ASEAN Biodiversity Outlook 3

BCAMP
Biodiversity Conservation and Management of Protected Areas in ASEAN

ASEAN CENTRE FOR BIODIVERSITY

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ASEAN Centre for Biodiversity (2023). *ASEAN Biodiversity Outlook 3*. Philippines. (392 pages).

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ISBN	:	978-971-9668-14-5
Printed by	:	RedPill Productions
Publisher	:	ASEAN Centre for Biodiversity
Year of publication	:	2023
Disclaimer	:	This publication was produced with the financial support of the European Union through the *Biodiversity Conservation and Management of Protected Areas in ASEAN* (BCAMP) Project. The views and opinions expressed herein should not be taken in any way to reflect the official position or opinion of the European Union.

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Acknowledgements

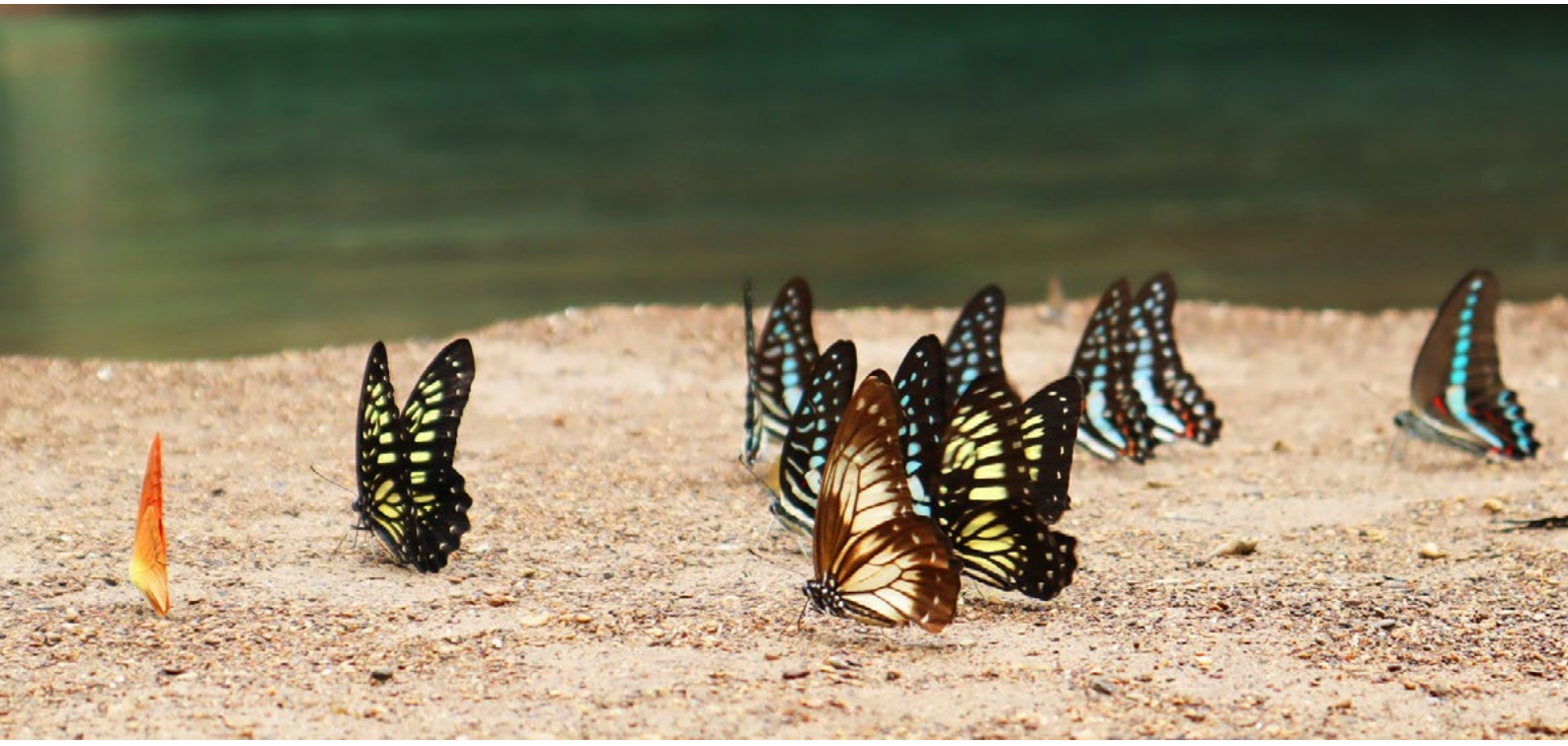
The ASEAN Centre for Biodiversity (ACB) recognises the significant support of various partners in the development of the third edition of the ASEAN Biodiversity Outlook (ABO 3). The publication was drafted in collaboration with ASEAN Member States (AMS)—Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. AMS provided key resources for the ABO 3, including the Sixth National Reports to the Convention on Biological Diversity (CBD), as well as experts who extended significant support and guidance in its development.

