	Heart of Borneo (HoB) Initiatives	FGR
21	Indonesia and Malaysia Transboundary Conservation Area (TBCA)	

Indicator 13.1: By 2021, all actions and programmes under the National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation have been fully implemented.

Status: Progress toward target but at an insufficient rate
Considerable efforts have been implemented in agricultural biodiversity conservation. Initial discussions to review the Action Plan are under way.

Target 14: By 2025, Malaysia has an operational ABS framework that is consistent with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation.

As a biological resource-rich country, Malaysia plays a pivotal role in the negotiation of Nagoya Protocol on Access and Benefit Sharing (ABS) and issues emerging from ABS such as Digital Sequence Information of Genetic Resources (DSI). Malaysia acceded to the Nagoya Protocol in November 2018, following the introduction of the Access to Biological Resources and Benefit Sharing Act 2017. At the national level, an effective ABS law and its regulations are at the final stage of preparation to enable the implementation of the ABS regime. Hence, Target 14 pertains to the development and operationalization of a national framework on ABS; capacity building and awareness-raising, and the documentation of traditional knowledge of ILCs.

Action 14.1: Develop and enforce legislation on ABS

Malaysia passed the Access and Benefit Sharing Act on 17 October 2017 to regulate access to genetic resources and ensure equitable sharing of benefits derived from their commercialization at the national level. The Act consists of 10 parts (63 sections) and 2 schedules that cover key provisions on the requirement for a permit to access biological resources, benefit sharing agreement, prior informed consent (PIC), mutually agreed terms (MAT), measures for monitoring and tracking, user measures, payment into fund and transitional provisions. Currently, the Access and Benefit Sharing Regulations for Peninsular Malaysia is being reviewed by the Attorney General's Chamber (AGC).

Prior to the National ABS Act, the states of Sabah and Sarawak have enacted state laws in the form of Sabah Biodiversity Enactment (SBE) 2000 and Sarawak Biodiversity Ordinance 1997. The Sarawak Biodiversity Centre Ordinance 1997 provides provisions for prior informed consent (PIC), mutually agreed terms, and benefit sharing. The SBE 2000 was also amended in 2017 to make provisions for ABS. In Peninsular Malaysia, KATS is the National Competent Authority which plays a coordinating role in addition to its function as the National Focal Point for CBD and Nagoya Protocol. At the state level, 13 State Competent Authorities representing each state has the power to enforce the ABS Act 2017, including granting access permits and negotiation of benefit sharing terms.

To build capacity on ABS, KATS worked with support from the UNDP on a Project to Develop and Implement the Access and Benefit Sharing Framework in Malaysia (2013-2018). The project resulted in a strengthened national institutional and stakeholder capacity for implementation of the national ABS framework and best practice of ABS processes recognizing the principles of PIC and Mutually Agreed Terms (MAT). In addition to the support on ABS Act, the project worked at the community level across Peninsular, Sabah and Sarawak. In Peninsular Malaysia, the Forest Research Institute Malaysia (FRIM) developed and piloted prototypes based on traditional medicinal plants of several indigenous tribes in the northern region of Peninsular Malaysia, in addition to documenting traditional knowledge of indigenous and local communities. Subsequently, the mutually-agreed terms (MAT) associated with the commercialization of the prototype are reflected in the ABS Agreement developed specifically for communities involved. In Sabah, training was provided to the communities in Melangkap to develop their respective biocultural community protocol which documents their customary laws, traditions and community resource areas. The process builds awareness among the communities on the principles of ABS and biodiversity resources. In Sarawak, the Sarawak Biodiversity Centre (SBC) has piloted a project

on ABS where the Centre has successfully developed a line of natural personal care products derived from the traditional plant *Litsea cubeba*. The communities involved in this project were empowered to carry out inventory, propagation, sustainable collection based on Good Wild Craft Practice (GWCP) and steam distillation to produce essential oil from the plant. The project also led to the development of the benefit sharing framework and protocol based on the communities' inputs. Subsequently, the first benefit sharing agreement was signed between SBC and the communities based on mutually agreed terms to create value and improve the livelihood of the indigenous communities of Sarawak.

To ensure implementation of ABS, the ABS users' guide, guidelines on National Competent Authority and Competent Authorities roles and responsibilities, as well as ABS training modules, have been made available. A clearing-house mechanism for ABS to facilitate information sharing for relevant stakeholders is under preparation.

Indicator 14.1: By 2017, the national legislation and regulations on access to biological resources and benefit sharing (ABS) are in place.

Status: On track to achieve target
Following the passing of the Access to Biological Resources and Benefit Sharing Act 2017, Malaysia has formally instituted the legislative framework to regulate ABS. The Act regulates access to biological and genetic resources, prevent biopiracy and ensure that the benefits gained from biological resources are shared equitably. Malaysia has established the ABS framework for the mechanism and procedures to regulate the access and benefit sharing terms.

Action 14.2: Enhance capacity and awareness on ABS

Because ABS is a new concept, a concerted CEPA (communication, education and public awareness) targeting the Competent Authority is planned upon the adoption of the ABS Regulation. Some of the awareness-raising programmes organized by the ministry (KATS) include:

- Awareness workshop with the Competent Authorities and Enforcement Officers (March 2016)
- National Conference on ABS (September 2016)
- ABS Awareness Materials Contest (16 December 2016 - 31 January 2017)
- ABS Booth during 10th Kuala Lumpur Eco Film Festival Exhibition (26-29 October 2017) and Asia Pacific Conference on Food Security 2018 (30-31 October 2018)

In Sarawak, a series of ABS awareness has been conducted targeting the enforcement agencies (Customs, Immigrations, Police, Marine, and NREB) and checkpoints (Malaysian Airport Berhad), universities (UNIMAS, UiTM, UPM Bintulu, Swinburne University of Technology Sarawak and UCTS), research institutions/organizations (both public and private sectors), courier service companies and tour agents from 2016 to 2018. Additionally, SBC also carried out annual seminars on ABS with communities participating in the Traditional Knowledge Documentation Programme and various ethnic associations in Sarawak. SBC also promotes ABS by displaying the ABS banner at Kuching International Airport, Sibu Airport, Bario and Mulu airports in Sarawak.

Indicator 14.2: By 2025, the level of public awareness on ABS has doubled compared to the 2016 level.

Status: On track to achieve target

A survey of public awareness was conducted for institutional stakeholders and the ILCs in 2016 to establish a baseline understanding of ABS. The findings indicate that more than 80% of the institutional/government stakeholders are aware of elements of ABS (principles of Prior Informed Consent (PIC), mutually-agreed terms; traditional knowledge and benefit sharing agreement between resource users and providers). Additionally, more than 80% of the government stakeholders indicated that there are no existing measures by the respective organization when dealing with ABS issues.

The similar level of awareness was echoed by the indigenous and local communities (ILCs) surveyed in terms of their understanding of PIC, and the benefit sharing agreement from the use of traditional knowledge. Almost half of the indigenous and local communities perceived that implementation of ABS law in Malaysia may restrict their use of biological resources to exercise their community's traditional and customary practices and is unsure that implementation of ABS law is beneficial to them.

Action 14.3: Protect and document the traditional knowledge, innovations and practices of indigenous people and local communities.

In Peninsular Malaysia, Traditional Knowledge (TK) documentation among the indigenous communities and the Malay people in Peninsular Malaysia have been undertaken. Among others, the study involved conducting rapid rural appraisal, awareness workshops, socio-economic household surveys, capacity building on documentation among the Orang Asli communities, database development and lab analysis of selected potential medicinal plants. Also, several prototypes from various sub-ethnic groups derived from traditional knowledge on the medicinal plant of the Jahai, Temiar, Semoq Beri, Mendriq, Lanoh, Semelai and Temuan communities in Peninsular Malaysia have been identified and developed. FRIM maintains an ethnobotanical garden since 1995 as a centre for domestication and ex-situ conservation of medicinal and aromatic plants used by various ethnic groups. To date, there are about 250 species of medicinal and aromatic plants from 89 families that are conserved in the garden.

Similarly, in Sarawak, traditional knowledge documentation programme was conducted in selected communities. To date, workshops and TK documentation among 20 out of 28 indigenous communities from 88 villages, resulting in 6,156 plants being recorded. Of this, 1,328 species have been classified and identification efforts are ongoing.

In Sabah, PACOS Trust has empowered and supported the ILCs in the preparation of community protocol to ensure community readiness to participate in ABS.

Indicator 14.3: By 2025, a registry of traditional ecological knowledge has been established.

Status: On track to exceed target

The Malaysia Traditional Knowledge Digital Library (MyTKDL), under the purview of the Malaysia Intellectual Property Corporation (MyIPO), was set up in 2009 to serve as a digital database on traditional knowledge, traditional cultural expression and genetic resources from Malaysia. The database is a point of reference when processing traditional knowledge and patent application. To date, there are a total of 50 patents that are registered under the MyTKDL flagship.

A member of the indigenous community using a hunting blowpipe. Photo credit: WWF Malaysia

BOX 6

From Traditional Knowledge to Innovation - The LitSara Story

The stoy of LitSara begins in the year 2005, when researchers from the Sarawak Biodiversity Centre (SBC) who were on a field trip with the Lun Bawang of Long Telingan (an ethic group found in Central Nothern Borneo) came across a tree that made an invigorating, crisp and citrus scent. Thriving along ascending clearings of up to 2300 meters above sea levels, the tree *Litsea cubeba* was located 3.5 hours drive away from the nearest Lawas township. The team made the discovery while they were there to facilitate the documentation of community knowledge on the utilization of useful plants under SBC's Traditional Knowledge Documentation Programme. Since then, the potential of this multipurpose oil derived from the fruits and leaves of the *Litsea* tree has led to Intellectual Property certifications - Geographical Identification (GI) for the tree (Sarawak Litsea) and Trademark for essential oil (LitSara).

The LitSara essential oil exemplifies the powerful realms of essential oils by having a strong anti-microbial, anti-inflammatory properties, and can act as natural insect repellent which makes it suitable as an active component in personal care products. Traditionally used by ILC as a source for healing and flavouring, the Litsea tree bears small and delicate fruits. Known to the Bidayuh as "Pahkak" and to the Kelabits and Orang Ulu as "Tenem", the fruits are often mistaken as peppercorn, its fruits are a popular culinary condiment and to treat stomachache among the communities of the highlands. Its leaves are also used as traditionally remedy to treat backaches. The essential oil is obtained from the leaves and fruits of this tree by steam distillation. Laboratory test has showed that the composition of oil in the trees in Sarawak differs from the same species of trees found in other countries and geographical locations.

SBC is working closely with the local communities in sustainable harvesting of raw material, distillation of essential oiland the propagation of the tree itself. Currently, the 5 ILCs are the Bidayuh of Kampung Kiding, Padawan; Lun Bawang of Long Kerebangan and Long Telingan, Lawas; and the Kelabit of Pa'lungan, and Pa'Ukat, Bario. The LitSara Story is one of the successful projects that demonstrates the essence of ABS whereby the benefits arising from the utilizaton of traditional knowledge are shared in a fair and equitable manner with its customary holders.

Figure 26: A series of ListSara products. Photo credit: www.litsara.com

Target 15: By 2025, capacity for the implementation of the national and subnational biodiversity strategies, the CBD and other related MEAs has significantly increased.

Malaysia is a party to various biodiversity-related multilateral environmental agreements (MEAs) including the Convention on Biological Diversity (CBD); the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Ramsar Convention. Target 15 involves strengthening the capacity to implement the MEAs at the federal and state level, enhancing coordination between federal and state agencies, as well as improving legislation and encouraging international cooperation.

Action 15.1: Strengthen the capacity of government agencies to manage biodiversity

There are ongoing training programmes nationally and internationally, which builds the capacity of government agencies in biodiversity management. Resources have been allocated to maintain training centres such as the Institute of Biodiversity under the Department of Wildlife and National Parks (DWNP); Forestry Training Institute under the Forestry Department of Peninsular Malaysia; The Academy of Fisheries under the Department of Fisheries Malaysia; Sabah Forestry Training Institute under the Sabah Forestry Department; Forest Department Sarawak and Sarawak Forestry Corporation.

All key biodiversity agencies maintain training centres to build capacity for their personnel. There are nineteen (19) training centres under FDPM; from these, the two main centres are Forestry Training Institute (FORTRAIN), Kepong, and Terengganu Forestry Training Centre. The DWNP operates the main training centre in Institute of Biodiversity in Lanchang, Pahang, which offers the Effective Protected Area Management Programmes in collaboration with Universiti Teknologi Mara (UiTM). DWNP is also developing a new course module in Effective Wildlife Management (EWIM) and Enforcement - Law Enforcement (ELEM).

DOFM conducts annual training programmes related to aquatic species identification and taxonomy. Series of regional meetings and training workshops were organized in collaboration between SEAFDEC/TD and SEAFDEC/MFRDMD to improve human resources capacity in data collection and identification at the species level for fisheries researchers of SEAFDEC Member Countries.

In Sabah, a Third Country Training Programme (TCTP) targeting third world countries that are rich in biodiversity have been developed jointly between the Malaysian Government and the Japan International Cooperation Agency (JICA) as part of the Malaysia Technical Cooperation Programme (MTCP) since 2009. The programme aimed to share Sabah's experience in integrated biodiversity and ecosystem management with other developing countries and to gain different perspectives and challenges within the context of promoting South-South Cooperation.

Indicator 15.1: By 2018, the National Biodiversity Centre is operational.

Status: Progress toward target but at an insufficient rate

The development of the Malaysian Biodiversity Centre (MBC) is proposed in three stages - beginning as a unit under KATS before being fully functional as a statutory body. Currently, a special core team has been established under KATS. MBC's mission is 'to safeguard biodiversity for present and future generations by

mainstreaming and enhancing the science-policy interface.' MBC is envisioned to be the one-stop centre for information and issues related to biodiversity and its management in the country.

Action 15.2 Strengthen coordination and decision making at the national level

At the national level, the National Biodiversity Council (NBC), chaired by the Deputy Prime Minister and attended by Chief Ministers of states, is the highest decision-making body for biodiversity matters and the Policy (NPBD). Within the reporting period, two (2) NBC meetings have been convened. KATS serves as the Secretariat and is also the supranational body driving the NPBD mechanism at the federal and state levels. In parallel, inter-ministerial and inter-agency Steering and Technical Committees have been set up on selected subject matters i.e. IAS, Biosafety, ABS, PA, and Endangered Species.

Aside from the NBC, National Land Council (NLC) that is mandated by the Federal Constitution also convenes on issues related to land, forestry and minerals. The NLC which is conducted at least once a year, is chaired by the Deputy Prime Minister, attended by at least 10 Cabinet Ministers and all Chief Ministers of states.

At the time of writing, KATS has established the National Biodiversity Roundtable (NBR), a platform to catalyze a higher level of partnerships between stakeholders from the private sector, environmental NGOs, community-based organizations and academia. Among others, the NBR is expected to realign non-governmental stakeholder efforts in conservation to specific NPBD targets. The NBR also serves as a platform for the private sector and civil society to provide support to the National Steering Committee of NPBD on the implementation and monitoring of the NPBD.

Indicator 15.2: By 2016, Meeting of Ministers of the Environment (MEXCOE) has incorporated biodiversity consideration.

Status: On track to exceed target

MEXCOE was established in 2016 to facilitate coordination on environmental issues between the federal ministry and all 13 state EXCOs[50] in charge of the environment. MEXCOE meetings were chaired by the former NRE Minister. Among biodiversity-related issues discussed in previous meetings include sustainable forest management, Malaysia Biodiversity Enforcement Operation Network (MBEON), preparation for Like-Minded Megadiverse Countries (LMMC) forum and CBD COP 13. However, the mandate of organizing MEXCOE has since transferred to MESTECC.

Action 15.3 Establish a framework and mechanisms for implementing the national Policy at the State level

At the state level, biodiversity is placed under the purview of the EXCO for Natural Resources or EXCO for Environment. For the implementation of NPBD, state representatives are included in the National Steering Committee of the Policy. Thus, biodiversity conservation effort is predominantly guided by the NPBD. In Sabah, biodiversity policies are guided by the Sabah Biodiversity Strategy 2012-2022 and coordinated by the Natural Resource Office (NRO), while implementation of the biodiversity policies in Sarawak is coordinated by the Ministry of Urban Development and Natural Resources (MUDeNR).

[50] The EXCO position in the State Cabinet is equal to the Minister position in the Federal Cabinet.

Indicator 15.3: By 2018, at least 5 states have formulated and begun implementing state-level biodiversity strategies and action plans consistent with this policy.

Status: Progress towards target but at an insufficient rate
The NPBD 2016-2025 was launched in 2016. As of 2018, Sabah has formulated its own biodiversity-specific policy – the Sabah Biodiversity Strategy 2012-2022. Although many states have yet to formalize specific biodiversity policies, a large number of states have embedded biodiversity considerations consistent with NPBD 2016-2025 into their respective state plans. Examples of such plans at the state level have been through the implementation of the Johor Sustainability Policy 2017-2021 and the Melaka Green City Action Plan.

Action 15.4 Strengthen legislative framework to support the Policy implementation

In Malaysia, there are at least 40 environment-related acts currently existing (See Table 3), encompassing forestry and wildlife, marine and freshwater bodies, as well as urbanization, land and air pollution. During the reporting period, one new legislation had been enacted i.e. the Access to Biological Resources and Benefit Sharing Act 2017. To address contemporary challenges, several Acts are under review including the Wildlife Conservation Act 2010, National Forestry Act 1984, Fisheries Act 1985 and the Environmental Quality Act 1974.

In September 2016, the Sabah government amended the state Wildlife Conservation Enactment 1997. The amendments included a higher minimum and maximum penalties for offences including wildlife poaching and trafficking, mandatory jail time for several offences including hunting, possession and transporting of protected species, and collection and possession of turtle eggs. The amendment streamlines the enactment of the federal laws.

In Sarawak, the Sarawak Biodiversity Centre Ordinance 1997 was amended in 2014 to include provisions for Prior Informed Consent (PIC), protocols to obtain PIC, and to regulate access and benefit sharing. In addition, the State Government enacted the Sarawak Research and Development Council Ordinance (2017) which came into force in January 2018. The Council sets the direction towards the commercialization of R&D findings and intellectual properties.

Indicator 15.4: By 2020, a comprehensive review of national and state policies, legislation and institutions related to fisheries, marine parks, and marine biodiversity has been completed.

Status: Progress towards target but at an insufficient rate
Review of policies and legislations related to fisheries and marine resources is ongoing. In 2017, DOFM gazetted the Fisheries (Inland Fisheries Aquaculture) Rules for the Federal Territories. Most recently, as a response to the threat of IUU fishing, Malaysia has completed a study with support from FAO on the fishery legal framework. The project conducted a gap analysis of the fisheries legal framework and made recommendations to bring current legislation to address the current IUU related issues, and to be in line with Port State Measures Agreement (PSMA) and United Nations Fish Stocks Agreement (UNFSA) which

looks at sustainable fisheries resource management including biodiversity restoration and enhancement. This study culminated with amendments to the Fisheries Act 1985.

Action 15.5 Strengthen international and transboundary cooperation

Malaysia was elected Chairperson of the LMMC[51] Bloc from 2016-2018, and hosted the ministerial and technical working committees. At COP 14, Malaysia played an important role in formalizing the Sharm El-Sheikh Declaration of Like-Minded Megadiverse Countries, which emphasizes issues such as biodiversity mainstreaming, digital sequence information on genetic resources, and the post-2020 global biodiversity framework.

At the regional level, Malaysia actively participates in the ASEAN Cooperation on Environment, which envisions an ASEAN Community that engages and benefits the peoples and is inclusive, sustainable, resilient, and dynamic. The institutional framework of the ASEAN Cooperation on Environment consists of the ASEAN Ministerial Meeting on the Environment (AMME), ASEAN Senior Officials on the Environment (ASOEN), and seven working groups one of which is the ASEAN Working Group on Natural Resources and Biodiversity (AWGNCB). In addition, the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area (BIMP – EAGA) initiative established in 1994 has a shared strategy to accelerate socioeconomic development of the less developed and geographically remote areas in the member countries. It is currently guided by its Vision 2025[52] and biodiversity conservation is covered within its Environmental Pillar.

With regards to transboundary cooperation, the Heart of Borneo (HoB) and Coral Triangle Initiative (CTI) initiative as previously elaborated on in Target 8 focuses on conserving biodiversity through a network of protected areas. In Sarawak, the Social Economic Working Committee for Malaysia- Indonesia (SOSEK-MALINDO) has agreed to facilitate the exchange of information between the region of Kalimantan west and Sarawak regarding protected and threatened wildlife and protection of forest genetic resources.

Malaysia under ASEAN and SEAFDEC has been actively collaborating on all related transboundary and regional collaboration on various aspects of marine biodiversity conservation, covering collaboration on the transboundary species research and management; endangered species research and management; marine protected area programmes such as the refugia projects, and resources enhancement measures in critical habitats/fishing grounds; sustainable resource management studies; fish health management; sustainable trade and IUU fishing; climate change adaptation and capacity building program. Malaysia is currently embarking on GEF funded regional projects, which are the Bay of Bengal Large Marine Ecosystem (BOBLME) Project and the Refugia Project.

[51] Malaysia is a member of the Like-Minded Megadiverse Countries (LMMC) bloc. This bloc consists of 20 countries (Bolivia, Brazil, China, Costa Rica, Colombia, Congo, Ecuador, Ethiopia, Guatemala, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mexico, Peru, Philippines, South Africa and Venezuela) which collectively hosts 60-70% of the world's biodiversity. Since its formation in 1992, the Bloc has been influential in determining the future of biodiversity, especially in developing countries through progressive international legislation.

[52] BIMP-EAGA, 2018. "BIMP-EAGA Vision 2025". Accessed 15 Jan 2019: https://www.adb.org/sites/default/files/related/72256/bimp-eaga-vision-2025.pdf

Indicator 15.5: By 2025, 10 new sites of biological importance are accorded with international recognition.

Status: On track to exceed target

Since the launch of NPBD 2016-2025, the Kota Kinabalu Wetland in Sabah has been accorded with Ramsar Site status, and the Raja Musa Forest Reserve in Selangor accredited as the Queens Commonwealth Canopy. In the marine environment, three (3) areas within Malaysia waters have also been recognized to meet the Convention on Biological Diversity (CBD) criteria on Ecologically or Biologically Significant Marine Areas (EBSAs) at the 13th CBD COP. The areas include Redang Island Archipelago, Southern Straits of Malacca and Tioman Marine Park. In 2018, five (5) sites have been accredited as Important Marine Mammal Areas (IMMAs). In addition, Malaysia is in the process of nominating four additional UNESCO World Natural Heritage Sites which are Forest Reserve Institute Malaysia (FRIM), Royal Belum State Park, Klang Gates Quartz Ridge (Figure 27) and Taman Negara National Park. Additionally, the process for Penang Hill to obtain accreditation as a UNESCO Man and Biosphere site is also ongoing.

Figure 27: The Klang Gates Quartz Ridge, located at the outskirts of Kuala Lumpur, is documented as the longest quartz formation in the world, spanning more than 14km long and 200m wide. Surveys indicate at least 265 plant species thrive here, with five of them endemic to the area. (Photo credit: FDPM)

Target 16: By 2025, knowledge and the science base relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are significantly improved and applied.

Sound evidence-based scientific insights are the prerequisites of effective conservation and sustainable use of biodiversity. Science must be applied to inform decision-making to meet the growing challenges that Malaysia faces in achieving its conservation goals. Biodiversity, water, and environment issues are specified as the Mega Science Agenda by the Academy of Sciences Malaysia. Target 16 seeks to enhance the quality and quantity of research on Malaysia's biodiversity, establish comprehensive databases and monitoring programmes, improve our knowledge on the link between climate change and biodiversity and improve the interface and communication between science and policy.

Action 16.1 Enhance the quality and quantity of research on Malaysia's biodiversity

Scientific expeditions are conducted periodically within the forest reserves and PAs. For example, FDPM has successfully conducted 28 series of forest biodiversity scientific expeditions from 1999 to 2017, encompassing all types of forest in the Peninsular Malaysia consisting of Hill Dipterocarp Forests (8 expeditions), Lowland Dipterocarp Forests (14 expeditions), Coastal Forests (2 expeditions), Montane Forests (3 expeditions) and Mangrove Forests (1 expedition). These expeditions often gathered experts and researchers from local universities and NGOs. The findings are shared in seminars.

Several government agencies maintain their scientific journals. For example, FDPM has published the biennial international journal on Malaysian and tropical forestry, 'The Malaysian Forester,' since 1931. The journal aims to promote knowledge on all aspects of Malaysian forests and forestry in addition to inviting local and international contributors to publish in the Elsevier indexed journal. Other agencies that publish scientific journals include FRIM ("Journal of Tropical Forest Science"), DWNP ("The Journal of Wildlife and Parks") and SFD ("Sandakania").

Between 2014-2018, examples of tropical forest biodiversity-related research conducted by FRIM includes:

1. Publication of 3 volumes of Flora of Peninsular Malaysia Series II: Seed Plants (Vols. 5-7);
2. Publication of 1 volume of Tree Flora of Sabah & Sarawak (Vol. 8)
3. Traditional knowledge:
    - Medicinal plant specimens available for reference;
    - Database on OA medicinal plants available in MyTKDL and BRAHMS;
    - Publications on OA and Malay traditional medicine available;
    - Transliteration and analysis of Malay Medicinal Manuscript as an authentic referral;
    - IP protection/invention disclosure;
    - Protection on TK from miss-appropriation and bio-piracy;
    - Species discovered as a therapeutic/nutraceutical/ cosmetical/personal care for future wealth;
    - Sharing of the benefit arising from resource utilization (royalty, cash income from planting);
    - Germplasm of selected species available;
    - Empowerment of traditional medicine application;

- Collection of Malay Traditional Medicine Apparatus in Biomedical Museum, IMR.

4. Forest Genetics: DNA profiling (population and individual levels) for at least two species of timber developed and Reference DNA barcoding databases for about 100 native species available.
5. Project on "Monitoring Diversity of Selected Vertebrates at Environmentally Sensitive Areas (ESA) in Peninsular Malaysia" initiated;
6. "Studies on Vertebrates at Selected Ecological Corridors (Central Forest Spine, CFS) in Peninsular Malaysia" initiated;
7. Two new HCVF were established - one in Chikus FR, Perak for *Dipterocarpus coriaceus* (Dipterocarpaceae) and one in Kledang, Perak for *Vatica abdulrahmaniana* (Dipterocarpaceae);
8. Publication of "Conservation Action Plan for the threatened agarwood species *Aquilaria malaccensis* (Thymelaeaceae) in Peninsular Malaysia";
9. Specific conservation measures and monitoring procedures developed to maintain and enhance the conservation attribute in Jerangau HCVF, Terengganu, Malaysia (funded by PEFC);
10. Established with the private sector a germplasm ex situ collection of threatened tree species.

For fauna research, The Museum of Zoology operated by the Universiti Malaya has maintained a large collection of Malaysian fauna consisting of insects (20,000 specimens and 1,000s of species), fishes (2,000 specimens) frogs (672 specimens and 176 species), reptiles (445 specimens and 186 species), birds (603 specimens and 261 species) and mammals (896 specimens and 144 species). Established in 1999, the museum is an integral part of the teaching programme in the Institute of Biological Sciences, and is an important national repository of Malaysian fauna. The Management and Ecology of Malaysian Elephants (MEME), a collaboration between the University of Nottingham, Malaysia campus and the DWNP contributes to the understanding of elephant movements and ecology and developing avoidance protocols in managing wild elephants in the Central Forest Spine (CFS) landscape.

For insects, the Entomological Reference Collection managed by FRIM consists of approximately 600,000 specimens, of which 10,000 have been identified at the species level. It serves as a centre of reference for insect taxonomic studies by scientists locally and internationally. Recently, a new species of firefly (*Pygoluciola dunguna*) was found. Other than FRIM, Additionally, Malaysian dragonflies, beetles, grasshoppers and crickets have been digitalized to make information accessible for research. Within the Sandakan Herbarium, a Forest Insect Museum with insect diversity database is managed by the Entomology Section, Forest Research Centre of SFD. The Museum houses the biggest insect collections in Sabah with about 150,000 mounted specimens of 15,000 species. The collection serves as a reference centre for various researchers and university students, including providing information for biodiversity protection and monitoring. Digital data of other flora and fauna collection include trees, large mammals and birds maintained by the Ecology Section, as well as fish and frogs by the Silviculture Section, FRC.

In the marine environment, ongoing collaborations with local universities and NGOs are expected to enhance knowledge on marine biodiversity within current and potential marine parks. Research activities are planned to enhance decision-making processes and management interventions; the research outcomes are also translated into education and awareness materials to enhance public knowledge of Malaysia's marine biodiversity.

The Sabah Government has established a long-term collaboration with the international research consortium, such as the Southeast Asia Rainforest Research Partnership (SEARRP[53]) since 1985. The partnership is crucial in support of the Sabah State Government's conservation targets. SEARRP maintains three landmark scientific projects in Sabah namely, the Stability of Altered Forest Ecosystems (SAFE) Project and the Biodiversity Experiment and the 50 ha plot. The Sabah Forestry Department (SFD) also conducts annual scientific expeditions to assess the natural vegetation and selected group of wildlife (terrestrial mammals and birds) in several key protected areas. Between 2014-2018, 23 expeditions were organized by SFD, focusing mainly on biodiversity documentation and looking into issues that could adversely affect biodiversity in the study area. These areas include Ulu Kalang, Sg Rayoh, Gemok Hill, Sg Rawog, Kalabakan-Serudong (2018), Batu Timbang (ICCA), Trusan Sugut, IJM Secret Garden, Nuluhon Trusmadi, Sg Bole (USM), Tambulanan, Ulu Dusun (2017), Agathis, Kungkular, Pensiangan, Kawag, Tenompok (2016, Ulu Kalumpang-Wullersdorf, Northern Gg. Rara, Pin Supu, Ecoplantation (Paitan-Sugut) (2015), Sg Imbak (2c & 2d), and Timimbang-Botitian (2014).

In August 2015, Sarawak launched the Research for Intensified Management of Bio-Rich Areas of Sarawak (RIMBA Sarawak) to research key protected areas. The objectives of the studies are to study and document biodiversity components within TPAs of Sarawak, formulate management plans, build and enhance the capabilities and skills in research, and conservation management. To date, eleven (11) new plant species have been discovered. Other expeditions include the Tama Abu Scientific Expedition in 2017 and the Tanjung Datu National Park – Samunsam Wildlife Sanctuary (SWS) Marine and Coastal Resources Expedition in 2018.

[53] SEARRP was established by the UK's Royal Society in 1985 and headquartered at the then newly opened Danum Valley Field Centre. Source: Sabah Forestry Department website. 20 April 2017. "Landmark Science Project to Expand Sabah's Protected Forests''. Available at: http://www.forest.sabah.gov.my/media-centre/broadcast/press-release/654-landmark-science-project-to-expand-sabah-s-protected-forests

BOX 7

Scientific Expedition in Urban Natural Reserve Found Four New Species – Penang Hill

In October 2017, Malaysia's first "BioBlitz" took place in Penang Hill. Funded by the Habitat Foundation, more than 100 scientists from Malaysia and abroad took part in the documentation of the flora and fauna of Penang Hill – from underground to the treetops. The unprecedented expedition discovered four new species - ghost scorpion, iridescent flies, bacterium and tardigrade. There have also been numerous sightings of species new to Penang. These include the red-rumped swallow, the stripe-throated bulbul, the spotted-wing fruit bat, a species of orchid, eight species of mammals (including the peculiar lesser mouse deer), two species of frogs, and several species of flies, ants and spiders. The team also recorded the cryptic Sunda colugo (*Galeopterus variegatus*). The findings have been compiled to support the nomination of Penang Hill as a UNESCO Man and the Biosphere Reserve.

Figure 28 The 'ghost scorpion", one of the new species discovered during the Bioblitz expedition undertaken in October 2017. (Photo credit: Phil Torres/ BioGraphic)

Indicator 16.1: By 2020, five Centres of Excellence on biodiversity conservation and management are operational.

Status: On track to exceed target

The Ministry of Education has introduced the Centres of Excellence at Public Institutions of Higher Learning (HICoE) in accordance with the statutes of the Colleges and Universities Act 1976 in 2007. To date, there are more than ten accredited COE as part of the programme (See Table 14). The objectives are to promote research in strategic disciplines in various key areas of knowledge, including biodiversity. Also, other research centres active in biodiversity research are featured in Table 15.

Table 14: Examples of Centre of Excellence on biodiversity research and management.

No.	Centre of Excellence	Institution	Year of Establishment	Website
1	Institute for Environment & Development (LESTARI)	Universiti Kebangsaan Malaysia (UKM)	1994	http://www.ukm.my/lestari/en/
2	The Centre for Research in Biotechnology for Agriculture (CEBAR)	Universiti Malaya (UM)	2005	https://www.um.edu.my/cebar
3	Institute of Ocean and Earth Sciences (IOES)	Universiti Malaya (UM)	2003	https://ioes.um.edu.my/
4	Earth Resources and Sustainability Centre	Universiti Malaysia Pahang (UMP)	N/A	https://eras.ump.edu.my/index.php/en/
5	Borneo Marine Research Institute (BMRI)	Universiti Malaysia Sabah (UMS)	2000	https://www.ums.edu.my/ipmbv2/
6	Institute for Tropical Biology and Conservation (ITBC)	Universiti Malaysia Sabah (UMS)	1994	http://www.ums.edu.my/ibtpv2/en/about-us/introduction
7	Institute of Oceanography and Environmental (INOS)	Universiti Malaysia Terengganu (UMT)	2001	http://inos.umt.edu.my/
8	Institute of Tropical Agriculture and Food Security (ITAFoS)	Universiti Putra Malaysia (UPM)	2007	https://itafos.upm.edu.my/
9	Institute of Bioscience (IBS)	Universiti Putra Malaysia (UPM)	2010	https://ibs.upm.edu.my/
10	Atta-ur-Rahman Institute for Natural Product Discovery	Universiti Teknologi Mara (UiTM)	2004	https://aurins.uitm.edu.my/main/
11	Institute of Infrastructure and Environmental Services and Management (IIESM)	Universiti Teknologi Mara (UiTM)	2009	https://iiesm.uitm.edu.my/v3/index.php

Table 15: Other research centres related to biodiversity research and management

No.	Research Centre	Institution	Year of Establishment	Website
1	Institute of Biodiversity and Environmental Conservation (IBEC)	Universiti Malaysia Sarawak (UNIMAS)	1994	http://www.ibec.unimas.my/
2	Centre for Marine and Coastal Studies (CEMACS)	Universiti Sains Malaysia (USM)	1991	http://cemacs.usm.my/index.php/en/
3	Vector Control Research Unit (VCRU)	Universiti Sains Malaysia (USM)	N/A	http://vcru.usm.my/
4	Centre for Global Sustainability Studies	Universiti Sains Malaysia (USM)	N/A	http://cgss.usm.my/index.php/en/
5	Danum Valley Scientific Laboratory	Sabah Forestry Department (SFD)	2016	http://forest.sabah.gov.my/media-centre/broadcast/press-release/571-danum-lab
6	National Wildlife Forensic Laboratory (NWFL)	Department of Wildlife and National Parks (DWNP)	2016	N/A
7	Centre for Marker, Discovery and Validation (CMDV)	Malaysian Agricultural Research and Development Institute (MARDI)	2011	http://cmdv.my/
8	Danau Girang Field Centre (DGFC)	Cardiff University & Wildlife Department Sabah	2008	http://www.dgfc.life/home/
9	Imbak Canyon Studies Centre (ICSC)	Yayasan Sabah Group	2019	N/A
10	Centre of Excellence for Orangutan (Nanga Delok)	Sarawak Forestry Corporation	2007	N/A
11	Centre of Excellence for Plants (Nanga Beloh)	Sarawak Forestry Corporation	2007	N/A

Action 16.2 Establish comprehensive databases and monitoring programmes

The Malaysia Clearing House Mechanism (CHM) of the CBD was established in 2008 and revamped in 2016 as the Malaysia Biodiversity Information System (MyBIS). Maintained by KATS, the database serves as a one-stop repository database system in providing and facilitating access to information on biodiversity studies and management at a national level. To date, the database contains information on nearly 39,000 species of flora and fauna. It includes over 2,500 pictures, the conservation status of 1,062 plants, 480 biodiversity experts, and 1,069 publications. MyBIS won the Gold Award under the new CHM category – the most progress in the development of CHM – during COP13 held in December 2016.

In the marine environment, the long-term coral reef monitoring programme has been established as a result of government-NGO partnerships since 2007. In 2018, real-time water quality monitoring stations on marine park centres were also set up as part of the Marine Park Data Centre (MPDC). Systematic Marine Biodiversity Information System (SyMBiosIS); and Marine Park Management Information System (MPMIS) are maintained to support the management of marine parks. MPMIS is a management database that contains spatial data where information such as marine park zoning plans, marine habitats, encroachment hotspots, recreational facilities (boundary markers, mooring buoys and rest floats), as well as reference materials are stored for accessed by authorized officers and staffs. In addition, the myFRIS is a new database established to integrate all fishery survey data in one database portal for analysis and reporting, especially for demersal, pelagic, acoustic, shrimp and socio-economic surveys.

To ensure integrated data availability for monitoring, Sabah is currently developing its own CHM through Sabah Biodiversity Integrated Information System (SaBIIS) as a centralized database. SaBIIS' main function is to provide a central platform to store, analyze and share Sabah's biodiversity collection. Specifically, the plant collection database is managed by using botanical research and herbarium management software (BRAHMS) in Sandakan Herbarium with a dedicated endemic and IUCN red-list plant species database.

In Sarawak, the State Government has launched the big data initiative in 2018 to facilitate information-sharing among all government agencies for reporting. The database allows a central repository of socio-economic and environmental data regulated by the Sarawak Multimedia Authority. Within the Forest Department Sarawak, the Sarawak Herbarium maintains the Botanical Research Herbarium Management System (BRAHMS) to record the specimen data.

A private-sector funded project by Khazanah Nasional Berhad and Yayasan Hasanah to bring back Malaysia's biodiversity held overseas in digital format saw the collaboration with the British Natural History Museum in repatriating a total of 5,000 type specimens of the Alfred Wallace collection from Malaysia and 13,000 Malaysian biodiversity digital images. All the images have been placed on the Atlas of Living Malaysia (ALAM) platform. The platform was developed based on the Global Biodiversity Information Facility (GBIF) platform[54].

Indicator 16.2: By 2021, a national marine and freshwater aquatic life stocktaking survey has been completed.

[54] GBIF is an international network and research infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth.

Status: Progress toward target but at an insufficient rate
In 2017, the marine captured fisheries stock assessment was completed. This survey comprises four main components: demersal fish, prawn, small pelagic fish and tuna of coastal and offshore waters of Malaysia. Overall, the stock assessment showed that the demersal fish resources have been harvested beyond the Maximum Sustainable Yield for the coastal and offshore area especially in Peninsular Malaysia. The pelagic resources in Malaysian waters are relatively healthy except in the West Coast of Peninsular Malaysia. Additionally, the inland fish stock survey is ongoing.