The ACB likewise appreciates the efforts of biodiversity experts in and beyond the ASEAN who took the time to review, provide direction, and improve the publication. The Centre acknowledges the members of the ACB Scientific Advisory Committee (SAC), the ABO 3 Advisory Group, the ACB Governing Board, the Secretariat of the Convention on Biological Diversity, and the ASEAN Working Group on Nature Conservation and Biodiversity (AWGNCB) for providing significant guidance to the development of ABO 3.

The ACB appreciates the support of the European Union in the production of the ABO 3 through the Biodiversity Conservation and Management of Protected Areas in ASEAN (BCAMP) project.

The Centre would like to thank the ASEAN Secretariat for its technical and political guidance and support that contribute to the successful implementation of biodiversity programmes, projects, and activities in the region. The gains from these conservation efforts form a significant part of the ABO 3.

The ACB also wishes to acknowledge those who have contributed, in one way or another, to the preparation of this report. The arduous task of putting the ABO 3 together goes beyond the efforts of the core team.



Message from the **ASEAN Secretary General**

The year 2022 marks an important milestone as the world finalises the post-2020 global biodiversity framework. With ASEAN about to set out on a new journey to contribute to the achievement of these new global biodiversity targets, it is crucial to take stock of the region's efforts, thus far, in promoting the conservation, sustainable use, and equitable sharing of benefits from its immense biological resources.

As the region continues to recover from the COVID-19 pandemic, the importance of adopting nature-based solutions and ensuring the sustainable use and management of our natural resources have become even more essential. These approaches have also been identified as key strategies in the ASEAN Comprehensive Recovery Framework and its Implementation Plan which was jointly adopted by ASEAN Leaders in 2020.

The publication of the Third Edition of the ASEAN Biodiversity Outlook (ABO 3) is therefore a timely presentation of the progress of ASEAN and its Member States (AMS) in their conservation efforts, as reflected in their Sixth National Reports to the Convention on Biological Diversity, as well as up-to-date information on biodiversity conservation initiatives at the regional level.

Moreover, ABO 3 presents significant recommendations on how we can scale up conservation efforts in the pursuit of our common vision to build back better, stronger, and more resilient. The report aims to encourage key players, including governments, civil societies, and businesses to invest in safeguarding our region's natural capital that serve as the foundation of sustainable economic development. In particular, this report builds on the region's achievement of Aichi Biodiversity Target 11 on terrestrial protected areas through the flagship ASEAN Heritage Parks programme, as well as our efforts in coastal and marine biodiversity conservation towards a blue economy.

I hope that readers and stakeholders would find the recommendations outlined in this publication useful, and that it will encourage ASEAN and AMS to take more vigorous actions toward realising an ASEAN Community with equitable access to a sustainable environment. It is only through continued and steadfast commitment that we can push for a sustainable and resilient recovery as one community.

H.E. DR. DATO LIM JOCK HOI
Secretary-General of ASEAN

Message from
ACB Executive Director

The ASEAN Centre for Biodiversity is proud to present the third edition of the ASEAN Biodiversity Outlook (ABO 3). This publication takes off from the ABO 2, which presented a mid-term assessment of the region's progress in contributing to the achievement of Aichi Biodiversity Targets (2011–2020) and the ABO 1, which highlighted regional efforts in achieving the 2010 global biodiversity targets.

The ABO 3 reports ASEAN's progress towards achieving the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets. It draws best examples and lessons from the Sixth National Reports (6NRs) of the ASEAN Member States (AMS) and other official and relevant scientific resources. Data and analyses from regional and global databases, plus regional workshop outputs, assessments and recommendations augment and further enrich the information from the 6NRs. The ABO 3 also presents articulations taken from the 6NRs on mainstreaming biodiversity in health, and related business sectors, such as infrastructure development, manufacturing, tourism, agriculture, and mining.

The information and analyses that the ABO 3 proffers are intended to support the science-policy interface at the national and regional levels. Science-based decision-making is vital, especially at a critical time when the world is re-examining its commitments and targets for the future of biodiversity. So here, we try to demonstrate the value of accurate and easy to understand information which highlights, among others, the best practices gleaned from the experiences and initiatives of AMS. With the finalisation of the post-2020 global biodiversity framework, it is our utmost hope that the ABO 3 could serve as our yardstick in science-and evidence-based policymaking, planning, and implementation.