Action 16.3 Improve our knowledge on the link between climate change and biodiversity

There is insufficient knowledge on the impact of climate change on terrestrial fauna biodiversity. Assessment in this area for terrestrial fauna is confined to birds, orangutans, and elephants where the vulnerability of the species to habitat loss is more urgent and critical than climate change. The impacts of climate change on the survival of the threatened species in the Red List and other biodiversity have not been assessed. Observations on the changes in fruiting seasons in both local fruit trees like durians and wild trees in the forest were made due to the changes in rain and heat patterns, which may have implications on the migration pattern of migratory birds. Research has shown that various species of moths native to Mount Kinabalu, Sabah are moving their ranges uphill due to the temperature rise. Many bird, amphibian and reptile species in Malaysia are likely move to higher altitudes given their sensitivity to temperature rise. In Malaysia, the literature indicates that climate change may lead to potential changes to forest phenology, affecting food availability for orangutans. However, this link remains poorly understood.

Nevertheless, various conservation efforts are ongoing which are expected to build resilience and reduce the risk of impacts of climate change. Implementation of the Central Forest Spine (CFS) and the Heart of Borneo (HoB) initiatives would increase connectivity and reduce forest fragmentation. The National REDD Plus Strategy has been developed and adopted in 2017. The Strategy outlines policy actions to ensure at least 50% of Malaysia's land-mass remains forested. Long-term and consistent monitoring is key to track and manage forest cover.

In Sabah, aerial mapping of the state's forest and land area using laser scanning technology - Light Detection and Ranging (LiDAR) has been completed. The initiative mapped forest and non-forest vegetation carbon stocks, 3-D vegetation structure, and canopy tree diversity, to determine areas of high conservation importance and the fine-scale habitat utilization of wildlife. Notably, the campaign uncovered the tallest tropical tree in the world - a towering 94.1 m tree with a canopy measuring 40.3 m in diameter. This is in addition to 49 other trees taller than 90 m spread all over Sabah[55]. The aerial mapping has provided crucial baselines on various quantifiable parameters for monitoring purposes, carbon capture and indicates areas of high biodiversity value.

[55] Gaworecki, M. 2016. "World's tallest tropical tree discovered, along with nearly 50 other record-breakers". Accessed 17 Feb 2019 at: https://news.mongabay.com/2016/11/worlds-tallest-tropical-tree-discovered-along-with-nearly-50-other-record-breakers/

Figure 29: The tallest tropical tree (*Shorea* spp.) stands out in the middle. Photo credit: Carnegie Institution for Science.

In the coastal and marine area, the National Coastal Erosion Study completed in 2016 will inform coastal protection and mitigation plans. The Department of Irrigation and Drainage (DID) Guideline on Erosion Control for Development Project in the Coastal Zone (Revision 2012) has been implemented by Local Authorities throughout the country when approving development projects along the shoreline. Integrated Shoreline Management Plan (ISMP) has been completed for some states but there is currently no legislative basis for its adoption. Where there is no ISMP, the National Physical Plan-Coastal Zone provides an alternative guide for the use of states. To further protect coastlines vulnerable to climate change, a national mapping exercise to establish a coastal vulnerability index is ongoing to identify coastal areas that are susceptible to the impacts of sea-level rise. This is supplemented the Department of Survey and Mapping Malaysia's (JUPEM) projections of sea-level rise to inform planning and mitigation measures. Further, oceanographic conditions such as rising sea surface temperature, changing currents and ocean acidification are monitored.

Annual coral reef health surveys show that the coral reefs in Malaysia are reasonably healthy. However, these coral reefs are affected by an increase in sea surface temperature, especially during El Ninõ episodes, where over 40% of the corals die through coral bleaching. A Coral Bleaching Response Plan was developed to guide response to the mass coral bleaching event. WWF-Malaysia works closely within the Coral Triangle Initiative (CTI) region to assess the impacts of climate change on coral reefs and sea turtles. In addition, sea surface temperature monitoring in the coral reefs of Semporna, Sabah, a priority

conservation area, is ongoing. The project aims to identify vulnerability factors and recommend adaptation measures.

Malaysia is expected to produce the National Climate Change Adaption and Mitigation Plan by 2021. Climate change modelling for various scenarios in the water sector, agriculture, health and energy, forest carbon stocks mapping have been conducted.

Indicator 16.3: By 2018, the resilience and vulnerability of all major ecosystems to climate changes have been assessed.

Status: Not Assessed
At present, there has been limited assessments of the resilience and vulnerability of major local ecosystems to climate change.

Action 16.4 Improve the interface and communication between science and policy

The importance of incorporating research into policy is acknowledged. Biodiversity has been identified as one of the nine (9) priority research areas by the National Policy of Science, Technology and Innovation 2013-2020. To bridge the gap between science and national policy, the Academy of Sciences Malaysia (ASM) was set up as a statutory body under the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) to conduct strategic studies, produces reports, position papers, blueprints, roadmaps and reviews which are independent and evidence-based.

Indicator 16.4: By 2018, the National Advisory Committee on Biodiversity and Ecosystem Services (NACBES) has been established.

Status: Not Assessed
The National Advisory Committee on Biodiversity and Ecosystem Services (NACBES) was envisioned by the NPBD 2016-2025 to advise NBC and KATS on policies, strategies and programmes for biodiversity conservation. The role of NACBES in the current institutional framework has been replaced by existing committees, including the PA Working Group, NBR, and NPBD working committees.

Target 17: By 2025, there is a significant increase in funds and resources mobilised for the conservation of biodiversity from both government and non-government sources.

Mobilizing financial resources for conservation investments is crucial to address the direct and indirect pressures on biodiversity and to drive conservation efforts. Globally, it is estimated that the loss of ecosystem services and biodiversity is valued at around USD 740 billion per annum. Like many countries, the majority of biodiversity finance in Malaysia is sourced from government budget allocations, official development assistance (ODA), corporate CSR and philanthropy. However, there is a limited understanding of how existing financing is contributing to desirable biodiversity outcomes. Target 17 aims to improve resource mobilization for biodiversity through improving the utilization of the existing funding mechanism, scaling up the National Conservation Trust Fund, explore and implement new and innovative financing mechanisms, and diversifying state government revenue streams.

Action 17.1 Improve the utilization of the existing funding mechanisms

Malaysia's national expenditure has grown consistently from RM 208.2 billion to RM 280.2 billion between 2009 - 2018. However, the share received by the Ministry of Natural Resource and Environment (the former Ministry (KATS)) has been less than 1% since 2012. Though the share of the ministry's allocation from national expenditure is shrinking, the amount of development expenditure (DE) allocation to KATS remains consistent at around RM 1.54 billion during the 10th and 11th Malaysia Plan. To understand the biodiversity expenditure, needs, and financial gaps, Malaysia has embarked on the Global Biodiversity Finance Initiative (BIOFIN) launched by Global UNDP. Preliminary results show historical spending concentrated on several focal areas while the implementation of NPBD requires a more balanced approach in funding allocations. Early efforts to improve the efficacy of biodiversity effort include the inter-agency partnership on enforcement – the Malaysia Biodiversity Enforcement Operation Network (MBEON). Additionally, the government has increasingly reached out to the private sector and NGOs to streamline and improve the efficacy of biodiversity conservation efforts. Examples include the newly established National Biodiversity Roundtable, sustained collaboration on species conservation (with the private sector - Maybank, Yayasan Sime Darby), landscape and seascape protection (with WWF Malaysia and Yayasan Hasanah) and awareness and education (with GEC, MNS).

Indicator 17.1: By 2025, the amount of funds directly committed to biodiversity conservation from both government and non-government sources have increased significantly compared to the 2016 level.

Status: On track to achieve target

The annual development expenditure allocated to KATS has averaged at RM 1.54 billion since 2010. The public funds are supplemented by increasing private sector contribution to environment and biodiversity, as demonstrated in the respective corporate sustainability reports (Maybank, Petronas, Yayasan Hasanah).

Action 17.2: Scale up the National Conservation Trust Fund for Natural Resources

The National Conservation Trust Fund for Natural Resources (NCTF) was established in January 2015 with

an initial government seed grant of RM 10 million to support conservation efforts in four focal areas – Natural Resource Management; Research and Development; Capacity Building; and Sustainable Financing Mechanism. The NCTF serves as a platform to mobilize financial resources from various partners including the government, private sector, and international organizations for biodiversity-related projects or activities, which are not funded through existing government sources. The NCTF is administered by the Ministry (KATS) with the Strategic Plan for the NCTF is expected by the end of 2019.

Indicator 17.2: By 2020, the NCTF is able to disburse at least RM 2 million per year for biodiversity conservation.

Status: Progress toward target but at an insufficient rate
The National Conservation Trust Fund (NCTF) received a one-off RM 10 million seed fund as a grant for recipients to conduct biodiversity conservation projects. NCTF has successfully disbursed RM 2.5 million in 2016, while RM 1.7 million and RM 1.44 million was approved in 2017 and 2018, respectively.

Action 17.3: Explore and implement new and innovative financing mechanisms

The last decade has seen a diversification of sources for conservation funding. In addition to trust funds and partnerships with the private sector, in September 2017, the Government passed the Tourism Tax Act 2017 to impose tourism tax. The tax is collected from foreign tourists by operators of accommodation facilities, at a flat rate of RM 10 per room per night. Returns are used to develop the tourism industry, and to preserve and conserve the natural and cultural heritage.

More recently, market-based instruments such as PES have started to emerge. The Forest Department of Peninsular Malaysia (FDPM) has developed the framework for PES for water and ecotourism and will introduce the mechanism to the states. Additionally, FDPM is also exploring the review of the National Forestry Act to include provisions for PES. Meanwhile, the Perak State Forestry Department has initiated a PES scheme with small hydropower producers operating within the Production Forest of Permanent Reserved Forest (PRF). Payment for Ecosystem Services (PES) based on water supply has also been piloted in Sabah, leading to the endorsement and approval by the state assembly as part of a conservation fee concept. In Sarawak, Shell and PETRONAS have both contributed to the creation of an endowment fund to manage the Piasau nature reserve, a former oil and gas staff camp turned into an urban park.

One of the innovative financing solutions led by the private sector is Taman Tugu Project which was established in 2018. The project is a Public-Private-Civil Society Partnership initiative spearheaded by Khazanah Nasional Berhad, in collaboration with Kuala Lumpur City Hall (DBKL) and other partners. The Project maintains a 66-acre urban forest park in Kuala Lumpur and administers the National Heritage Trust (Amanah Warisan Negara, AWAN). Established under the Trustees Incorporation Act (1952), the Trust was incorporated to undertake projects that involve the rejuvenation, rehabilitation, and operations of selected public spaces alongside supporting heritage assets of national significance.

Other innovative financing mechanisms include the green *sukuk*[56], which seeks out specific environmentally sustainable infrastructure projects, such as the construction of a renewable energy generation facility. The Securities Commission Malaysia developed the Sustainable and Responsible Investment (SRI) Sukuk Framework in 2014 to create an ecosystem for greater financing of SRI initiatives. In July 2017, Malaysia issued the world's first green SRI *sukuk* by Tadau Energy Sdn Bhd. This *sukuk* is the result of a collaboration between Securities Commission Malaysia, Bank Negara Malaysia, and the World Bank Group (Figure 30).

First Green Sukuk Issuance by Tadau Energy Sdn Bhd

Tadau Energy Sdn Bhd is a renewable energy and sustainable technology investment firm providing venture and growth capital across the renewable energy industry to support innovative, well-managed, rapidly-growing companies. The Green SRI Sukuk Tadau has been assigned a long-term rating of 'AA3' by RAM Rating Services Bhd. Tadau Energy's goal is to conserve the environment by providing an environmental friendly, clean and sustainable power supply.

The Project is deemed to be an Eligible SRI project under the Guidelines on Unlisted Capital Market Products. Affin Hwang IB is the principal adviser, lead arranger, lead manager and facility agent. The RM250 million SRI sukuk has been rated by CICERO. Based on CICERO's overall assessment of Tadau's underlying project's type and policies guiding the project implementation, the framework has been rated as "Dark Green" describes as realisations of the long-term vision of a low carbon and climate resilient future. Typically, this will entail zero emission solutions and governance structures that integrate environmental concerns into all activities.

Figure 30: First Green Sukuk in Malaysia launched in June 2017. (Source: Liew, 2018)

To access to international results-based payment scheme, Malaysia submitted its Forest Reference Level (FRL) to UNFCCC on 8th Dec 2014 in the context of reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD Plus) under UNFCCC.

Indicator 17.3: By 2018, two innovative financing mechanisms are in operation.

Status: On track to achieve target

By 2018, innovative financing mechanisms have been explored. At the national level, the tourism tax was introduced in 2017. At the site level, pilot PES, the heritage fund, and endowment fund for parks management are operational in selected sites.

[56] Sukuk is an Islamic bond engineered to generate returns to investors without infringing the Islamic law prohibiting *riba* or interest.

Action 17.4: Diversify state governments' revenue streams

During the 2019 Budget Speech, the Federal Government announced the allocation of RM60 million to state governments to conserve their natural resources through the Ecological Fiscal Transfer (EFT) initiative. EFT will incentivize state governments to protect and expand the size of natural forests and protected areas. Other mechanisms and finance solutions being explored by states include the Payment for Ecosystem Services (PES), Conservation Fees, green *sukuk*, bio-banking, ecotourism development, and partnerships with the private sector.

Indicator 17.4: By 2020, a transparent and results-based mechanism to provide incentives for states to implement environmental protection and biodiversity conservation programmes is operational

Status: Progress toward target but at an insufficient rate

The framework for more transparent and results-based mechanisms is being explored to ensure a sustained incentive system for states to conserve and protect the environment.

Summary of Progress at the Target Level

Malaysia's 6NR adapts the 'Target Dashboard' framework used in the Global Biodiversity Outlook 4 (GBO 4) to assess the status of the NPBD indicators. Indicator achievements are assessed on a five-point scale (See Table 16). The level of confidence for the assessment (See Table 17) and the presence of a monitoring system is also indicated.

Table 16: Assessment methodology for the NPBD Actions and Indicators.

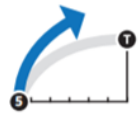
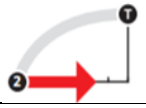
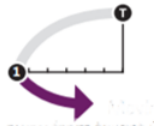
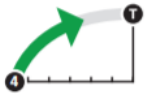
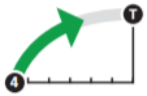
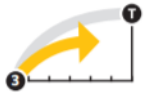
Status symbol	Status Description
	On track to exceed target (we expect to achieve the target before its deadline)
	On track to achieve target (if we continue on current the trajectory, we expect to achieve target by deadline)
	Progress toward target but at an insufficient rate (unless we increase efforts the target will not be met by its deadline)
	No significant overall progress (we are neither moving towards the target or moving away from it)
	Moving away from target (things are getting worse rather than better).

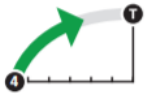
Table 17: Level of Confidence assigned for the assessment.

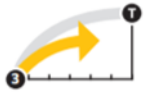
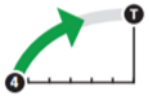
Level of Confidence	
★★★	High
★★☆	Medium
★☆☆	Low

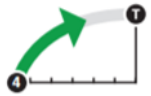
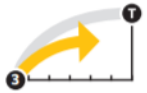
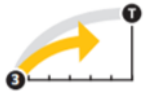
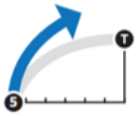
Table 18 summarizes the assessment for the NPBD actions based on the indicators.

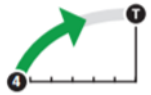
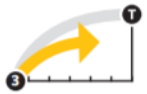
Table 18 Assessment of the status for indicators and targets identified in the NPBD

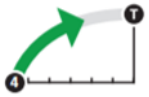
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
Target 1: Biodiversity Awareness	1.1 By 2025, the level of public awareness on the importance of biodiversity has doubled compared to the 2016 level.		★★☆	Yes	• The Biodiversity Baseline Survey was undertaken in 2018 (for indicator 1.1, 2.2, 2.3, 5.3, 6.3, 10.1, 11.1). • A CEPA Action Plan is being formulated; • Initiated in 2009, the '*Rakan Alam Sekitar*' Programme has achieved more than 300,000 active members for environmental and nature-based activities by 2018. • '*Kelab Pencinta Alam'* (Nature Lovers Club) supported by NGOs in participating schools; • Eco-school and Eco-campus Programme (EEP) and Kelab Pencinta Alam (Nature Lover's Club) are maintained by NGOs. • Special Environmental Courts for civil matters established throughout Malaysia since 2016. • Parliamentary Special Select Committee on Science, Innovation and Environment formed in 2019.
	1.2 By 2025, at least 500,000 youths and children are participating in nature based activities annually.		★★★	Yes	
	1.3 By 2021, the Parliamentary Environmental Caucus has been established.		★★★	No	
Target 2: Stakeholder Recognition Empowerment	2.1 By 2021, policy and legal provisions to empower indigenous peoples and local communities to be		★★☆	Yes	• The Special National Taskforce on Planting of Mangrove and Other Suitable Species, initiated in 2005, actively engages civil society and

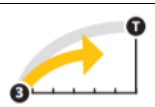
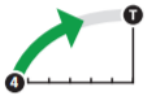
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	custodians of biodiversity have been developed.				ILC participation and awareness building. • The Community Conservation Resilience Initiative (CCRI) to support CCA efforts. • Routine partnerships with NGOs, particularly focusing on enforcement and patrolling, wildlife monitoring and awareness campaigns. • The FTSE4GOOD Bursa Malaysia Index was introduced in 2014 for PLCs to encourage sustainable operations. • The National Biodiversity Roundtable established in early 2019. • Regulatory Impact Assessment and Unified Public Consultation (UPC) online portal made mandatory to facilitate public participation in policy/law amendments.
	2.2 By 2025, the number and/or size of collaborative projects with civil society have doubled compared to the 2016 level.		★★☆	Yes	
	2.3 By 2025, the number and/or size of collaborative projects with the private sector have doubled compared to the 2016 level.		★★☆	Yes	
	2.4 By 2016, the National Biodiversity Roundtable has been established and is represented in the National Steering Committee for NPBD.		★★★	Yes	
Target 3: Mainstreaming biodiversity	3.1 By 2018, a policy and/or regulatory framework for incorporating biodiversity conservation into national and state development and into sectoral policies and plans is in place.		★★★	Yes	• The policy for biodiversity mainstreaming is included in a dedicated 'Green Growth" chapter in the 11th Malaysia Plan (2016-2020). • The System of Environmental Economic Accounting (SEEA) Roadmap was published in 2017 to

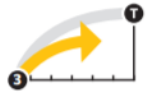
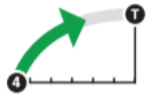
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	3.2 By 2020, a natural resource accounting programme has been established for the valuation of biodiversity and ecosystem services.		★★★	Yes	guide the establishment of SEEA accounts. The Physical Supply and Use Table (PSUT) for energy, and water accounts have been established. • Economic valuation studies have been conducted in forest reserves and in marine parks in the peninsular. • The Malaysian National Interpretation for the Identification of High Conservation Values (HCV) was published in 2018. This is supported by a Steering Committee and technical working group comprised of the public & private sector, and CSOs. • The Sustainable Consumption and Production (SCP) Blueprint was published in 2016. • 21% of Government Green Procurement (GGP) for selected products and services achieved in 2017.
	3.3 By 2020, all states have identified hotspots where biodiversity is of significant conservation value.		★★☆	Yes	
	3.4 By 2020, 20% of the Federal Government's procurement is green.		★★★	Yes	
Target 4: Sustainable Primary Production	4.1 By 2025, 100% of all timber and timber products are sustainably managed (i.e. certified under schemes such as MTCS, FSC, etc.).		★★☆	Yes	• Implementation of sustainable certification schemes for forestry and key commodity sectors introduced (MTCS and MSPO); • About a third of the PRF in Malaysia is certified under MTCS; while 54.6% oil palm planted area