The ABO 3 also presents how the region calls for a whole-of-community approach in promoting sustainability and resilience in light of the COVID-19, a catastrophic global health crisis. Mainstreaming biodiversity across sectors is already emphasised in the ASEAN Comprehensive Recovery Framework, as part of the measures to recover from the effects of the pandemic and to build resilience against other current and future global challenges.

Nature, including biodiversity, holds the key to ensuring a better and safer future for our generation and the next. As our natural capital, we can no longer ignore its tangible and intangible contributions to economic sustainability and to our health and well-being as a community. We need to press forward and take greater strides toward achieving our goal of living in harmony with nature.

My sincere gratitude goes to AMS, the ASEAN Secretariat, and the passionate and dedicated experts in the region, who made the development and production of ABO 3 possible. May this publication serve as an important reference in developing a roadmap for more strategic, bolder, and coordinated actions towards a stronger and more resilient ASEAN community.

DR. THERESA MUNDITA S. LIM
Executive Director

Acronyms and Abbreviations

3R	Reduce, Re-use, Recycle
5NR	Fifth National Reports
6NR	Sixth National Reports
AATHP	ASEAN Agreement on Transboundary Haze Pollution
ABO	ASEAN Biodiversity Outlook
ABPN	State Revenues and Expenditure Budget, Indonesia
ACB	ASEAN Centre for Biodiversity
ACCP	ASEAN Committee on Consumer Protection
ACRF	ASEAN Comprehensive Recovery Framework
ACDS	ASEAN Catch Documentation Scheme
AEC	ASEAN Economic Community
AED	ASEAN Environment Day
ADB	Asian Development Bank
AEEAP	ASEAN Environmental Education Action Plan
AIS	Automatic Identification System
AHP	ASEAN Heritage Parks
AMAF	ASEAN Ministers on Agriculture and Forestry
AMPDCEI	ASEAN+3 Marine Plastics Debris Cooperative Action Initiative
AMS	ASEAN Member States
AMME	ASEAN Ministerial Meeting on Environment
APFP	ASEAN Peatland Forests Project
APMS	ASEAN Peatland Management Strategy
APRSCP	Asia-Pacific Roundtable on Sustainable Consumption and Production
AQI	US Air Quality Index
ASAPCP	ASEAN Strategic Action Plan for Consumer Protection
ASEAN	Association of Southeast Asian Nations
ASEAN AIFS	ASEAN Integrated Food Security Framework
ASEAN GAqP	ASEAN Good Aquaculture Practices
ASC	Aquaculture Stewardship Council
ASCC	ASEAN Socio-Cultural Community
ASFN	ASEAN Social Forestry Network
ASOEN	ASEAN Senior Officials on the Environment
ASPA-WRM	ASEAN Strategic Plan of Action on Water Resources Management
AWGCW	ASEAN Working Group on Chemicals and Waste
AWGEE	ASEAN Working Group on Environmental Education
AWG-SF	ASEAN Working Group on Social Forestry
AWGWRM	ASEAN Working Group on Water Resources Management
AYBP	ASEAN Youth Biodiversity Programme
AYECA	ASEAN Youth Eco- Champions Award

AYEF	ASEAN +3 Youth Environment Forum
BBP	Biodiversity-based products
BCAMP	Biodiversity Conservation and Management of Protected Areas in ASEAN
BDFAPS	biodiversity- friendly agricultural practices
BEDO	Biodiversity-Based Economy Development Office
BHI	Biodiversity Habitat Index
BMA	Bankgkok Municipal Administration
BRWCG	Boon Reuang Wetland Conservation Group, Thailand
CARE4BioDiv	ASEAN-German Cooperation Programme on Biodiversity Conservation
CAT	Citizen Action for Tigers, Malaysia
CBD	Convention on Biological Diversity
CBT	Community-Based Tourism
CCET	Centre Collaborating with UNEP on Environmental Technologies
CEPA	Communication, Education and Public Awareness
CHANGE	Centre of Hands-on Actions and Networking for Growth and Environment, Viet Nam
CFG	Community Forestry Groups
CFUG	Community Forest User Groups
CIFOR	Center for International Forestry
CITES	Convention on the International Trade in Endangered Species of Wild Fauna and Flora
CIVAT	Coastal Integrated Vulnerability Assessment Tools
CLUP	Comprehensive Land Use Plan
COP	Conference of Parties
COVID-19	Coronavirus Disease
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTI	Coral Triangle Initiative
CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security
CTMPAS	Coral Triangle Marine Protected Area System
DILG	Department of Interior and Local Government, Philippines
DJSI	Dow Jones Sustainability Indices
DMDF	dry mixed deciduous forest
DOE	Department of Environment, Malaysia
DOFM	Department of Fisheries Malaysia
DFR	Deramakot Forest Reserve
EAA	Ecosystem Approach to Aquaculture
EAF	Ecosystem Approach to Fisheries
EAFM	Ecosystem Approach for Fisheries Management
EIA	Environmental Impact Assessment
ESA	Environmentally Sensitive Areas
EPR	Extended Producer Responsibility
ERIA	Economic Research Institute for ASEAN and East Asia
ESD	Education for Sustainable Development