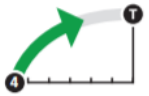
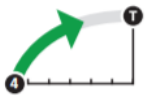
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	4.2 By 2025, 50% of all agricultural areas are sustainably managed (i.e. certified under schemes such as MSPO, RSPO, MyGAP, etc.).		★★★	Yes	certified by MSPO by September 2019. • New forestry policies include the Sabah Forest Policy 2018 and the Sarawak Forest Ordinance (Chapter 71) 2015 to have a stronger emphasis on biodiversity. • The National Roadmap for Social Forestry is finalized. • Marine fish stock assessment completed in 2017. • The National EAFM Steering Committee and technical working group established to oversee the implementation of EAFM. • The ASEAN catch documentation scheme is being piloted.
	4.3 By 2025, 20% of fish catch are through sustainable fisheries programmes (i.e. certified under schemes such as GAP, MSC etc.).		★★★	Yes	
	4.4 By 2021, perverse subsidies in the agriculture, forestry and fisheries sectors have been identified and rationalised.		★★★	No	
Target 5: Sustainable Tourism	5.1 By 2025, 50 tourism sites/resorts have been certified under Global Sustainable Tourism Criteria (GSTC) or similar schemes.		★★★	No	• The National Ecotourism Plan 2016-2025 has been implemented. • As of 2018, twenty (20) hotels have been certified under ASEAN Green Hotel Standard. Additionally, twenty (20) ecotourism sites have been certified under MyTQA. • As of 2018, there are 1,600 certified green guides under MOTAC in Peninsular Malaysia, 106 in Sabah, and 144 in Sarawak.
	5.2 By 2018, all tourism guides for nature-based		★☆☆	No	

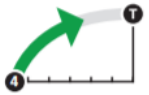
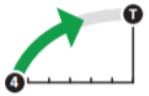
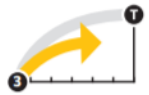
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	attractions have been certified as green guides.				• The existing nature guide training modules (since 1996) is being upgraded to the National Occupational Skills Standard (NOSS) module by the Department of Skill Development. • The Malaysia Homestay Programme (MHP) is recognized by the Rural Tourism Master Plan as a catalyst for community-based ecotourism. Up to 2017, the MHP has led to a total of 201 homestay clusters or villages across every state in the country. • Kg Dedari Jungle Hut Programme supported community-based ecotourism for the *orang asli* in Taman Negara National Park.
	5.3 By 2025, the number of indigenous peoples and local communities actively participating in ecotourism has doubled compared to the 2016 level.		★★★	Yes	
Target 6: Protected Areas	6.1 By 2025, 20% of the land surface and inland waters are conserved as protected areas or other effective area-based conservation measures.		★★★	Yes	• By mid-2016, the extent of terrestrial and inland water Protected Areas is at 13.2% nationwide. • DOFM maintains freshwater protected areas such as freshwater sanctuaries and fish estates. • The *Tagal* system is established in Sabah and replicated in other parts of Malaysia. • By 2016, Marine Protected Areas are at 3.3% nationwide.
	6.2 By 2025, 10% of the coastal and marine territories are conserved as marine protected areas or other effective area-		★★★	Yes	

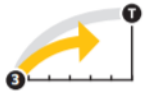
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	based conservation measures.				• The National Framework for Protected Areas provided a uniform classification of PAs, coordination framework, and provisions to consider other effective area-based conservation measures (OECM). • Support for community participation in PAs management increased; Forestry Department of Federal Territory was set up to coordinate forest management in the federal territories in 2017. • National Landscape Policy 2011-2020 serves as the guide to conserve urban biodiversity.
	6.3 By 2025, the number/size of community conserved areas has doubled compared to the 2016 level.		★★★	No	
	6.4 By 2018, the national Protected Area framework has been established.		★★★	Yes	
	6.5 By 2018, the national action plan for the conservation of urban biodiversity has been formulated.		★★☆	No	
Target 7: Vulnerable Ecosystems	7.1 By 2020, all vulnerable ecosystems have been mapped and by 2025, 50% of these ecosystems are legally protected.		★★☆	No	• Mapping for mangrove, peat swamp, and coral reefs are conducted routinely. • Mapping is done for seagrass in selected sites. • A nationwide mapping on limestone hills to create the MYKARST database is under way. • The Restoration, Reclamation and Rehabilitation project on degraded
	7.2 By 2025, 20% (compared to the 2020 level) of all identified degraded vulnerable ecosystems	Not Assessed	N/A	N/A	

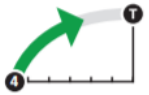
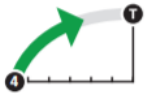
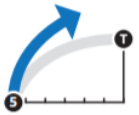
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	are under rehabilitation programmes.				forest ecosystems have been implemented since 2016. • Coastal replanting of mangrove and other species programme conducted nationwide lead to the rehabilitation of 2,874 ha by 2018. • National Peatland Steering Committee and working committee at state level established.
	7.3 By 2025, 10,000 ha of degraded peat swamp forests have been rehabilitated.		★★☆	Yes	
Target 8: Ecological Connectivity	8.1 By 2025, 10 primary corridors under the CFS initiative have been fully implemented.		★★★	Yes	• As of 2018, the Central Forest Spine Master Plan has fully been implemented in 3 Primary Linkages (PLs) with ongoing activities carried out by state government in respective 6 PLs and 5 SLs. • Within the HoB, priority corridors had been identified in Sabah (4 mil ha) and Sarawak (2.7 mil ha) guided by the HoB Project Implementation Framework. • Kinabalu ECOLINC project implemented to improve connectivity between Kinabalu Park and Crocker Range Park with significant community involvement. • Annual HoB conference. • CTI-CFF Regional Plan of Action 2010-2020 prioritizes MPA in the region and conserves migratory routes of fish and marine mammals.
	8.2 By 2020, the ecological linkage master plan for the HoB has been completed and by 2025, 3 priority corridors have been fully implemented.		★★☆	Yes	
	8.3 By 2020, a national master plan for marine ecological linkages has been completed.		★★☆	Yes	
Target 9: Endangered	9.1		★★★	Yes	• The Wildlife Conservation Act 2010, the International Trade in

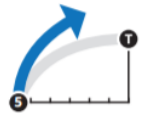
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
Species Conservation	By 2020, the National Red Data list on plants and animals is completed.				Endangered Species Act 2008, the Fisheries Act 1985; along with the Wildlife Conservation Enactment 1997 in Sabah, the Wildlife Protection Ordinance 1998 in Sarawak, are key legislations to protect wildlife • The National Red List for Mammals v2.0 published in 2017 and the National Red List for Plants (Dipterocarpacae) v2.0 is under preparation. • First National Tiger Survey ongoing • National Wildlife Forensic Laboratory and the Wildlife Genetic Research Laboratory were set up to conduct genetic research studies • Nationwide turtle conservation programmes with 28 turtle hatcheries (in-situ and ex-situ) established throughout Malaysia • Wildlife conservation centres and rescue centres are maintained by key wildlife agencies. • Regional collaboration established to stem cross border wildlife trade e.g. ASEAN, UNODC, and TRAFFIC. • The Malaysian Botanic Gardens Network (MYBGNet) has been established and expected to be formalized in 2020.
	9.2 By 2025, all endangered and threatened species are protected by Federal and/or State legislation.		★★★	Yes	
	9.3 By 2025, a network of national botanical gardens has been established.		★★★	No	

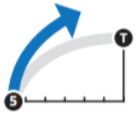
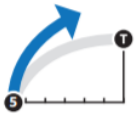
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
Target 10 Strengthened Enforcement and Control of Wildlife Crime	10.1 By 2020, resources for enforcement are doubled compared to the 2016 level.		★★★	Yes	• The Biodiversity Baseline Survey indicated that the majority of enforcement agencies reported increasing but inadequate financial resources and manpower. • The Malaysian Biodiversity Enforcement Network (MBEON) programme - an integrated joint enforcement launched in 2014. • NPOA for IUU Fishing (2013) and regional collaborations. • Community engagement through Honorary Wildlife Ranger, Special Parks Committee, Rakan Park Programme. • Collaboration with NGOs on enforcement and behavioural change campaigns (TRAFFIC, WWF). • Legal actions taken on outlets found to sell illegal wildlife, parts, and derivatives.
	10.2 By 2021, outlets involved in the trade and/or sale of illegal wildlife, parts and derivatives have been identified and legal action taken.		★★☆	Yes	
Target 11 Invasive Alien Species	11.1 By 2025, the level of awareness of the public regarding IAS has doubled compared to the 2016 level.		★★☆	Yes	• The Biodiversity Baseline Survey revealed low public awareness of IAS. • The "Invasive Alien Species in Malaysia 2018" has been compiled. • A National Working Committee on IAS to implement the National Plan of Action for Prevention, Eradication, Containment, and Control of Invasive Alien Species.
	11.2 By 2018, a risk assessment framework		★★★	Yes	

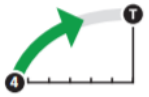
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	for invasive alien species has been established.				• Baseline studies to enhance IAS monitoring by selected government agencies - in forest plantations and several seaports. • Biosecurity Plan for the Oil Palm Industry launched in 2018. • Organization of annual National Seminar on IAS to share research findings. • Malaysia acceded IMO Ballast Water Management Convention 2004 in 2010 and is currently preparing national legislation. • Risk assessment focused on the agricultural sector – international sanitary and phytosanitary requirements, Import Risk Analysis procedure to determine the risk of imported live aquatic animals. • The MAQIS Act 2011 was enacted to enforce quarantine regulations at the country's entry points.
	11.3 By 2021, the National Action Plan for the Prevention, Eradication, Containment and Control of Invasive Alien Species has been fully implemented.		★★☆	Yes	
Target 12 Biosafety	12.1 By 2020, a systematic procedure for the safe handling, transport, packaging and identification of Living Modified Organisms (LMOs) is operational.		★★★	Yes	• A comprehensive mechanism for handling, transport, packaging and identification of LMOs is operational. • A Technical Committee for Monitoring of Living Modified Organisms (LMO) was set up in 2017. • Two new regulations were gazetted in 2018 to strengthen the
	12.2		★★★	Yes	

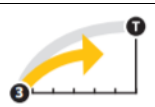
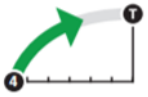
NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	By 2020, the mechanism to incorporate socio-economic considerations into decision making on applications for release of LMOs is operational.				implementation of the Biosafety Act. • Ongoing studies to include elements of liability and redress in local legislation. • Socio-economic considerations for the release of LMOs are integrated into decision-making.
	12.3 By 2020, the legal framework to address liability and redress for damage caused by LMO has been established.		★★★	Yes	
Target 13 Agricultural Genetic Conservation	13.1 By 2021, all actions and programmes under the National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation have been fully implemented.		★★★	No	• Malaysia has been a party to ITPGRFA since 2003. • The National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation (NSAP-ABCSU) launched in 2012 to conserve agricultural genetic diversity. • The national genebank, MyGenebank, established in 2015 to coordinate germplasms exchange in the country. • Centre for Marker Discovery and Validation (CMDV) to conduct genetic research for crops, livestock, and fisheries. • Agrobiodiversity information systems (AGROBIS) a centralized

NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
					genetic database is operational with five major clusters. • Genetic resources of farmed aquatic species are maintained in MRFDMD and DOF research centres.
Target 14 Access and Benefit Sharing	14.1 By 2017, the national legislation and regulations on access to biological resources and benefit sharing (ABS) are in place.		★★★	Yes	• The ABS Act 2017 came into force on 17 October 2017 to provide a national ABS Framework. • Amendment of Sabah Biodiversity Enactment 2000 in 2017 and Sarawak Biodiversity Regulations 2016 was passed to meet the requirement of Nagoya Protocol • A series of public awareness programmes have been conducted. • The ABS users' guide, Guidelines on National Competent Authority and Competent Authorities roles and responsibilities as well as ABS training modules. The Ministry (KATS) is in the process of developing a CHM for ABS. • Capacity building and engagement with the State Competent Authorities and checkpoints have been improved. • Traditional knowledge documentation study has been completed in the Peninsular, Sabah and Sarawak. • The principles of PIC, mutually agreed terms (MAT), and support
	14.2 By 2025, the level of public awareness on ABS has doubled compared to the 2016 level.		★★★	Yes	
	14.3 By 2025, a registry of traditional ecological knowledge has been established.		★★★	Yes	

NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
					for the development of community protocols to enhance participation of ILCs • The MyTKDL operated by MyIPO is the Traditional Knowledge registry for ABS purpose.
Target 15 Capacity Building for Implementation of NPBD and MEAs	15.1 By 2018, the National Biodiversity Centre is operational.		★★★	Yes	• Key biodiversity agencies maintain training centres with regular training courses conducted. • The Malaysian Biodiversity Centre is at the early stage of establishment. • The National Biodiversity Council convened twice during the progress period. • The MEXCOE Meeting continues to represent and discuss biodiversity and forestry issues. • At the state level, Sabah has formulated its own biodiversity specific policy (Sabah Biodiversity Strategy 2012-2022) while many other states have incorporated biodiversity considerations in respective state plans. • Malaysia participates actively in the Like-Minded Megadiverse Countries (LMMC) bloc and the ASEAN Corporation on Environment. • Internationally-recognized sites of biological importance including five (5) IMMAs, one (1) Ramsar, and one
	15.2 By 2016, Meeting of Ministers of the Environment (MEXCOE) has incorporated biodiversity consideration.		★★★	Yes	
	15.3 By 2018, at least 5 states have formulated and begun implementing state-level biodiversity strategies and action plans consistent with this policy.		★★★	No	
	15.4 By 2020, a comprehensive review of national and state policies, legislation and institutions related to		★★★	No	

NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	fisheries, marine parks and marine biodiversity has been completed.				(1) Queen's Commonwealth Canopy).
	15.5 By 2025, 10 new sites of biological importance are accorded with international recognition.		★★★	Yes	
Target 16 Knowledge and Science Base for Biodiversity	16.1 By 2020, five Centres of Excellence on biodiversity conservation and management are operational.		★★★	Yes	• Annual scientific expeditions have been conducted by key biodiversity agencies, NGOs, and research institutions. • Malaysia Biodiversity Information System (MyBIS) is the Malaysia Clearing House Mechanism (CHM) of the CBD • For marine biodiversity, the establishment of systematic Marine Biodiversity Information System (SyMBioIS) and Marine Park Management Information System (MPMIS); and myFRIS database for fish stock assessment data. • Malaysia Science and Technology Information Centre (MASTIC) established in 1992 to be the national primary reference centre for Science, Technology & Innovation (STI) information • National Policy on Science, Technology and Information 2013 - 2020 guides R&D direction – biodiversity identified as one of
	16.2 By 2021, a national marine and freshwater aquatic life stocktaking survey has been completed.		★★★	Yes	
	16.3 By 2018, the resilience and vulnerability of all major ecosystems to climate change have been assessed.	Not Assessed	N/A	No	
	16.4 By 2018, the National Advisory Committee on Biodiversity and Ecosystem Services	Not Assessed	N/A	No	

NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	(NACBES) has been established.				nine priority areas by the National Science Research Council (NSRC). • Biodiversity research initiatives like the SAFE Project, the Sabah Biodiversity Experiment, and the 50 ha Plot; Research for Intensified Management of Bio-Rich Areas of Sarawak (RIMBA Sarawak); aerial mapping of forests using Light Detection and Ranging (LiDAR). • Annual scientific expeditions have been conducted by key biodiversity agencies, NGOs and research institutions. • The number of Centres of Excellence for biodiversity have exceeded the target. • The NC3 BUR2 submitted in 2018 gives emphasis on improving the GHG inventory, projection of GHG emissions until 2030, mitigation assessment, vulnerability, and adaptation assessment, and establishing MRV system.
Target 17 Resource Mobilization	17.1 By 2025, the amount of funds directly committed to biodiversity conservation from both government and non-government sources have increased significantly		★★☆	Yes	• The government allocation for NRE constitutes approximately 1% of the national budget since 2012. • The NCTF was set up in 2015 to fund biodiversity projects. • Financing mechanisms that were introduced include the Tourism Tax; Taman Tugu Heritage Fund;

NPBD Target	Key Indicator	Progress Status	Confidence Level	Monitoring	Key Initiatives
	compared to the 2016 level.				and the Payment for Ecosystem Services which is operational in Perak State for the mini-hydro project. • Federal to State fiscal transfer based on ecological criteria was introduced during the 2019 Budget Speech. • Green *sukuk* for conservation purposes is at the exploration stage.
	17.2 By 2020, the NCTF is able to disburse at least RM 2 million per year for biodiversity conservation.		★★★	Yes	
	17.3 By 2018, two innovative financing mechanisms are in operation.		★★★	Yes	
	17.4 By 2020, a transparent and results-based mechanism to provide incentives for states to implement environmental protection and biodiversity conservation programmes is operational.		★★☆	Yes	

CHAPTER 3: MALAYSIAN BIODIVERSITY EFFORTS TOWARDS AICHI TARGETS AND SDGS

The linkage between Malaysia's national targets with the Aichi Biodiversity Targets and the 2030 Agenda for Sustainable Development

The seventeen (17) national targets set within the NPBD 2016-2025 are based on the twenty (20) Global Aichi Biodiversity Targets (ABTs). Further, the link between ABTs and SDGs has been established through the "Biodiversity and the 2030 Agenda for Sustainable Development" technical note published by the CBD Secretariat.

By adhering to the national targets, Malaysia fulfills commitments to achieve the ABTs and SDGs. The key difference is the timeframe for the targets. Each national target is accompanied by a set of actions and accompanying indicators. The indicators are used to measure the achievement of each target.

Table 19 shows the contribution of Malaysian biodiversity targets toward the Aichi Biodiversity Targets (ABTs) and the Sustainable Development Goals (SDGs)

Contribution of Malaysian biodiversity efforts towards the Aichi Biodiversity Targets and the Sustainable Development Goals

Table 19: Table on Malaysian biodiversity efforts and its contribution towards the Aichi Target and SDGs.