EU	European Union
EPMO	Environmental Protection and Management Order
FAMAD	ASEAN Framework of Action on Marine Debris
FAO	Food Agriculture Organization
FDIP	Forest Department Protection and Inspection Division
FLEGT	Forest Law Enforcement, Governance and Trade
FLR	Forest Landscape Restoration
FSC	Forest Stewardship Council
FSCC	Forest Stewardship Council Certification
FPA	Freshwater Protected Areas
GBO	Global Biodiversity Outlook
GDAAS	Guangdong Academy of Agricultural Sciences
GD-PAME	Global Database on Protected Area Management Effectiveness
GEF	Global Environment Facility
GFRA	Global Forest Resource Assessment
GGP	Government Green Procurement Plan
GHG	greenhouse gas
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit/German Development Corporation
GMO	genetically modified organisms
GMS	Greater Mekong Subregion
GPSNR	Global Platform for Sustainable Natural Rubber
GT	gigatonnes
GYBN	Global Youth Biodiversity Network
HACCP	Hazard Analysis Critical Control Point
HNN-NPA	Hin Nam No National Protected Area
HSF	Hanns Seidel Foundation
IAS	Invasive Alien Species
ICCA	Indigenous and Community Conserved Areas
ICM	Integrated Coastal Management
IDEAS	Institute of Democracy and Economic Affairs
IFAD	International Fund for Agricultural Development
IFL	Intact forest landscapes
IFOAM	International Federation of Organic Agriculture Movement
IKI	International Climate Initiative
IMO	International Maritime Organization
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPLC	Indigenous peoples and local communities
IPO	Indigenous People's Organisation
IPM	Integrated Pest Management
IRRI	International Rice Research Institute

ISB	ASEAN-German Cooperation Programme on Institutional Strengthening of the Biodiversity Sector
ISPO	Indonesian Sustainable Palm Oil Certification System
IUCN	International Union for the Conservation of Nature
IUUF	Illegal, Unreported, and Unregulated Fishing
KBA	Key Biodiversity Areas
KfW	German Development Bank
KNP	Kutai National Park
KUMKM	Cooperatives and Micro, Small, and Medium Enterprises, Indonesia
Lao PDR	Lao People's Democratic Republic
LGU	Local Government Unit
LMMA	Locally Managed Marine Areas
LMNP	Lampi Marine National Park, Myanmar
MAFF	Ministry of Agriculture, Forestry, and Fisheries, Cambodia
MAHFSA	Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia
MARD	Ministry of Agriculture and Rural Development
MCRB	Myanmar Centre for Responsible Business
MDG	Millenium Development Goals
MEAT	Management Effectiveness Assessment Tool
METT	Management Effectiveness Tracking Tool
MOA	Ministry of Agriculture and Agro-based Industry
MoE	Ministry of Environment, Cambodia
MOE	Ministry of Education, Malaysia
MOECAF	Ministry of Environmental Conservation and Forestry, Myanmar
MoNRE	Ministry of Natural Resources and Environment (Viet Nam, Lao PDR)
MPA	Marine Protected Area
MRC	Mekong River Commission
MRC-WQMN	Mekong River Commission-Water Quality Monitoring Network
MRL	maximum residue limits
MRRP	Myanmar Reforestation and Rehabilitation Programme
myGAP	Malaysian Good Agricultural Practices
MSPO	Malaysia Sustainable Palm Oil certification
MSW	Municipal Solid Waste
MSY	maximum sustainable yield
MTI	Marine Trophic Index
MTCS	Malaysian Timber Certification Scheme
myGAP	Good Agricultural Practice, Malaysia
MYSAP	Myanmar Sustainable Aquaculture Programme
NAMA	Nationally Appropriate Mitigation Actions
NBSAP	National Biodiversity Strategic Action Plans
NCA	National Capital Accounting
NCB	Non-carbon benefits
NRMC	natural resource management committee