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
 Target 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.	Target 1: By 2025, more Malaysians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. Target 2: By 2025, the contributions of indigenous peoples and local communities, civil society and the private sector to the conservation and sustainable utilization of biodiversity have increased significantly.	• Biodiversity Baseline Study completed in 2018. • National CEPA Action Plan under formulation. • 'Rakan Alam Sekitar' (Friends of the Environment) government programme to promote citizen engagement. • 'Kelab Pencinta Alam' (Nature Lovers Club) supported by NGOs in participating schools. • Introduction of environmental education as a formal syllabus. • The Malaysian Bar Council maintains an Environment and Climate Change Committee. • Parliamentary Select Committee on Science, Innovation and Environment formed in 2019. • Implementation of Sabah Environmental Education Policy (SEEP). • Community-based natural resource management such as '*tagal*' and '*tagang*' are recognized and replicated. • Honorary wildlife ranger/ Special Park Committee/ myKP as examples of community engagement. • National Biodiversity Roundtable (NBR) is introduced. • Public-private partnership in PA management is increased.	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
 Target 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.	Target 3: By 2025, biodiversity conservation has been mainstreamed into national development planning and sectoral policies and plans.	• Establishment of green economy indicators. • Implementation of Roadmap for System of Environmental Economic Accounting (SEEA) 2016-2020. • SDG Roadmap. • Government Green Procurement Action Plan. • Malaysian Carbon Reduction and Environmental Sustainability Tool to promote green building and waste management. • Wildlife Impact Assessment is under consideration to complement EIAs. • Environmentally Sensitive Areas (ESAs) within the National Physical Plan is specified. • Criteria for the identification and protection of HCV forests are in place.	
 Target 3 - By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and	Target 3: By 2025, biodiversity conservation has been mainstreamed into national development planning and sectoral policies and plans. Target 4: By 2025, our production forests, agriculture production and fisheries are managed and harvested sustainably.	• The 'Green Growth' strategy is espoused within the national development framework. • A review of harmful subsidies of selected crops has been undertaken, with plans to rationalize the incentive schemes. • Performance-based incentives to encourage sustainable agriculture practices under implementation.	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
in harmony with the Convention and other relevant international obligations, taking into account national socio-economic condition.			
 Target 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 the use of natural resources well within safe ecological limits.	Target 3: By 2025, biodiversity conservation has been mainstreamed into national development planning and sectoral policies and plans. Target 4: By 2025, our production forests, agriculture production and fisheries are managed and harvested sustainably. Target 5: By 2025, tourism is sustainably managed and promotes biodiversity conservation.	• The National SCP Blueprint 2016-2030 is being finalized. • Implementation of sustainable certification schemes for forestry and key commodity sectors introduced (MTCS and MSPO). • Sustainable Forest Management (SFM) within PRF continues with improved practice. • The National Roadmap for Social Forestry is finalized. • Malaysian Palm Oil Wildlife Conservation Fund is administered for wildlife research and conservation, with contributions from public and industry players. • Integrated Pest Management (IPM) approach adopted. • Marine-captured fish stock assessment completed in 2017 which informed new fisheries management plans. • The Malaysia Fish Stock Sustainability Index (MFSSI) is being developed. • Regional initiative ASEAN Catch Documentation Scheme (ACDS) to address IUU fishing;	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
		• National Ecotourism Plan (NEP) 2016-2025 is being implemented.	
 Target 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.	Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures. Target 7: By 2025, vulnerable ecosystems and habitats, particularly limestone hills, wetlands, coral reefs and seagrass beds, are adequately protected and restored. Target 8: By 2025, important terrestrial and marine ecological corridors have been identified, restored and protected.	• PA/MPAs are expanded as the main tool for biodiversity and ecosystem protection. • SFM and forest plantation to minimize forest loss and degradation. • Mapping of vulnerable ecosystems such as limestone, coral reefs is ongoing. • The Coastal Replanting of Mangrove and Other Species programme implemented annually since 2005. • National Action Plan on Peatlands (NAPP) 2011-2020 and multi-stakeholder Peatland Fire Prevention Programme. • Central Forest Spine (CFS) implementation contributed to gazettement of ecological corridors, wildlife inventories, strengthening SFM, and forest rehabilitation. • Heart of Borneo (HOB) contributed to PA gazettement, sustainable natural resource management, ecotourism development, and capacity building. • Coral Triangle Initiative (CTI) is a regional collaboration to improve sustainable fisheries management, climate change adaptation, and establishes and manages priority seascapes.	 

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
 Target 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.	Target 4: By 2025, our production forests, agriculture production and fisheries are managed and harvested sustainably.	• Ecosystem Approach for Fisheries Management (EAFM) implemented. • Stock Assessment completed in 2017 to inform new fisheries management system. • Eight (8) NPOAs were developed with the objectives of sustainable fisheries management, species protection (sharks, dugong, and turtles) and restoring vulnerable habitats. • Active regional collaboration including several RPOAs adopted in areas of responsible fishing and IUU Fishing. • Annual coral reef survey to monitor coral cover. • Constant funding for rehabilitation of coastal mangroves. • A fisheries conservation zone from 0 to 1 nm has been introduced in several states. • Identification of migratory routes, spawning, feeding and breeding grounds for endangered species, including maintaining a network of turtle nesting sites. • National implementation of Turtle Excluder Device (TED), made mandatory in several states. • Task Force for the Management and Conservation for Threatened Marine Species including for sharks and rays, sea turtles, marine mammals, corals, giant clams, and seahorses. • Institutionalized joint enforcement effort – Malaysian Biodiversity Enforcement Operation Network (MBEON).	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
		• Increased MCS through vessel monitoring system in addition to participation in regional initiatives.	
 Target 7 - By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	Target 4: By 2025, our production forests, agriculture production and fisheries are managed and harvested sustainably.	• In 2019, approximately one-third of PRF is certified under the voluntary national scheme, MTCS. • SFM with a focus on genetic and biodiversity components is practised. • For the commodities sector, more than half of the oil palm planted area is certified under MSPO. • The concept of HCV has been adopted in the forestry and commodities sector. • Malaysian Good Agricultural Practice (myGAP), the ASEAN Guidelines for Good Aquaculture Practices on Food Fish (GAqP) and Malaysian Organic (myOrganic) certification scheme for crops, aquaculture and livestock sectors. • Rehabilitation effort on degraded forest ecosystems or plantation as corridors for wildlife. • Identification and protection of HCV forest.	
 Target 8 - By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to	Target 3: By 2025, biodiversity conservation has been mainstreamed into national development planning and sectoral policies and plans.	• Establishment of an extensive network of monitoring stations for rivers and marine areas to monitor the Water Quality Index. • Malaysia's Roadmap Towards Zero Single-use Plastics 2018-2030 is launched.	

Aichi Biodiversity Targets		National Targets	Key Initiatives	Sustainable Development Goals
	ecosystem function and biodiversity	Target 4: By 2025, our production forests, agriculture production and fisheries are managed and harvested sustainably. Target 5: By 2025, tourism is sustainably managed and promotes biodiversity conservation.	• National Action Plan on Peatlands 2011-2020 (NAPP) to address fires, haze, and GHG emissions. • Enforcement of International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004. • Ratification and enforcement of other multilateral environmental agreements related to waste such as Basel Convention on Transboundary Movement of Hazardous Waste 1993; Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade 2002; Stockholm Convention on Persistent Organic Pollutants 2002; Minamata Convention on Mercury 2014.	
	Target 9 - By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	Target 11: By 2025, invasive alien species and pathways are identified, priority species controlled, and measures are in place to prevent their introduction and establishment. Target 12: By 2025, a comprehensive biosafety system inclusive of a liability and redress regime is operational to manage	• A National Working Committee on IAS to implement the National Plan of Action for Prevention, Eradication, Containment, and Control of Invasive Alien Species meets bi-annually. • The "Invasive Alien Species in Malaysia 2018" document has been compiled. • Baseline studies to enhance IAS monitoring by selected government agencies in forest plantations and several seaports were carried out. • Biosecurity Plan for the Oil Palm Industry launched in 2018. • Annual seminar on IAS is held.	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
	potential adverse impacts of modern biotechnology on biodiversity and human health.	• Malaysia acceded IMO Ballast Water Management Convention 2004 in 2010 and is currently preparing national legislation. • Risk assessments focused on the agricultural sector – international sanitary and phytosanitary requirements, Import Risk Analysis procedure to determine the risk of imported live aquatic animals. • The MAQIS Act 2011 was enacted to enforce quarantine regulations at the country's entry points. • Malaysia ratified the Cartagena Protocol on Biosafety in 2003 and the Malaysian Biosafety Act 2007 was enacted.	
 Target 10 - By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures. Target 7: By 2025, vulnerable ecosystems and habitats, particularly limestone hills, wetlands, coral reefs and seagrass	• Gazettement of PA/MPAs as adaptive measures to climate change. • Annual nationwide coral reef survey and the Coral Bleaching Response Plan 2011 were revised in 2016. • Coastal Replanting of Mangrove and Other Species implemented since 2005. • Restoration, Reclamation and Rehabilitation of Degraded Forest Area in Peninsular launched in 2016. • Fire Danger Rating System and the Standard Operating Procedure for Prevention of Peatland Fires was adopted to mitigate fire risks in peatlands.	 

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
	beds, are adequately protected and restored. Target 8: By 2025, important terrestrial and marine ecological corridors have been identified, restored and protected.	• CFS, HOB and CTI initiatives implemented to reconnect ecological corridors (terrestrial and marine) to address impacts from development and climate change.	
 Target 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	Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures. Target 8: By 2025, important terrestrial and marine ecological corridors	• Terrestrial and marine PAs stand at 13.2% and 3.3% of land and marine areas respectively. • The PA Master List was established as an inventory, with potential PAs identified for gazettement. • OECMs acknowledged including UNESCO Natural World Heritage Sites, Ramsar sites, freshwater/ fish sanctuaries, and IMMAs. • Urban green areas are promoted via the National Landscape Policy. • Policy recognition of ICCAs stated within federal and state documents, i.e., The National Physical	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
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.	have been identified, restored and protected.	Plan 3, the NPBD, the Heart of Borneo Strategic Plan of Action, and the Sabah Biodiversity Strategy. • CFS, HOB and CTI initiatives implemented to reconnect terrestrial and marine ecological corridors. • Newly established State Park Enactment in Terengganu with higher interest from other states.	
 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.	Target 9: By 2025, the extinction of known threatened species has been prevented and their conservation status has been improved and sustained. Target 10: By 2025, illegal harvesting and illegal trade of wildlife, fish and plants are under control and significantly reduced.	• The Wildlife Conservation Act 2010, the International Trade in Endangered Species Act 2008, the Fisheries Act 1985; along with the Wildlife Conservation Enactment 1997 in Sabah, the Wildlife Protection Ordinance 1998 in Sarawak, are key legislations to protect wildlife. • The National Red List for Mammals v2.0 published in 2017, and the National Red List for Plants (Dipterocarpacae) version 2.0 is under preparation. • First National Tiger Survey is ongoing. • National Wildlife Forensic Laboratory and the Wildlife Genetic Research Laboratory were set up to conduct genetic research and to provide forensic evidence.	 

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
		• Nationwide turtle conservation programmes with 28 turtle hatcheries (in-situ and ex-situ) established throughout Malaysia. • Wildlife conservation centres and rescue centres are maintained by key wildlife agencies. • Regional collaboration to stem cross border wildlife trade with ASEAN, UNODC, and TRAFFIC.	
 Target 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 minimizing genetic erosion and safeguarding their genetic diversity.	Target 13: By 2025, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives is adequately conserved.	• Malaysia has been a party to ITPGRFA since 2003. • The National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation (NSAP-ABCSU) launched in 2012 to conserve genetic agricultural diversity. • The national genebank, MyGenebank, established in 2015 to coordinate germplasms exchange in the country. • Centre for Marker Discovery and Validation (CMDV) to conduct genetic research for crops, livestock and fisheries. • Agrobiodiversity information systems (AGROBIS) a centralized genetic database is operational with five (5) major clusters. • Genetic resources of farmed aquatic species are maintained.	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
 Target 14 - By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures. Target 7: By 2025, vulnerable ecosystems and habitats, particularly limestone hills, wetlands, coral reefs and seagrass beds, are adequately protected and restored. Target 8: By 2025, important terrestrial and marine ecological corridors have been identified, restored and protected.	• Forest classes including soil protection, flood control, water catchment, wildlife sanctuary, virgin jungle reserve, amenity forests, education and research forests have been classified as Protection Forests. • Integrated River Basin Management Plan (IRBM) completed for ten (10) identified river basins between 2016-2020. • Integrated Shoreline Management Plan (ISMP) planning framework and tool developed to support states in achieving sustainable coastal development. • The Coastal Replanting of Mangrove and Other Species programme initiated since 2005 following the Indian Ocean Tsunami to stabilise the coast after the impact of tsunamis. • Community-based resource management systems, e.g., *Tagal* and *Tagang* are recognized and supported by the government. • The framework to regulate Payment for Ecosystem Services (PES) is available; pilot programmes to preserve water catchment for water supply implemented in states of Perak and Sabah. • National Coastal Erosion Study completed in 2016.	 

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
 Target 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.	Target 6: By 2025, at least 20% of terrestrial areas and inland waters, and 10% of coastal and marine areas, are conserved through a representative system of protected areas and other effective area-based conservation measures. Target 7: By 2025, vulnerable ecosystems and habitats, particularly limestone hills, wetlands, coral reefs and seagrass beds, are adequately protected and restored. Target 8: By 2025, important terrestrial and marine ecological corridors have been identified, restored and protected.	• The national development framework identifies "Strengthening resilience against climate change and natural disasters" and "Spatial Sustainability and Resilience to Climate Change" as the focal area in 11MP and NPP-3 respectively. • The NC3 BUR2 submitted in 2018 gives emphasis on improving the GHG inventory, projection of GHG emissions until 2030, mitigation assessment, vulnerability, and adaptation assessment, and establishing MRV system. • Malaysia is a party to UN Convention to Combating Desertification (UNCCD). • Peatland Fire Prevention Programme as a disaster risk reduction measure to protect peatland (for haze and GHG reduction). • A Climate Change Act is under formulation. • Malaysian National Policy on Climate Change 2009 has been developed, and the National Climate Change Adaptation and Mitigation Plan is being formulated. • The National REDD Plus Strategy and Roadmap have been adopted; • The National Coastal Vulnerability Index (NCVI) introduced; national mapping exercise to identify coastal areas susceptible to the impacts of sea-level rise, and assessment of the impact of climate change on coral reefs and sea turtles in the Coral Triangle region.	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
 Target 16 - By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	Target 14: By 2025, Malaysia has an operational ABS framework that is consistent with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation.	• Access and Benefit Sharing Act 2017 provides the national ABS framework. • Amendment of Sabah Biodiversity Enactment 2000 in 2017 in response to the requirement of Nagoya Protocol. • Sarawak Biodiversity Regulations 2016 was passed to guide the implementation at the state level. • The ABS users' guide, Guidelines on National Competent Authority and Competent Authorities roles and responsibilities, and ABS training modules are available. • KATS is in the process of developing a CHM for ABS. • Capacity building and engagement with the State Competent Authorities and checkpoints; • The principles of PIC, mutually agreed terms (MAT), and support for the development of community protocols to enhance participation of ILCs. • Malaysia Traditional Knowledge Digital Library (MyTKDL) to safeguard traditional knowledge was set up in 2009.	  
 Target 17 - By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an	Target 2: By 2025, the contributions of indigenous peoples and local communities, civil society and the private sector to the conservation and	• NPBD 2016–2025 is the second generation NBSAP which is aligned to Global ABTs. • The National Steering Committee for NPBD established which involves stakeholders from federal and state levels.	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
effective, participatory and updated national biodiversity strategy and action plan.	sustainable utilisation of biodiversity have increased significantly. Target 15: By 2025, capacity for the implementation of the national and subnational biodiversity strategies, the CBD and other related MEAs has significantly increased.	• To catalyze NGO and private sector participation, the National Biodiversity Roundtable (NBR) has been established. • Pilot BIOFIN study has been conducted to understand past biodiversity financing needs and gaps to implement NPBD.	
 Target 18 - By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of	Target 2: By 2025, the contributions of indigenous peoples and local communities, civil society and the private sector to the conservation and sustainable utilisation of biodiversity have increased significantly.	• Traditional Knowledge Documentation Programme has been completed in Peninsular, Sabah and Sarawak. • Malaysia Traditional Knowledge Digital Library (MyTKDL) to safeguard TK was set up in 2009. • ILC considerations strengthened via international instrument, e.g. REDD Plus, Indigenous People and Community Conserved	

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
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.	Target 14: By 2025, Malaysia has an operational ABS framework that is consistent with the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation.	Areas (ICCAs), the Nagoya Protocol, and the FAO Code of Conduct for Responsible Fisheries. • Support for community empowerment initiatives includes community mapping, community learning centres (CLCs), Community Conservation Resilience Initiative (CCRI).	   
 Target 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	Target 1: By 2025, more Malaysians are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. Target 16: By 2025, knowledge and the science base relating to biodiversity, its values,	• Malaysia Biodiversity Information System (MyBIS) is the Malaysia Clearing House Mechanism (CHM) of the CBD. • For marine biodiversity, Systematic Marine Biodiversity Information System (SyMBioIS) and Marine Park Management Information System (MPMIS), and myFRIS database for fish stock assessment data. • Malaysia Science and Technology Information Centre (MASTIC) established in 1992 to be the	    

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
transferred, and applied.	functioning, status and trends, and the consequences of its loss, are significantly improved and applied.	national primary reference centre for Science, Technology & Innovation (STI) information. • National Policy on Science, Technology, and Information 2013-2020 guides R&D direction – biodiversity identified as one of nine priority areas by the National Science Research Council (NSRC). • Biodiversity research initiatives, e.g. the SAFE Project, the Sabah Biodiversity Experiment, and the 50 ha Plot; Research for Intensified Management of Bio-Rich Areas of Sarawak (RIMBA Sarawak); aerial mapping of forests using Light Detection and Ranging (LiDAR), • Annual scientific expeditions have been conducted by key biodiversity agencies, NGOs and research institutions. • The list of Centres of Excellence for biodiversity management identified.	
 Target 20 - By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and	Target 2: By 2025, the contributions of indigenous peoples and local communities, civil society and the private sector to the conservation and sustainable utilisation of biodiversity have increased significantly. Target 15: By 2025, capacity for the	• The government allocation for NRE constitute approximately 1% of the national budget since 2012 – where Government funding on biodiversity has remained consistent while public sector contribution is increasing. • Partnerships and collaboration such as the inter-agency enforcement initiative – MBEON; government-NGO partnership platform NBR; Genetic Modification Advisory Committee to support biosafety issues; Government Industry and Academic Committee (GMAC).	 

Aichi Biodiversity Targets	National Targets	Key Initiatives	Sustainable Development Goals
agreed process in the Strategy for Resource Mobilization, 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.	implementation of the national and subnational biodiversity strategies, the CBD and other related MEAs has significantly increased. Target 17: By 2025, there is a significant increase in funds and resources mobilised for the conservation of biodiversity from both government and non-government sources.	• KATS set up the National Conservation Trust Fund for Natural Resources (NCTF) in 2015. • At the department level, Marine Reserve and Park Trust Fund (by DOFM), the Biodiversity Conservation Trust Fund (DWNP), the Department of Environment Trust Fund for promoting environmental awareness and education; the Forest Community and Forest Rehabilitation Funds (SFD), and the Wildlife Conservation Trust Fund (SFC). • To promote scientific research and ideation, MESTECC maintains funds such as the Science Fund and Inno Fund; • Financing mechanisms that were introduced include the Tourism Tax at the national level; and PES scheme and the Taman Tugu Heritage Fund at the site level. • Green *sukuk* has a strong potential to support biodiversity conservation was introduced.	

CHAPTER 4: CHALLENGES, TECHNICAL AND CAPACITY NEEDS

Background

The management of biological diversity in Malaysia is complex. Significant conservation outcomes are dependent on diverse stakeholders, competing national priorities, and a holistic understanding of existing policy and legislation. Taking this into cognizance, this chapter identifies the challenges, capacity needs and actions.

Through the 6NR process, a series of consultations with biodiversity stakeholders were held. The broad constraint for the implementation of NPBD lies in limited funding and lack of coordination between stakeholders especially on matters of land and natural resources. However, due to competing national priorities, securing sustainable biodiversity financing for the implementation of the NPBD remains a challenge. This funding gap is reflected in the preliminary findings from the Biodiversity Finance Initiative (BIOFIN) assessment. Federal - state government cooperation can be further enhanced to ensure natural resource management are implemented in respective states to fulfil international obligations.

During the consultations, implementing agencies and stakeholders were tasked to identify the challenges, as well as technical and capacity needs in implementing each target within the policy. Responses are captured in the sections below.

TARGET 1 BIODIVERSITY AWARENESS

Challenges. While CEPA efforts on environment and biodiversity issues by stakeholders have been consistent, these efforts are often uncoordinated, potentially resulting in replication and overlap. Similarly, such efforts are usually presented to society at large instead of being targeted to specific sectors. As for members of the public, the Biodiversity Baseline Survey showed that 91% do not fully comprehend the term "biodiversity." This low level of awareness may lead to limited public interest and action to protect nature.

Technical and Capacity Needs. The implementation of NPBD requires a strong communication and advocacy strategy aimed at high-level decision-makers to ensure that its agenda is set within national and state-level development frameworks. A centralized platform to coordinate CEPA programmes across all stakeholders was recommended to foster communication and partnerships. There is also a need to identify successful and easily replicable CEPA programmes, increase the capacity and skills in conducting CEPA programmes, and create a standardized tool to measure CEPA effectiveness. CEPA for other segments of society, including the legislature, judiciary, and relevant economic sectors (construction, agriculture, tourism) should be further explored.

TARGET 2 STAKEHOLDER RECOGNITION AND EMPOWERMENT

Challenges. Although there is increased interest by non-governmental stakeholders like the private sector and civil society in biodiversity conservation, translating this interest into collaborative actions aligned with the NPBD remains a challenge. There is also a lack of legal provisions to facilitate the participation of ILCs in biodiversity conservation, which limits their involvement in decision-making processes. While there are initiatives to involve ILCs in conservation through programmes such as the honorary wildlife warden/ranger programme, these efforts are localized and yet to be applied across all relevant agencies. Government agencies also face challenges in conducting effective consultations with non-government stakeholders to achieve positive conservation outcomes.

Technical and Capacity Needs. There is a need for a platform to engage non-governmental stakeholders in the implementation of the NPBD. There is also a need to engage the private sector, academia, and civil society by aligning CSR projects or research to the NPBD. Suggestions for more active participation of ILCs in biodiversity conservation include making legal provisions for ILC involvement, capacity building for stakeholders that regularly engage with ILCs, sustained engagement and empowerment for ILCs on biodiversity conservation initiatives, and providing support on alternative livelihood based on nature preservation.

TARGET 3: MAINSTREAMING BIODIVERSITY

Challenges. The task of embedding biodiversity considerations into legislation and policy at federal, state, and local levels face challenges, mainly due to competition with development priorities, limited understanding of biodiversity and ecosystem functions, and the lack of institutional capacity. While the national development plans recognize the importance of biodiversity conservation, mainstreaming efforts via the government budgeting system needs to be strengthened to support greater adoption across sectors. Many of the decision-making and policymakers are subject to periodic turnover resulting in a lack of institutional capacity. There is also a limited decision support system based on environmental information to guide landscape planning at the federal or state level. Often, the implementation of existing programmes face challenges in monitoring and evaluation. At the state level, the implementation of biodiversity management programmes is further constrained by the lack of capacity and resources.

Technical and Capacity Needs. A greater need to mainstream biodiversity policies across sectoral development has been recognized. Sectoral assessments are required to understand the impacts of key economic sectors (trade, transport, construction, and energy) on biodiversity and the environment. Support for enhancing and promoting economic valuation studies of biodiversity and ecosystems is required to generate results that influence decisions, especially on land use. Robust monitoring and reporting frameworks are critical to ensure existing programmes support biodiversity mainstreaming outcomes. Across ministries and agencies, talent retention programmes such as the Subject Matter Expert (SME) can be expanded in scope to improve succession planning. There is also a need to strengthen and improve the function of centralized platforms - MyBIS to provide the necessary tools for mainstreaming biodiversity at the federal, state, and local level.

TARGET 4 SUSTAINABLE PRIMARY PRODUCTION

Challenges. Malaysia acknowledges sustainability in the economic sector, albeit the broader roles of socio-ecological balance in forestry, agriculture, and fisheries need to be a driving factor in the formulation of agricultural policies and regulatory framework. For example, the emphasis on biodiversity conservation is limited in the National Agrofood Policy. The lack of understanding of ecosystem functioning (soil regeneration, pollination, crops genetic diversity) in productivity has resulted in potentially costly implications. In addition, the drive for sustainability among smallholders in the commodity sector remains a challenge.

Technical and Capacity Needs. Recommendations include the need to identify and rationalize harmful incentives to promote the alignment of biodiversity conservation objectives in the agriculture and commodity sector. For forest management, tools and technologies for forest inventory; monitoring, reporting and

verification framework; fire management systems and restoration of hydrological function especially in peat forests; and greater cooperation between stakeholders are needed. For the agriculture/ commodity sector, there is a need for technical capacity in auditing for sustainability schemes, assessment of High Conservation Value (HCV) areas and its monitoring and enforcement framework, and a central repository of spatial data on forestry, agriculture and fisheries areas. There need to be increased in trainings on the latest tools and technologies and sustainable supply chains to improve natural resource management.

TARGET 5 SUSTAINABLE TOURISM

Challenges. Competing priorities in the tourism sector have resulted in limited progress in ecotourism and mitigation of tourism impacts. Development of tourist spots, particularly within PAs or conserved areas, if uncontrolled, may lead to degradation of these natural sites. There is also a lack of awareness on the importance of sustainable ecotourism schemes such as the Global Sustainable Tourism Criteria (GSTC) and Green Fins. Ongoing efforts to engage ILCs in tourism continues, although the ILC participation rate remains low due to limited funding.

Technical and Capacity Needs. For internationally recognized sustainable tourism schemes like GSTC to be adopted at the national level, recommendations include the need for capacity building exercises especially technical advice from the GSTC council. In addition, standard management protocol for specific eco-tourism sites (geoparks, caves, and highlands) and accompanying training programmes are needed. Other needs include guidelines for tourist site development and legal review or provision to manage ecotourism/heritage sites. Strengthened enforcement in terms of development compliance and activity compliance are equally important. ILC participation in tourism through existing green guide certification can be enhanced by reviewing implementation mechanisms. To further empower and involve ILCs in ecotourism, more outreach and communication programmes at the local level should be conducted, explicitly focusing on livelihood development through tourism activities.

TARGET 6 PROTECTED AREAS

Challenges. There is a need to adopt OECM principles to recognize conserved areas outside of the gazetted PAs. There are also significant knowledge gaps in areas that harbour high biodiversity. This limits the expansion of current PA networks. For example, areas rich in marine biodiversity such as submerged reefs exist outside marine protected areas (MPAs) and have significant ecological value but are yet to be identified. In addition, existing PAs face challenges in site management and enforcement due to capacity and resource limitations. The lack of legal provisions limits the involvement and engagement of ILCs as partners in co-management.

Technical and Capacity Needs. Greater coordination between key states and federal agencies through a national platform is needed to increase the PA/MPA coverage. An increase in financial resource allocation, specifically for the establishment and strengthening of the management of the existing PA network, is also necessary. To catalyze private sector contribution, a sustainable financing mechanism or business plan for PAs is required to ensure financial sustainability and viability. Investment for regular scientific research to establish flora and fauna inventories coupled with systematic monitoring are crucial to enhance critical areas

of protection. Additionally, the concept of OECM needs to be further explored and developed to complement the existing PA network.

TARGET 7 VULNERABLE ECOSYSTEMS

Challenges. The challenges identified include the lack of a clear definition, mapping, and identification of vulnerable ecosystems. There is also a lack of awareness on the importance of vulnerable ecosystems and limited technical capacity to identify and carry out surveys and mapping of vulnerable ecosystems. As many of the vulnerable ecosystems specified are currently not protected within the PA network, resources are not mobilized to increase the scientific understanding of these vulnerable ecosystems. The lack of data has resulted in the lack of a common approach to address and protect various vulnerable ecosystems.

Technical and Capacity Needs. Recommendations for this target include establishing baseline information on identified vulnerable ecosystems. There is also a need for an increase in capacity for monitoring the identified vulnerable ecosystems for long-term management. Human resources, and spatial data through partnerships with relevant agencies such as Remote Sensing Agency Malaysia (ARSM) is crucial. Partnerships between the government and research institutions for better data would be beneficial. Support to advance scientific studies or species inventories can promote the protection of these ecosystems. Innovative and improved silvicultural practices in peat swamp rehabilitation are cited as the technical needs to restore degraded peat swamp areas along with fire prevention and control expert on peatlands.

TARGET 8 ECOLOGICAL CONNECTIVITY

Challenges. The main challenge for the implementation of the CFS Master Plan lies in the lack of capacity and financial incentives for state governments. Other obstacles identified are the lack of funding and competing priorities in the gazettement process of state land to PRF, lack of coordination between relevant stakeholders and the financial implications. In addition, the need to maintain existing forest reserves is also identified as a significant challenge for habitat connectivity.

Technical and Capacity Needs. Recommendations include the institutionalization of financial incentives to motivate States in maintaining natural forest within the CFS landscape. Scientific research and technological capacity are needed, i.e., GIS, drone operations, remote sensing, viaduct design, and wildlife ecology studies to operationalize and monitor the CFS corridors. Continuous and effective stakeholder engagement is critical and needs to be supported by a communication and coordination platform for inter-state peer learning and information dissemination.

TARGET 9 ENDANGERED SPECIES CONSERVATION

Challenges. Species conservation in Malaysia face challenges in securing consistent funding, expertise, trained personnel and equipment. The lack of standardization of legislation for certain species (for example on sea turtle egg trade) poses challenges for inter-state conservation. For certain taxa, there is also a lack of local scientific data, like National Red List Data, to inform management decisions. In addition, the scale of poaching is difficult to estimate, as there is limited monitoring and/or systematic estimation of remaining populations for wildlife species. Other challenges of wildlife conservation include lack of inter-agency coordination, gaps in human and financial resources, low penalties, and increasing human-wildlife conflict.

Technical and Capacity Needs. It was recommended that the importance of species conservation be communicated to all members of society, including various ministries and agencies. There is also a need to increase capacity for species conservation through personnel training in species identification and assessment, use of technology, and ex-situ conservation management. Further, the design of species protection plans (either in-situ or ex-situ) and their monitoring must be informed by reliable scientific information and evidence-based management. Technical capacity on spatial ecology is also required to establish a more in-depth understanding, for example, wildlife movement or behaviour in relation to the landscape. It was also recommended that support and resources need to take into account lesser-known, uncharismatic and highly endemic species. Related national and state legislation needs to be reviewed, standardized, strengthened, and enforced to protect Malaysia's endangered and threatened species better.

TARGET 10 POACHING AND ILLEGAL TRADE

Challenges. Key challenges identified for poaching and illegal wildlife trade include constraints in human resources and financial capacity. Other challenges include the limited experience of relevant authorities in criminal prosecution (where abilities such as providing testimonies in court is a crucial component of the investigation process) and the emergence of new platforms for wildlife crime like online markets. The lack of public awareness also contributes to the consumption and demand for wildlife parts and derivatives.

Technical and Capacity. Critical recommendations and capacity needs include strengthening inter-agency cooperation, reviewing legislation, and adoption of new technology (i.e., SMART patrolling, unmanned aerial vehicle and the use of modern fieldwork instruments). Additionally, technical and skill-based training to relevant personnel is required; particularly on curbing cybercrime and the identification of endangered species products. Further, to achieve this target, there needs to be more 'boots on the ground' with adequate training on investigative techniques. Finally, an effective behavioural change campaign is needed to reduce demand and galvanize public support to report on illegal possession of wildlife and parts.

TARGET 11 INVASIVE ALIEN SPECIES

Challenges. The management and response of IAS in Malaysia predominantly focused on species and their impact on the agriculture sector. There is still little information on how the IAS has impacted local biodiversity and altered the structure and functions of the inherent ecosystems. IAS has been identified as a cross-cutting issue by the government; however, the management strategies and discussions remain within the realms and expertise of the National Committee of IAS. There is a knowledge gap on the true extent of IAS implications on local species and ecosystems. There is also a lack of engagement with the public and industry on IAS issues. Insufficient technical capacity in research, quarantine control and enforcement at the border, risk assessment, ballast water management are some of the areas that were identified as barriers to fully implementing actions within Target 11.

Technical and Capacity Needs. Among the recommendations and capacity for Target 11 include improving policy and industry coordination of IAS actions in Malaysia through strengthening policy frameworks to address IAS, coordinating national studies and analysis, encouraging collaboration, and increase in funding. Further, there is a need to increase technical capacity and research development, focusing on risk assessment for identified IAS and training on the identification. A National Framework for Early Detection and Rapid

Response (EDRR) for IAS is suggested to improve emergency response to IAS incursions. Target CEPA programmes are also required to inform the public and relevant enforcers on actions to curb the introduction and establishment of IAS.

TARGET 12 BIOSAFETY

Challenges. Although a wide range of capacity building and public awareness activities on modern biotechnology and biosafety have been conducted over the past several years, these activities have spread only thinly across various stakeholders, including the public. Among the challenges include constraints in resources, particularly in human resources, laboratory facilities, and assets. There is currently insufficient baseline data and possible impact assessment mechanism developed for LMOs. Lastly, the Biosafety Act 2007 does not currently have provisions to address liability and redress for damage caused by LMOs

Technical and Capacity Needs. Improving the level of awareness and understanding among government agencies is crucial to ensure effective enforcement of the Biosafety Act and other related regulations. There is also a need to strengthen coordination among agencies - federal, state, and local - to allow for rapid exchange of information and response to biosafety emergencies. Support on legal expertise to incorporate liability and redress regime in Malaysia is required to allowing Malaysia to ratify the Kuala Lumpur-Nagoya Supplementary Protocol on Liability and Redress.

TARGET 13 AGRICULTURAL GENETIC CONSERVATION

Challenges. This target was formulated specifically to address the National Strategies and Action Plans on Agricultural Biodiversity Conservation and Sustainable Utilisation (NSAP–ABCSU). The key challenges identified are the lack of dedicated committee to coordinate the implementation of the Action Plan, low awareness on agricultural genetic conservation, and insufficient funding. Additionally, the National Agrofood Policy emphasizes food security and productivity over agricultural biodiversity and sustainable use. The major gap in information and knowledge on the trends and conservation of associated biodiversity and ecosystem services is due to a lesser priority given to agricultural biodiversity and its linkage to food security. Conservation and utilization of associated biodiversity could only be achieved with support for inventories and research and development.

Technical and Capacity Needs. Recommendations for this target include improving the understanding amongst policymakers, farmers, and researchers on the importance of biodiversity in ensuring sustainable food production. There is a need to include agricultural biodiversity considerations into the future cycle of National Agrofood Policy to shift from over-reliance on agricultural inputs to achieve productivity. Identification of research gaps in agricultural genetics and conservation is needed to direct research direction in which agricultural policy should be developed based on findings from these targeted research areas.

TARGET 14 ACCESS AND BENEFIT SHARING

Challenges. Access and Benefit Sharing (ABS) remains a new concept, and its full implementation has yet to begin. Since the passing of the ABS Act 2017, the implementation is pending the passing of ABS Regulations.

Lack of capacity has been identified as the critical constraint for the introduction of a national ABS regime across a range of stakeholders at the national, state, and local community level. At the national level, there is a limited understanding of ABS issues beyond those who are directly involved in the conservation and development of the biological resources sector.

On top of that, this understanding may be further limited by new concepts, for example, the World Intellectual Property Rights (WIPO), and agricultural plant genetic resources linked to global instruments such as ITPGRFA and Digital Sequence Information (DSI). At the state level, capacity for implementation of ABS varies, with Sabah and Sarawak having dedicated responsible bodies while Johor, Perak, and Terengganu maintain their respective state park authorities which play roles in access to bio-resources. State governments have expressed the need for resources and training support to act as the Competent Authority specified in the ABS Act. Other barriers identified are related to the lack of involvement of ILCs, a policy to recognize the role of ILCs in conservation, engagement, and awareness-raising on ILCs' rights, tenure security issues and benefit-sharing modes is critically needed to address the ABS concept.

Technical and Capacity Needs. There is a significant need for awareness-raising, specific training, and capacity building programmes for state departments that act as competent authorities and the agencies at 'checkpoints' to administer ABS regulations. Research and development are needed to promote bioprospecting; in turn, this can encourage communities to protect and conserve biological resources. Permitting arrangements are essential to enable the functioning and profitability of bioprospecting initiatives. The technical needs to achieve ABS include engagement and support to the ILC groups to ensure full participation of ILCs. Other suggestions include instituting an ABS unit at the federal and state level to ensure coordinated implementation of ABS.

TARGET 15 CAPACITY BUILDING ON IMPLEMENTATION OF NPBD AND MEAs

Challenges. There has been limited success in encouraging states to draft and implement their respective biodiversity-specific strategies. Enforcement and monitoring of existing legislation and policies face challenges in the form of frequent personnel rotation (refer Target 3), access to data (refer Target 16), and ineffective dissemination of information. Because commitments to international MEAs are made at the federal level, challenges lie in effective implementation and coordination among the various level of government. In the marine environment, there is currently no central framework or policy guiding ocean governance.

Technical and Capacity Need. There is a need to expedite the formulation of state-level biodiversity-specific policies to incorporate the NPBD 2016-2025 since states are empowered to carry out their biodiversity management. Additionally, because biodiversity management is often a cross-sectoral, cross-jurisdictional or cross-ministerial issue, there is a need for a centralized platform to share knowledge, resources and encourage consultation between relevant stakeholders. Institutional capacity can be retained by improved succession planning through programmes such as Subject Matter Expert (SME). Communication of the effects and importance of multilateral environmental agreements and transboundary cooperation needs to be improved to enhance biodiversity outcomes. Raising the awareness of decisionmakers could be done through continuous and impactful CEPA programmes at all levels. Additionally, legal expertise is needed to review

laws and regulations relating to biodiversity, particularly related to marine biodiversity conservation and ocean governance.

TARGET 16 KNOWLEDGE AND SCIENCE BASE FOR BIODIVERSITY

Challenges. The lack of cohesive research strategy for biodiversity is identified as one of the key priority research areas. Effective mechanisms to establish the science-policy feedback loop is also limited. Currently, most research collaboration with the academic and research institutes responds to needs while long-term research partnerships between government and research institutes remain sporadic. Consequently, the lack of data is one of the key barriers to the effective implementation of biodiversity programmes and monitoring of ecosystem and species dynamics. Hence, more investment is needed to promote sound scientific research. It is also critical to improve engagement between policy and research stakeholders in policymaking, implementation and monitoring of biodiversity programmes.

Technical and Capacity Need. There is a need for a research strategy blueprint for biodiversity conservation to consolidate research efforts and resources. An increase in technical expertise is required and can be done by creating academic programmes to cultivate young scientists, creating more research opportunities and career prospects in the field for scientists and taxonomists. Malaysia maintains a biodiversity clearing-house mechanism and a spatial database for mapping biodiversity but technical support to further expand this application is urgently needed. This can be achieved through increased expertise in data science to support biodiversity policy. An effective platform for science communication is also needed to initiate the science-policy feedback loop to improve programme planning and implementation.

TARGET 17 RESOURCE MOBILIZATION

Challenges. There is a critical shortage of funding for biodiversity. Currently, revenue generation from natural resources is primarily limited to extractive activities and tourism. However, such revenue gains have minimal retention and re-investment into maintaining biodiversity and ecosystem services. Aside from federal and state budgets, innovative and sustainable biodiversity financing mechanisms beyond government sources have not been fully explored. There are also limited studies on the economic valuation of local ecosystems. While bilateral and multilateral sources of external funding have contributed significantly in the past, these sources of funds are gradually decreasing as Malaysia moves towards a high-income nation.

Technical and Capacity Need. Recommendations for Target 17 include the need to develop strategies to address state financial needs and to shift the focus away from extractive sectors. There is an urgent need for a methodology to quantify biodiversity spending and financing needs systematically. Furthermore, it is essential to mainstream biodiversity conservation financing across sectoral policies and plans to ensure optimum utilization of available government funds. Technical support required pertains to the formulation of a resource mobilization plan to leverage non-governmental sources of funding. For market-based approaches such as PES and green bonds, technical support to develop an enabling framework is needed with a monitoring, reporting and verification system in place. Future efforts in Target 17 should consider sustained partnerships with the private sector and capacity building for government agencies on financial planning and management.

CHAPTER 5: CONTRIBUTION OF INDIGENOUS PEOPLES AND LOCAL COMMUNITIES (ILCs) AND GENDER EMPOWERMENT IN CONSERVATION

Biodiversity conservation efforts covered in the previous chapters are mostly focused on government, NGO, and private sector initiatives in achieving national targets and the Aichi Biodiversity Targets (ABTs). The involvement of indigenous local communities (ILCs) and women in biodiversity conservation is recognized and included in this report to comprehensively reflect national circumstances. Thus, this chapter details three case studies to depict such involvement in different parts of Malaysia. The first two case studies (Case Study I & II) are based on-site visits (in Penang and Sarawak)– mainly focusing on women involvement, whereas the third case study (Case Study III) is based on desktop research of several local community initiatives towards conservation in Sabah.