NIPT	Network of Indigenous Peoples in Thailand
NParks	National Parks Board, Singapore
NPBD	National Policy of Biological Diversity
NTFP	Non-timber forest products
NUoL	National University of Lao PDR
OECD	Organisation for Economic Cooperation and Development
OECM	Other Effective area-based Conservation Measures
ONLIMO	online water monitoring
PAME	Protected Area Management Effectiveness
PCEPSDI	Philippine Center for Environmental Protection and Sustainable Development, Inc
PDIES	Procedures for Data and Information Exchange and Sharing
PES	Payment for Ecosystem Services
PFES	Payment for Forest Ecosystem Services
PHPL	Sustainable Production Forest Management, Indonesia
PM	particulate matter
PNLC	PEMSEA Network of Learning Centres
PNRPS	Philippine National REDD Plus Strategy
PLCN	Prey Lang Community Network, Cambodia
PRF	Permanent Reserved Forest
RAS	Rakan Alam Sekitar
RKC-MPD	Regional Knowledge Centre for Marine Plastic Debris
REDD+	Reducing Emissions from Deforestation and Forest Degradation+
ROAM	Restoration Opportunities Assessment Methodology
RPOA	Regional Plan of Action
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SDG	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SEApeat	Sustainable Management of Peatland Forests in Southeast Asia
SCP	Sustainable Consumption and Production
SFM	Sustainable Forest Management
SEAFDEC	Southeast Asian Fisheries Development Center
SEA-MaP	Southeast Asia Regional Program on Combating Marine Plastics
SEEA	System of Environmental Economic Accounting
SEC	Securities and Exchange Commission, Philippines
SET	Stock Exchange of Thailand
SFA	Singapore Food Agency
SFM	Sustainable Forest Management
SI	Singapore Index on Cities' Biodiversity
SIPUHH	Forest Product Administration Information System, Indonesia
SME	small- and medium-sized enterprises
SMSP	Semporna Marine Spatial Plan, Malaysia
SNI	Indonesian National Standard

SNR-i	Sustainable Natural Rubber Initiative
SLAAS	Sustainable School Environment Award
SNR-i	Sustainable Natural Rubber Initiative
SOMY	ASEAN Senior Officials Meeting on Youth
SSP	Sabah Structure Plan
SST	Sea Surface Temperature
SVLK	Timber Legality Verification System, Malaysia
TABI	The Agrobiodiversity Initiative
TEEB	The Economics of Ecosystems and Biodiversity
TESSA	Toolkit for Ecosystem Site-based Assessment
TNBTS	Bromo Tengger Semeru National Park
UFES	University of Forestry and Environmental Science, Myanmar
UNIDO	United Nations Industrial Development Organization
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNODC	United Nations Office on Drugs and Crime
UN SDGs	United Nations Sustainable Development Goals
UNU IAS	United Nations University Institute for the Advanced Study of Sustainability
URA	Urban Redevelopment Authority
USD	US dollar
VASEP	Viet Nam Association of Seafood Exporters and Producers
VCF	Viet Nam Conservation Fund
VIFARR	Viet Nam Fund for Aquatic Resources Reproduction
VIIRS	Visible Infrared Imaging Radiometer Suite
VND	Vietnamese Dong
VMN	Village Marketing Network, Viet Nam
VNFF	Viet Nam Forest Protection and Development Fund
VPA	Voluntary Partnership Agreement, Lao PDR
WDPA	World Database on Protected Areas
WHO	World Health Organization
WQI	Water Quality Index
WQMAS	Water Quality Management Areas
WPP	Wilayah Pengelolaan Perikanan
WTE	waste to energy
WWF	World Wildlife Fund
YBL	Youth Biodiversity Leaders

Photo by Indra Hadiyana

Executive Summary

The ASEAN region is home to some of the world's fastest-growing economies where people are enjoying a new era of prosperity. More than 660 million people are dependent on the region's rich natural heritage for their livelihood, welfare, and well-being. However, pressures mostly brought about by anthropogenic factors are now exacting a high price—the depletion of the region's precious and unique biodiversity that supports the region's economic advancement. The post-2020 global biodiversity framework presents the opportunity and means to address the unprecedented biodiversity loss in the region and the world.

The extensive conservation efforts of the ASEAN Member States (AMS), as reflected in their Sixth National Reports (6NRs) to the Convention on Biological Diversity (CBD), as well as regional initiatives to contribute to the sustainable use of the region's biological resources, are presented by the ASEAN Centre for Biodiversity (ACB) in the Third Edition of the ASEAN Biodiversity Outlook (ABO 3). The ABO 3 recommends narrative shifts to draw more attention to the collective, responsible, and pragmatic actions for biodiversity using the most recent available information on the progress, achievements, and areas for improvement of biodiversity in the region.

Guided by the Strategic Plan for Biodiversity 2011–2020, including the Aichi Biodiversity Targets (Aichi Targets), the region's progress, challenges, and ways forward are articulated through the following goals:

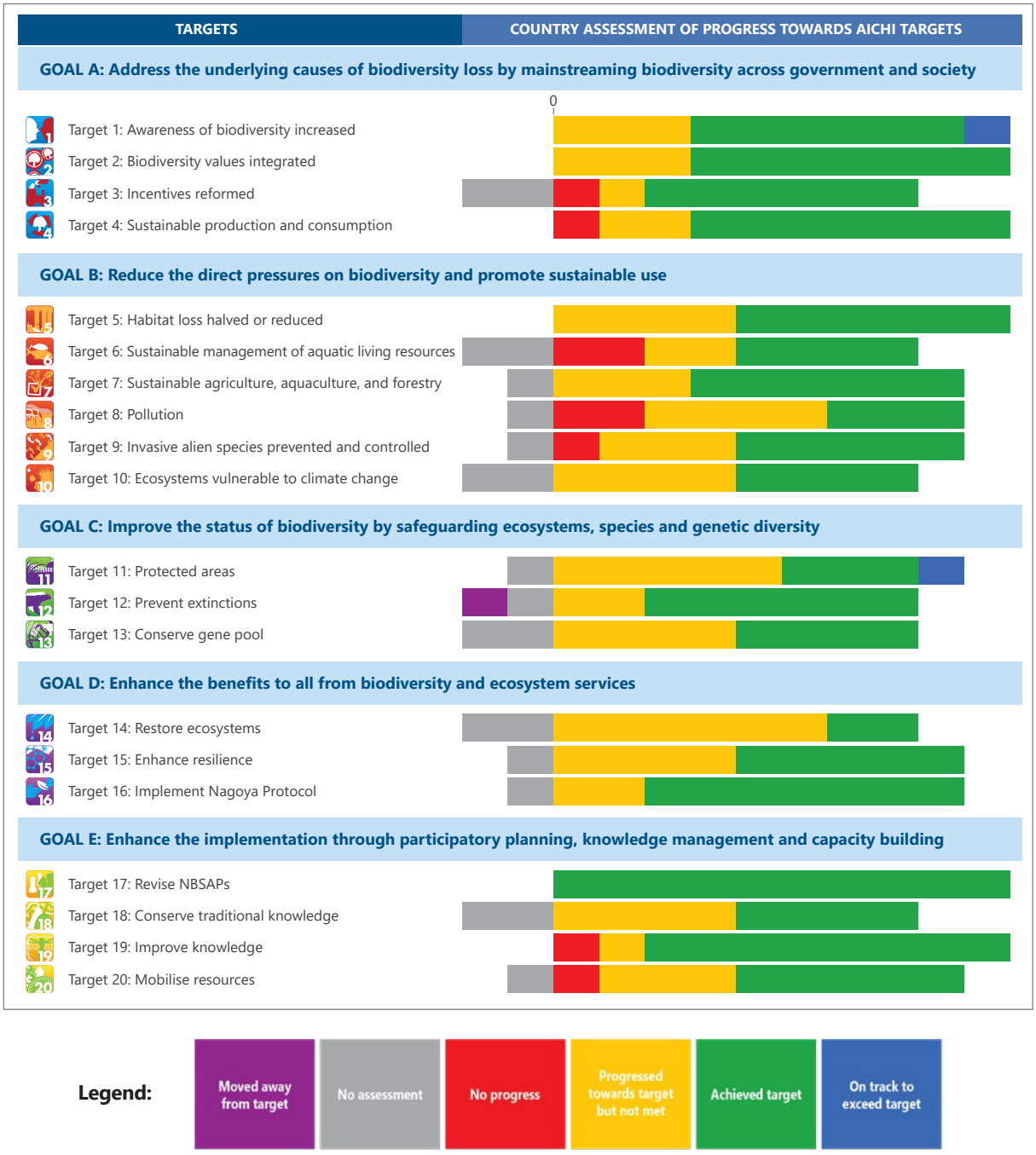
- Mainstreaming biodiversity across government and society;
- Reducing the direct pressures on biodiversity and promoting sustainable use;
- Safeguarding ecosystems, species, and genetic diversity;
- Enhancing the benefits to all from biodiversity and ecosystem services; and
- Enhancing implementation through participatory planning, knowledge management, and capacity building.

The AMS showed significant variability in their progress in achieving biodiversity conservation targets. Collectively, the ASEAN region faced both challenges and opportunities in realising the Aichi Targets, a scenario which is mirrored globally, as related in the Global Biodiversity Outlook 5 (GBO 5).