Case Study I: Mangrove Conservation in the Fishing Community of Kampung Sungai Acheh, Nibong Tebal, Penang

Background

Throughout the state of Penang, the trend of increasing coastal development has affected the livelihoods of many local fishing communities. The focal point of this study is Kampung Sungai Acheh, a village situated on the mainland of Penang approximately 2km away from Parit Buntar, a small town bordered by Kedah, Perak, and Penang states. Within the fishing community in this village, a small non-governmental organization (NGO) - Penang Inshore Fishermen Welfare Association (PIFWA) has been conducting mangrove conservation since the late 1990s. In 2013, PIFWANITA was established as a subsidiary organization.

Figure 31: Fishing village of Kampung Sungai Acheh, Penang

The conservation site is located in Kampung Sungai Acheh within Nibong Tebal, which is situated on the mainland section of Penang. It is approximately 2km away from Parit Buntar. Surrounding this village are many other villages such as Kampung Sungai Setar, Kampung Sungai Udang, and Kampung Tanjung Berembang. The distance to the sea from Kampung Sungai Acheh is approximately 1 km away. The main river in the area is Sungai Kerian, situated to the north of the village, which flows directly into the Malacca Strait.

This community is made up of predominantly Malay-Muslims. In the past, socio-economic activities within the village are focused on fishing activities. The people in this region have access to basic utilities such as electricity, water supply, and infrastructures such as road systems, a town centre, and schools amongst others.

Threats to the mangrove ecosystem

Among the threats faced by the fishing community include the degradation of mangrove ecosystems, the encroachment of trawling boats in the inshore areas, and pollution of river waterways caused by shrimp farming and industrial activities. Rapid development, tourism, industrialization, and coastal reclamation have contributed to the deterioration of coastal mangroves and estuaries in Penang.

Penang Inshore Fishermen Welfare Association (PIFWA)

The Penang Inshore Fishermen Welfare Association (PIFWA) was founded in 1997 by the fishing community of Kampung Sungai Acheh with the support of the Consumers' Association of Penang (CAP). The main functions of PIFWA include mangrove replanting, patrolling to prevent encroachers from illegally logging mangroves, educating the local fishing community about the importance of mangrove ecosystems, as well as organizing knowledge and peer-sharing events with other similar organizations. PIFWA is regularly invited to speak at workshops and peer-collaboration events on their mangrove conservation initiatives and products. Since its inception, PIFWA has realized the importance of mangrove conservation and its role in biodiversity sustainability and coastal protection.

Penang Inshore Fishermen Welfare Association for Women (PIFWANITA)

PIFWANITA was established in 2013 as a platform for local women to empower themselves through mangrove conservation and the creation of mangrove-derived products as supplementary income. This women's group mostly comprises of the wives of PIFWA members to help facilitate activities at the PIFWA Small Mangrove Education Centre, and spread general awareness about mangrove conservation. Typical roles of the women in this fishing community are as homemakers and caregivers to their children, with several holding odd jobs to support family incomes.

PIFWANITA Initiatives towards Conservation

Women play a critical role in spreading awareness and PIFWA has given support by stating that women are generally stronger at communication and soft skills compared to the men in the community. Through PIFWANITA, knowledge on mangrove conservation and product creation has been rapidly spread to their families by educating their children, conversations with friends, and in social situations. Currently, the main products produced under PIFWANITA are the *Berembang* jam, *Lapis Berembang* juice, and *Jeruju* tea. PIFWANITA has collaborated with the Forest Research Institute Malaysia (FRIM) to introduce the Lapis juice, derived from the *Berembang* species. This product has been studied and endorsed by FRIM for its nutritional benefits, with its future production at the planning stage.

Mangrove species and products by PIFWANITA

- *Daun Jeruju* species – *Jeruju* tea
- *Beru* and *Tamu* species – porridge (*bubur berus* and *bubur tamu*)
- *Api-api ludat, api-api jambu, api-api putih*, and *api-api bulu* species – local dessert ie. *kuih, biskut* and *lepat*
- *Berembang* species – jam and juice
- *Gedabu* species – jam and juice
- *Piai* species – local snacks i.e. *keropok*
- *Nipah* species – food i.e. jelly, and other products such as cigarettes.

PIFWA and PIFWANITA also manage a mangrove sapling nursery several kilometres away from the education centre. The species in this nursery include local species such as *Bakau kurap, Bakau minyak, Tumu putih, Tumu merah, Api-api putih, Api-api jambu, Api-api ludat, Berus, Tegar,* and *Lenggadai*; which are used in Corporate Social Responsibility (CSR) mangrove replanting activities. Collaborative events are conducted alongside PIFWA to connect with other communities and NGOs such as Sahabat Hutan Bakau Kuala Gula (Perak) and Sahabat Setiu (Terengganu). Through such peer-sharing collaborations, PIFWANITA has imparted traditional knowledge on mangrove product creation as well as gained new knowledge from outside the community. Other positive impacts apart from increased public awareness are the women's development of important skills in public speaking and networking through sharing traditional knowledge on the mangrove ecosystem as a natural resource. The women have also developed a more entrepreneurial mindset by creating new mangrove species products and marketing their uses and benefits to the public.

Figure 32: Mangrove saplings planted in the nursery

Conclusion

This community has stood out due to its strong intrinsic values and sense of responsibility in conservation. Having farsighted leaders under PIFWA and PIFWANITA combined with a passionate community has contributed to the successful conservation of mangrove habitats.

PIFWANITA has enabled women to become more empowered and amplified mangrove conservation in the village. PIFWANITA understands the importance of mangrove conservation to sustainable fish stocks and coastal protection. This is especially since their families are reliant on fish as a source of income. PIFWA and PIFWANITA have fervently demonstrated the importance of mangrove conservation not only for fish stock sustenance and coastal protection, but also in appreciating the vast traditional knowledge held by communities living within mangrove ecosystems.

Case Study II: Conservation Efforts of the Indigenous Bidayuh-Brois Women in Kampung Skiat Baru, Bau, Sarawak

Background

In a village in Bau (50 km away from the capital of Sarawak, Kuching), the increased threat of human development in recent years has led to forest destruction and river pollution, affecting the local Bidayuh-Brois indigenous community. The focal point is Kampung Skiat Baru, a village situated approximately 6km away from Bau, which was formerly known as a prominent gold mining town in the 1930s.

In the past, the villagers have depended heavily on water from gravity-fed pipelines and nearby rivers for their daily consumption and use. Connection to a treated water supply system via pipelines was installed only in 2016. During this time, electricity supply was also installed, and accessibility to the village was made available by a proper road system.

The target group for this case study is the Bidayuh-Brois[57] community of Kampung Skiat Baru. The Brois community inhabit the upper stream of the Sibuyoh and Jobung River areas, in the lowlands and around the limestone outcrops of Gunung Sabua, Gunung Totag, Gunung Riak, Gunung Tupak, and Gunung Beramu. The community comprises an estimated 135 families, with approximately 800 people living in the village.

Generally, the Brois are known as subsistence farmers mostly involved in vegetable gardening and small-scale plantations of hill and wetland paddy, rubber, and oil palm. Women in this village are seen as strong pillars of support to the community, mostly responsible for maize farming (baby corn) and maintaining herb gardens for traditional medicine and food use. Baby corn is chosen due to its high yield (approximately every 2.5 months) and improved returns compared with previous crops such as rubber. The produce is then transported twice daily to be sold in Bau town, enabling the women to obtain their daily provisions and supplies. Most of the men work in town as civil servants or as labourers at construction sites, industrial mills, and factories. On a seasonal basis, swiftlet nests are harvested from the caves within the limestone hills. Food sources are obtained from the town as hunting is not a common activity amongst the community.

Land issues pertaining to native ownership remains a longstanding problem in Sarawak. As it is for other indigenous groups, the land is a source of sustenance and livelihood based on farmland and forest products; which are the source for timber, herbs, medicines, and material for daily use.

Wanita Desa Sarawak (WADESA)

Wanita Desa Sarawak (WADESA), is the only state-wide women association in Sarawak. It was formed in 2005 by the indigenous Dayak women of the state. The general aim of WADESA is to improve the livelihood of indigenous women in Sarawak through capacity-building programmes; engagement of indigenous women and rural communities in exploring sustainable alternatives for natural resource management, conservation and sustainable living; enabling indigenous women to articulate and empower themselves of their rights; and promotion of gender balance and collective actions of women in the community and at large.

[57] There are approximately more than 30 Bidayuh groups in Sarawak alone.

Native Customary Rights (NCR)

Article 161A (5) of the Constitution provides for the reservation of land to natives of Sabah and Sarawak. Historically, Sarawak has recognized customary land rights of Indigenous peoples by statute through the Sarawak Land Code 1958 as the primary legislation governing land matters in the state. Native Customary Rights (NCR) may be created by demonstrating land use, for example, the felling of virgin forests, or planting of fruit trees, or use of the land for burial grounds. According to Section 5(2) of the Code, the land shall be State Land and any Indigenous person in occupation of this land will be deemed as a 'licence holder from the Government' until a document of title is issued. Thus, many communities remain licence holders as only a few native titles have been issued. Amongst the present issues of concern include recognition of '*pemakai menua'* (territorial domain) and '*pulau galau'* (communal forest reserves) as native customary rights (NCR) land which have not been given the force of law by the written laws of Sarawak. On a separate note, Malaysia has made several commitments to improve the livelihoods of Indigenous and local communities in the management of natural resources as stated in the Voluntary National Review of the Sustainable Development Goals (2017). The Review pledged to empower communities to report illegal activities, and more significantly, enable giving or withholding consent to proposed projects that may affect indigenous lands.

Community Initiatives towards Conservation

Within the 2015 – 2020 Gender Plan of Action, building the capacity of women, especially for indigenous women, is listed as one of the core elements. With the support of the village leader, the Brois of Kampung Skiat Baru realized the necessity for forest and river conservation by the community to ensure the sustainability of natural resources. The women took the initiative to reach out to Wanita Desa Sarawak (WADESA), the only state-wide women association in Sarawak – formed in 2005 by the indigenous Dayak women of the state. As a result of this collaboration, funding was obtained from the Global Environment Facility (GEF) Small Grants Programme (SGP) to support conservation initiatives over a 24-month period of May 2014 to April 2016.

During this period, measures were taken to support the active participation of the indigenous community in the conservation and management of natural resources and the environment; to enhance biodiversity and river conservation. Among the activities undertaken include environmental education for youths in the community, promoting sustainability of forests and conservation of traditional herbal plants.

After the GEF SGP project ended, the community succeeded in carrying out the activities and steps were made to ensure the sustainability of such practices. These community initiatives received attention from the district representative who has provided continuous funding to support infrastructure development in the community since 2014. For example, the road system has been upgraded, a bridge to improve accessibility and a community hall to facilitate on-site activities has been built. A WADESA Committee led by the women of the community was also set up to continue conservation practices such as the collection of seedlings, tree-planting to promote forest sustainability and conservation, and harvest of herbal plants for traditional medicine, and sustainable river conservation. Having in-depth traditional knowledge, the women in the village play a critical role in educating the youth on resource conservation and instilling care for the environment. The *tagal* system is also put in practice in the tributaries of Kampung Skiat Baru, allowing for sustainable management of the waterways.

Figure 33: A hut within the communal area of the village

To further empower women in the community, a social organization specifically for mothers, Kaum Ibu, was set up several decades ago and is currently being led by Ms Jinda anak Jakup. In 2017, it became a registered body under the Registrar of Societies (ROS), and there are currently 159 registered members under the organization. The organization conducts activities to hone skills in craft-making and promotes a healthy lifestyle through exercise. In contributing towards community welfare, Kaum Ibu conducts house visits and helps provide cash, food or medication assistance as needed. These activities are important in fostering a communal spirit amongst the indigenous women, empowering women within the community, and this is especially seen in their responsibility for harvesting baby corn on-site. In terms of traditional knowledge application, the Brois women propagate the growth of various herbs for medicinal use. The herbs are planted in a subsistent manner to help provide for the village community.

Based on a community engagement session with the UNDP in April 2019, approximately 50 members of the community, including the village chief, Mr Lia anak Jakup, participated in knowledge-sharing activities. It is generally seen that the community understands the importance of biodiversity, realizing that its conservation maintains flora and fauna richness, and the natural resources available are useful for food, water, clean air, and socio-economy. The highlighted contributions of women to the village include hosting clean-up activities, providing guidance and educating future generations, farming and looking after the land to protect their native land rights. Women of the Brois community also play an important role in fostering togetherness by conducting social events under Kaum Ibu.

In terms of environmental conservation and livelihood, it is positive to note the active community participation in the SGP project. Subsequent to this, community initiatives include continuing tree planting activities and landscape beautification, fish farming in Jebung river, ensuring proper waste disposal, current planning for an ecotourism committee, and the application by the head of farming to improve market access of baby corn grown by the community. The women of Kampung Skiat Baru have many reasons to protect

their village, and this can be seen by their strong appreciation for ancestral heritage and intention for future generations to continue to thrive on this land. Other motivating factors include the ecotourism potential of its natural environment that includes the forest, rivers, mountainous landscape and biodiversity, soil richness for farming activities, a strategic location to nearby towns, and the peaceful, united community.

Figure 34: Community engagement exercise with UNDP Malaysia

The village chief has given support to the SGP project because of its assistance in protecting Native Customary Rights (NCR) land. He highlighted the need to solve the NCR issue. Other developments brought up by the village chief include the reduction in coconut plantations in the area compared with the 1960s especially, the concern to protect the mountains as limestone hills in the surrounding vicinity have been listed in a quarry list and uniting women in their effort in the SGP project, particularly in mountain areas. He also expressed the intent for opportunities to develop tourism in the village. For example, a neighbouring village, Bungjagoy in Bau is already open to the public for tourism with the availability for visitors to stay in homestays.

According to WADESA, community mapping has been done to demarcate boundaries and identify important resource locations. A Community Learning Centre (CLC) has also been set up. River conservation and rehabilitation in the Jobung and Siboyuh rivers are expected to continue with the *tagal* system in place.

Conclusion and Lessons Learnt

In conclusion, the positive impact that the community initiatives have had on the sustainability of natural resources in Kampung Skiat Baru can be used as an example for other villages to embark on their own conservation efforts. As demonstrated in this community, women hold a primary responsibility in carrying out conservation measures and in passing on traditional knowledge to future generations, which is easily replicable in other communities. Here, the Brois women have managed to incorporate several conservation activities as part of their regular routine even after the SGP funding period. Support from various stakeholders

has allowed women of this village to be successful in leading conservation efforts. Due to the long-term vision of the village chief, sustainable management of natural resources is practised. The women in this community have also been encouraged to hone their leadership qualities – resulting in the formation of the Kaum Ibu group. With the help of WADESA, this has further strengthened women involvement amongst the community. Besides that, support extended by the district representative through funding has helped infrastructural development of the community in improving the road system, bridge, community hall, and overall maintenance.

Issues faced by the community is mainly on the Native Customary Rights (NCR) and obstacles faced as a woman. Amongst the gender inequality challenges include lower earning power as compared to men, priorities as steered towards raising their children and playing their distinct roles as homemakers. From a gender perspective, the success of the Kampung Skiat Baru's women paves the way for women in other communities to take an active role in biodiversity conservation. It is seen through this study that women in this community have become emboldened to take their own initiatives for conservation. Women in this community possess a large pool of traditional knowledge that is used for medicine, food, and in this case, in the cultivation of herb gardens. This knowledge is imparted to their children.

Figure 35: Some of the participants from the community engagement.

A large proportion of the Bidayuh community exists in Bau and generationally has formed an attachment to their land. The similar sentiment is shared for other village communities. The case study highlights that land is invaluable to a community. The villagers here rely on the land for their livelihood as it provides natural resources, food, and medicine; hence their future heavily depends on its conservation. In order to demonstrate the community's need for the land, commitment of conservation efforts needs to be shown as it goes hand in hand with obtaining land rights. How this village has stood out is mainly intrinsic; the village chief realizes that gender inclusion is important to be able to amplify the success of ensuring natural resource sustainability in the long run. The combination of a proactive community, regardless of gender, with a strong sense of ownership over their land and an appreciation for natural resources, has managed to cultivate a conservation-oriented mindset within Kampung Skiat Baru.

Case Study III: Community Conservation Resilience Initiative (CCRI), Sabah

Background

Sabah is located in the northernmost part of the island of Borneo and is the second-largest among the thirteen states in Malaysia, covering an area of 73,904 square kilometres. Most of the indigenous and local communities (ILCs) live in rural areas and are heavily dependent on the land, forests, and water to sustain their traditional livelihoods.

A community-based organization, Partners of Community Organizations in Sabah (PACOS) has undertaken the Community Conservation Resilience Initiative (CCRI) to supporting indigenous communities in Sabah. An initial seed grant from the Global Forest Coalition was obtained by PACOS in 2015 as part of the CCRI, leading to the start of a three-year project (2015–2017) with independent funding secured from the Commonwealth Foundation. The overall aim was to increase the resilience of indigenous peoples' customary institutions and natural resource stewardship systems in Sabah – carried out through constructive engagement and suitable decision-making processes.

This case study examines five communities from different parts of Sabah, each facing different issues pertaining to natural resource stewardship and customary institutions.

Overview of Communities Involvement

The five villages that underwent the CCRI process are a reflection of the diverse livelihoods and ecosystems, and the different land-use practices.

i. **Sungai Eloi** is located in the District of Pitas, specifically the mangrove areas at the mouth of the Pitas River. The traditional knowledge and practices of the local community contribute to the protection, restoration and sustainable use of their community mangrove forest.
ii. **Alutok** is within the District of Tenom, with parts of their traditional territory located within a commercial forest reserve, the Sipitang Forest Reserve. The community works to secure their customary tenure, for example, by highlighting traditional practices of forest and wildlife stewardship.
iii. **Kiau** is located at the foot of Mount Kinabalu in the District of Kota Belud. The community here seeks formal recognition from the government for their community forest, actively working to strengthen and revive their traditional practices.
iv. **Mengkawago** is in the District of Tongod, where the village overlaps with a commercial forest reserve, the Mangkuwagu Forest Reserve. The community seeks to secure their community forest for the continuity of their traditional practices and livelihoods.
v. **Terian** is in the District of Penampang on the mountains along the Crocker Range. The village is located adjacent to the boundary of the Crocker Range State Park. The community efforts are in strengthening the community watershed management system and securing access to certain parts of their customary territory within the Park.

CCRI and efforts to overcome challenges

Amongst the threats and challenges identified by the communities include loss of resources for their livelihoods, medicine, and handicrafts; pesticide and chemical use; loss of traditional knowledge regarding natural resources; decreasing wildlife populations; and loss of territories due to industrial development projects, i.e., dams and plantations and the gazettement of protected areas that totally prohibited human activities within the area.

Table 20: CCRI effort in selected communities.