The following matrix visually presents the combined progress of AMS towards each Aichi Target. It is a straightforward tallying of the AMS' self-assessment for each target, based on their 6NRs. Blue indicates that the AMS has exceeded the target, green indicates 'on track' progress towards the target; yellow indicates progress towards the target but has not been completely met; red indicates no progress; purple indicates a trend that moves away from the target; and grey indicates no assessment. A span of colour equates to the number of AMS with the same country assessment.

Based on the matrix, at least 50 per cent of the AMS have indicated 'on track' progress in achieving 13 Aichi Targets: increasing awareness of biodiversity (Target 1); mainstreaming of biodiversity (Target 2); addressing incentives (Target 3); sustainable production and consumption; habitat loss halved or reduced (Target 5); sustainable agriculture, aquaculture, and forestry (Target 7); reducing invasive species (Target 9); preventing species extinction (Target 12); enhancing resilience (Target 15); implementing the Nagoya Protocol (Target 16); revising of National Biodiversity Strategies and Action Plans (NBSAPs) (Target 17); improving knowledge, the science base and technologies relating to biodiversity (Target 19); and mobilising resources (target 20). At least one AMS has exceeded the target when it comes to increasing awareness on biodiversity and another AMS in increasing the coverage of protected areas (Target 11). The region faces challenges particularly in restoring ecosystems (Target 14) and reducing pollution (Target 8). Overall, the region met most of the Aichi Targets based on country assessments.

Figure 1. Country assessments of progress toward Aichi Targets[1]



Legend:

A mid-term review of progress towards Aichi Targets[1] shows that the ASEAN region's tropical forests are continuously threatened and remain a 'deforestation hotspot.' The growing demand for timber products and the conversion of land for agricultural use and human settlements reduce forest cover at a rate of 80,000 square kilometres annually.[2]

The ecological crisis leads to species extinction (Target 12), diminishing natural resources, and deteriorating ecosystems (Target 10). The urgent need to address this situation necessitates approaches with ambitious goals and transformative measures to restore and recover the natural habitats.

As a way forward, courses of action may include the expansion of protected areas and the application of Other Effective Area-based Conservation Measures (OECMs) under the post-2020 global biodiversity framework. Its roadmap may follow SMART—specific, measurable, attainable, relevant, and time-bound—action plans that address gaps in communication capacity, policy support, and enforcement of wildlife policies in protected areas.

Follow-up actions can be done by developing comprehensive planning approaches for natural resource governance; reviewing subsidies and incentives and removing those that cause harm to biodiversity (Target 3); striking a balance between conservation and consumption (Target 4); scaling up efforts to manage aquatic, agriculture, and forest resources and ecosystems sustainably (Targets 6 and 10); heightening efforts to mitigate or eradicate invasive alien species (Target 9); broadening the engagement and active participation of stakeholders including indigenous peoples and local communities (IPLCs) (Target 18); enhancing their capacity to sustainably manage these areas; and improving resource-related policies and their implementation. It is likewise important to recognise internationally accepted standards for protected area management and capitalise on best practices that are replicable in other sites and conditions.

The establishment of ecological networks through transboundary initiatives and the ASEAN Heritage Parks Programme are potent solutions to habitat loss and fragmentation. These could contribute to the restoration of interconnected ecosystems within a larger landscape and seascape framework.

A proactive approach in the development of biodiversity management plans calls for the consideration of nature-based solutions in climate action, such as the conservation and rehabilitation of habitats susceptible to extreme weather conditions. This requires continuing support for research and development efforts regarding the effects of climate change on species and ecosystems to identify appropriate management practices (Target 15).

A renewed focus on improving regional capacity and optimising the use of knowledge platforms and resources in national reporting, such as the National Clearing-House Mechanisms, ASEAN Clearing-House Mechanism, and the ASEAN Biodiversity Dashboard (Target 19) has become imperative. Although all AMS have successfully submitted their national reports to the CBD (Target 17), there is an opportunity to enhance the online reporting tool by making it more user-friendly and easier to navigate.

AMS are already taking concrete approaches and pragmatic measures to mainstream biodiversity in national programmes (Target 2). To sustain these initiatives, ABO 3 recommends comprehensive and systematic efforts to mobilise and substantially increase financial resources from all sources for more effective implementation of the NBSAPs (Target 20).