Site	Background	CCRI Intervention
Sungai Eloi	- The majority are of indigenous Tombounuo descents who are mainly farmers and fishermen.	- To combat encroachment problems, the Sungai Eloi community reached out to other villages nearby, forming an action committee called G6 (Gabungan 6 Kampung), a network of six villages. - Through G6, the community has worked voluntarily to replant some of the trees cleared by the companies, apart from introducing traditional practices such as *Momokan* to outsiders. - Community members have also worked to raise awareness of their struggles at regional and international meetings regarding human rights and biodiversity conservation.
Alutok	- The majority of the community has roots as a hunter-gatherer community. - Mainly engage in farming as their source of income, cultivating crops such as paddy, fruits and vegetables for subsistence, while rubber and excess fruits and vegetables are sold commercially.	- The Alutok community practises *Tavol,* which involves both temporal and spatial restrictions on resource use, whereby the community determines a specific area of forest as a restricted zone for a certain period of time. - Temporal restrictions are for hunting activities, water catchment, or community forest areas while farming land and areas for daily resource use are excluded. - Village elders to provide knowledge about boundaries and historical areas, while women are knowledgeable on the land's daily resource use. - Documented their traditional knowledge to be used as references for the younger generations and to educate others on the value of indigenous knowledge, particularly for the sustainability of natural resources.
Kiau	- The majority are of Dusun Tindal descent, with approximately 1,400 people living in this village. - Agriculture is still the primary source of income and livelihoods for many of the villagers here, for both	- Formed their own conservation area: Hutan Simpan Komuniti Kg. Kiau (Kiau Community Forest Conservation Area), a 1024-acre forest area set aside for sustainable management and protection of forests.

	subsistence (hill paddy, maize, bananas) and commercial purposes (pineapple, lemongrass, cacao, yam) - Export growth is limited due to the remoteness of Kiau and transport costs involved. - A number of villagers are involved in the tourism industry, especially in community-based tourism and as licensed mountain guides	- Traditional forest practices such as the use of Dusun forest terms (*Boros Puru*) and giving respect to the forest spirits (*Mamatang* and *Mamason*) are being practised. - Through community organization, GOMPITO (which means preserving and maintaining cultural heritage, customs, traditions, and nature), the Kiau community monitors and manages the forest and restricts access to natural resources. - Formulated a protocol to govern resource use.
Mengkawago	- Approximately 600 residents mostly from the sub-ethnic indigenous group Sungai Rumanau. - The history of occupation of this community spanning 300 years is evidenced by ancestral graves and old fruit trees that are maintained to date. The fruit trees are remnants of their tradition of planting a fruit tree whenever a new house was built in the village.	- *Ingaladan* or "use and protect" is one of the main principles of how the Mengkawago community manages their resources. - Maintains knowledge of a wild honey collection from bees that establish their hives in large flowering tree species, the Mengaris tree (*Koompassia excelsa*). - Faces challenges from having their land included within a Class II Forest Reserve since 1984. The community has no governing power over the forest area, and the Forest Enactment prohibits human activities within the Reserve without a licence. - The ILC hopes to show the importance and multiple values of the forest area and to secure legal recognition and protection of their customary lands, practices, and livelihoods. To date, they have successfully completed their community mapping, community profile, and documentation of historical sites. They are also in the process of documenting their traditional practice of honey collection as an example of customary community forest stewardship.
Terian	- For the indigenous Dusun people here, agricultural land is essential for their livelihood, as many are farmers who depend on agriculture as their primary source of income. The forest provides for the daily needs of the community, and due to the village remoteness, being self-sufficient by relying on the resources available is crucial. - Part of the income of the local community also comes from the sale of handicrafts. The Terian River and its nearby water catchment areas are	- The community observes the concept of *Gompi-Guno* or "use and care" in their traditional resource stewardship practices – resources are conserved to ensure continued access and availability. - One form of *Gompi-Guno* practised by the community is in their management of water catchment areas, and the Terian community is strongly against river pollution. - Currently, the critical pressing issue for the community is the Sabah Water Department's planned construction of a massive water reservoir dam to supply water to areas in Kota Kinabalu City and the District of Tuaran.

	used for clean water, irrigation, and electricity provided by a micro-hydro turbine.	- The community has taken several measures in response to the proposed dam by proposing alternatives such as micro-hydro turbines, sending out memoranda to relevant government authorities with advice and potential ramifications, holding workshops with NGOs, and meeting government agencies. The community has also been working with Sabah Parks to establish a Community Use Zone for subsistence activities.

Conclusion and Lessons Learnt

Through the CCRI process, the five communities have documented their customary laws and traditional knowledge in the hopes of ensuring the continuity of their traditional knowledge and practices. The initiatives undertaken by these ILCs have demonstrated their capability of managing resources sustainably. Overall, this process has also facilitated the visioning of the communities' self-determined long-term plans and priorities, initiating a process of engagement with decision-makers through their community protocols and demonstration of good practices.

Although the communities involved have demonstrated their resilience and ability to be stewards of their customary territories, significant challenges continue to threaten their practices. Consolidating their community protocols will provide a clear basis for targeted dialogues with government agencies and other stakeholders.

Review of the Indigenous Local Communities (ILCs) and Women in Conservation Studies

Overview

This chapter is a compilation of three case studies focusing on the role of women and indigenous local communities (ILCs) in biodiversity conservation. The first two on-site case studies - Kampung Sungai Acheh, Penang and Bau, Sarawak focused on women involvement in conservation while the third case study is based on desktop research on ILC involvement at five different sites throughout Sabah.

Critical Success Factor

From these studies, several similarities are found to be shared between the different sites. Based on the findings of the three case studies, the main conditions necessary for conservation success are the existence of a management structure, shared purpose, clear benefits to the community and effective leadership. Such conditions were found to promote the development of strong intrinsic values and a sense of responsibility in conservation within the communities.

For example, PIFWA and PIFWANITA have the shared purpose of creating more sustainable livelihoods for the inshore fishing community, and thus work together to demonstrate the importance of mangrove conservation through their specific roles. Many husbands of the PIFWANITA members are fishermen, and therefore, the organization strongly understands the importance of mangrove conservation for sustainable fishing, fish stock sustenance, coastal protection, and alternative livelihoods through mangrove-derived products. As a result, the women of this community have become tireless advocates for mangrove conservation. PIFWA's effective leadership by recognizing the importance of women in conservation has led to their empowerment and increase in skill development (leadership, entrepreneurial, and teambuilding skills) over time.

Figure 36: Interaction between the older and younger generation to map out their village and important resource areas.

With the help of WADESA, the women of the Kampung Skiat Baru community, in particular, have become emboldened to take the initiative for conservation. The combination of a proactive community with a strong sense of ownership over their land and an appreciation for natural resources has managed to cultivate a conservation-oriented mindset within Kampung Skiat Baru. Since the women in this community possess a large pool of traditional knowledge on the flora and fauna, they are aware of the beneficial uses for medicine and food. Effective leadership under an encouraging village leader and Kaum Ibu, the women's organization for mothers, has further strengthened women involvement in the community. Also, continuous financial support extended by the district representative has helped infrastructural development of the community through improvements to the road system, bridge, community hall, and overall maintenance.

As for the CCRI case study, with the help of PACOS Trust, the communities involved unanimously demonstrated their resilience and stewardship ability of customary territories despite the continuous challenges faced. The five communities in this case study – Sungai Eloi, Alutok, Kiau, Mengkawago, and Terian – documented their customary laws and traditional knowledge with hopes to ensure continuity and safekeeping of such practices and knowledge. The customary practices covered are *Momokan* (in Sungai Eloi)*, Tavol* (in Alutok)*, Boros Puru* (in Kiau)*, Ingaladon* (in Mengkawago), and *Gompi-Guno* (in Terian); addressing issues ranging from mangrove conservation, forest management, land recognition, preservation of traditional practices, and strengthening watershed management. Within these different villages, the communities are seen to have demonstrated combined leadership efforts by banding together for natural resource protection.

Recommendations

Based on the case studies, several key recommendations to encourage conservation success are listed below.

i. Conservation from a holistic perspective

To support sustainable natural resource management and environmental protection measures e.g. coastal protection, preventing river pollution.

ii. **Foster and introduce women leadership organizations for conservation**
Exemplified by the Kaum Ibu and PIFWANITA groups, and due to the critical role women play in communication/ soft skills.

iii. **Creating supplementary income in tandem with sustainable resource management**
For example, the introduction of mangrove products and collaboration with FRIM as seen in PIFWANITA conservation efforts, and honey collection in the Mengakawago site.

iv. **Formal recognition of community protocols and customary laws**
Especially in terms of forestry, land, and surveys.

v. **External funding and support from the government or international grant funding**
The Small Grant Programme (SGP) has helped to kickstart conservation initiatives and improve livelihoods of the community involved through road systems, utilities, and maintenance amongst others.

vi. **Community participation/ Co-management agreement between the government and community**
Encouraging full and effective community participation in land development regulation. For example, proper public review of EIA for projects such as aquaculture development, and identification of alternative options for projects such as dam construction.
To devolve responsibilities based on indigenous knowledge and practices, and allow secured community access to the forest for their subsistence.
Educating the next generation to appreciate and look after the environment as demonstrated in Kampung Skiat Baru and Kampung Sungai Acheh sites.

vii. **Ecotourism initiatives in accordance with community protocol and development plans**
Leverage on international recognition – for example, using the UNESCO Biosphere Reserve to recognize the community contributions to water catchment stewardship and biodiversity conservation.

Conclusion

Based on the lessons from the three case studies, there is potential for other communities to emulate conservation initiatives. The feedback from the workshops held in Kampung Sungai Acheh and Kampung Skiat Baru demonstrated that the reasons behind conservation efforts were fuelled intrinsically through a sense of responsibility for the sustainability of their communities and a determination to achieve conservation goals on their own accord.

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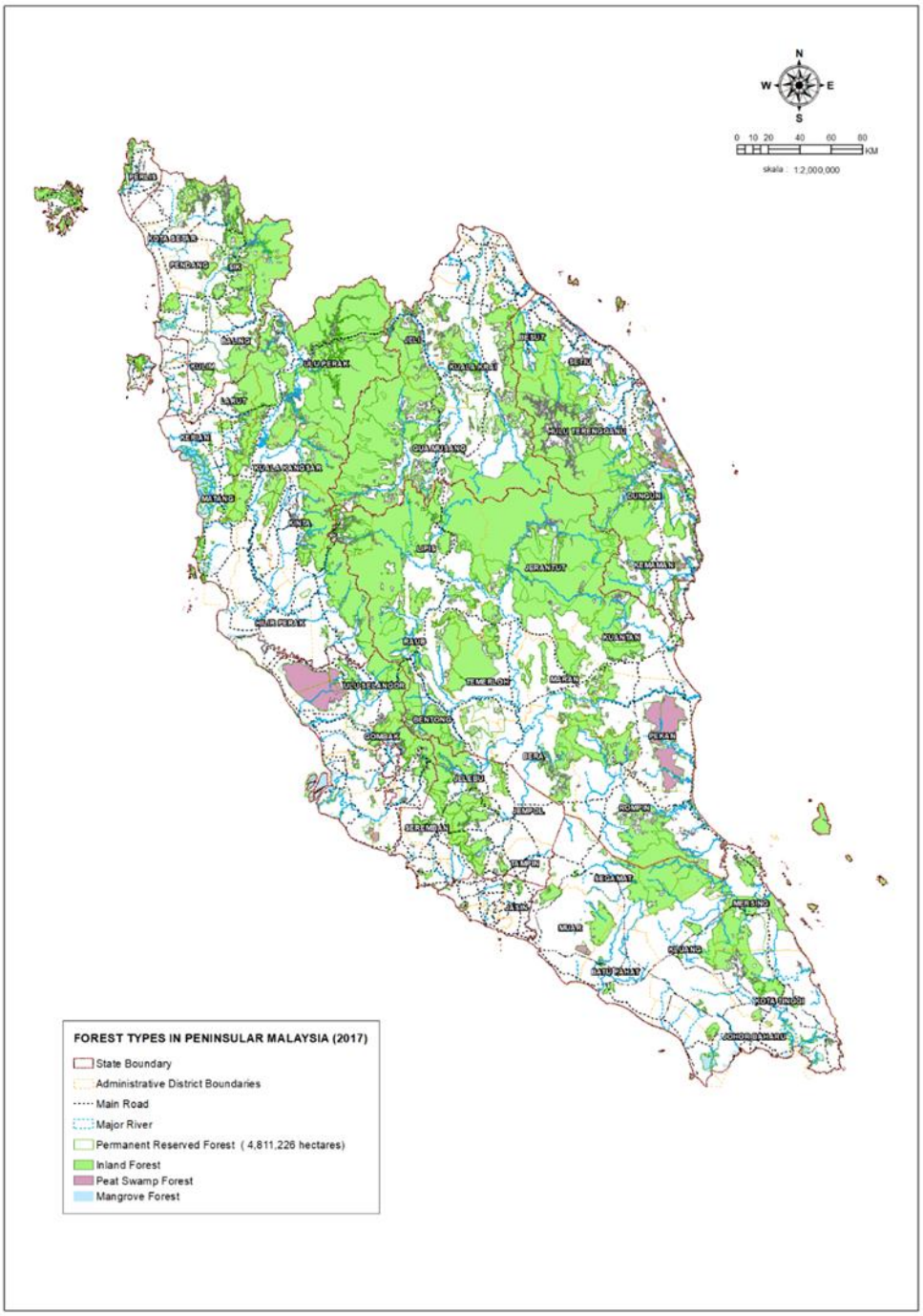
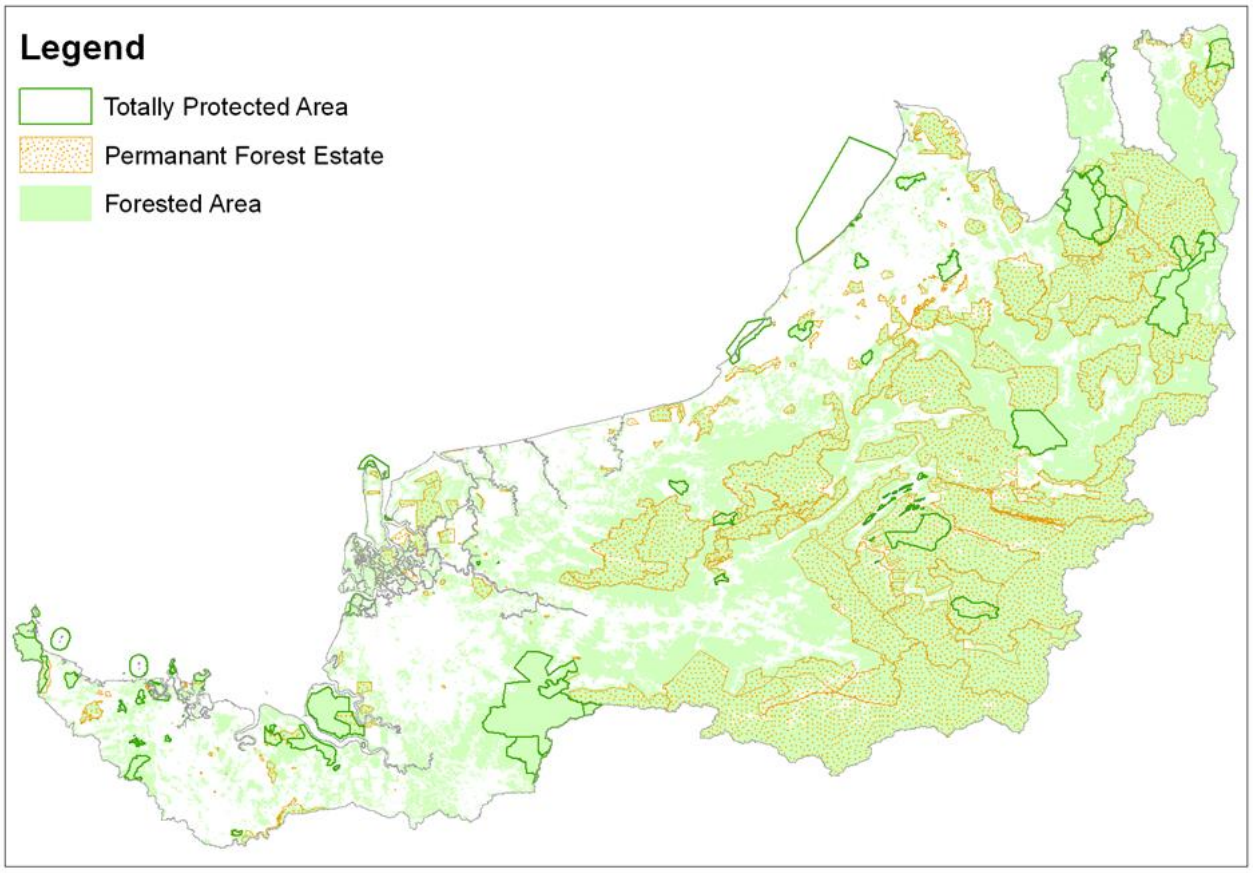
Annex I

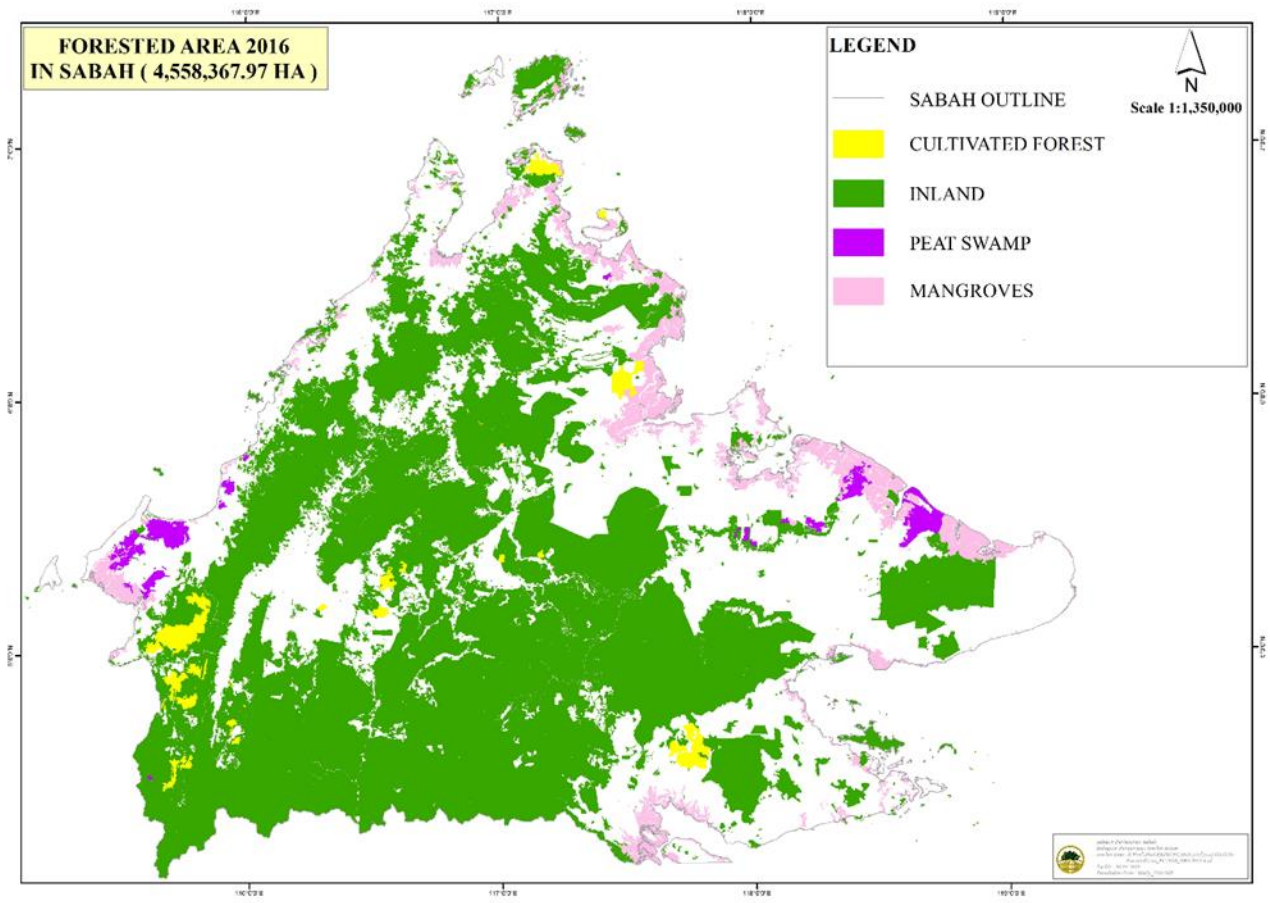
FOREST TYPES FOR PENINSULAR MALAYSIA (2017)



PERMANENT FOREST ESTATE IN SARAWAK (2017)



FOREST RESERVE IN SABAH (2017)



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