The ABO 3 likewise recommends the scaling up of programmes and collaborations that promote long-term sustainability and reduce pressures on the environment that are already being undertaken by AMS. Tools, such as the valuation of natural capital and ecosystem services, natural capital accounting, the 'polluter pays' principle, and the Extended Producer Responsibility for the treatment or disposal of post-consumer products, that can contribute to incentivising biodiversity-positive investments and discourage environmentally harmful business ventures, could lead to more sustainable and satisfactory outcomes across the production process, and up to the level of the consuming public (Target 8). Priority may also be given to implementing existing regional and international agreements on transboundary environmental challenges, including marine debris, and the illegal movement and disposal of hazardous substances and wastes that impact heavily on the health of marine biodiversity.

Biodiversity loss is a cross-sectoral global issue that requires collective action within and beyond the ASEAN region. It is only through a unified, holistic, and worldwide engagement that a significant headway towards transformative change can be realised. According to the World Health Organisation, unabated biodiversity loss and failure of ecosystem services to meet social needs can have significant impacts on humanity, as the loss of ecosystem services will have wide-ranging repercussions that will affect health, livelihoods, migration, income, and food security.[3]

GBO 5 pointed out that majority of the commitments under the Aichi Targets have yet to be fully met. Consequently, conserving biodiversity remains one of the greatest challenges that humans still need to overcome. Despite the considerable hurdles to reach these goals, the international community has made progress, particularly in protecting 17 per cent of land and 10 per cent of marine areas. Out of the 20 Aichi Biodiversity Targets, the ASEAN region has the most significant contribution to the achievement of Target 11 with protected areas established on 15.6 per cent of terrestrial and four (4) per cent of coastal and marine areas.

The individual and collective efforts of AMS under the rubric of the Aichi Biodiversity Targets, as well as synergies through other multilateral environmental agreements, demonstrate both accomplishments and challenges, as the region and the rest of the world usher in the post-2020 global biodiversity framework as the blueprint for fulfilling the three CBD objectives towards living in harmony with nature by 2050.

The foregoing recommendations provide strategies, not only for breaching critical thresholds that lead to irreversible adverse impacts on the ASEAN region's biodiversity, but more significantly, for restoring and enhancing vital ecosystems. These are both timely and crucial, particularly in light of compounding factors, including but not limited to, climate change, new and emerging diseases, and socio-political insecurity. The current outlook identifies opportunities for AMS to scale up initiatives, mobilise resources, strengthen individual and collective commitments, adopt and implement science-based policies and promote a rights-based, whole-of-community approach to halt biodiversity loss; and achieve multiple benefits where no one is left behind.

CHAPTER 1

Introduction

Photo by Lam Soon Tak

The ASEAN region is home to some of the world's fastest-growing economies where people are enjoying a new era of prosperity. This impressive feat, partly made possible through its rich natural resources, is now exacting a high price from its people—the depletion of the very resources that support their economic advancement. The need to balance social and economic development with actions that will prevent irreversible damage to biodiversity presents one of the most difficult aspects of the Strategic Plan for Biodiversity 2011–2020 of the Convention on Biological Diversity (CBD).

Photo by Aung Pyi Zone

The complex underlying drivers of biodiversity loss require equally multifaceted solutions covering a range of environmental challenges. It requires governments, entrepreneurs, investors, regulators, public health practitioners, civil society, activists, innovative thinkers, and all other stakeholders in the region to work together to amplify efforts to protect the region's rich but finite natural systems. This means shifting away from the business-as-usual ways of doing things towards a low-emission, resource-efficient green economy that seamlessly integrates biodiversity into the economic and financial decisions of policy-makers and implementors.

The continuing COVID-19 pandemic clearly demonstrates the immense and widespread impact of nature, species, and anthropogenic activities on global public health and economy. Additionally, the pandemic once again underscored the interaction between biodiversity and ecosystem and human health.

It is therefore imperative that conservation, rehabilitation, and recovery initiatives be integrated into one urgent, science-based, and cumulative undertaking. The ASEAN Comprehensive Recovery Framework (ACRF) is one such initiative which serves as the region's exit strategy from the COVID-19 crisis. Biodiversity conservation is a key platform for action in the ACRF's basic strategies.

The ASEAN Biodiversity Outlook 3 (ABO 3) presents the past and current state of biodiversity in the ASEAN region. It analyses how factors such as deforestation, intensive agriculture, industries, and expanding urbanisation are putting intense pressure on natural ecosystems and resources.

ABO 3 documents the collective efforts of the ten ASEAN Member States (AMS) from 2015 to 2020 to address the region's biodiversity crisis. It underscores the progress of initiatives that contribute to attaining the targets in the CBD Strategic Plan for Biodiversity 2011–2020 and move the regional sustainability agenda forward. It discusses opportunities for sustainable development and green transformation in areas where more depth and wider range of approaches need to be adopted.

There are recognisable accomplishments in the past five years towards meeting the goals set in the CBD Strategic Plan for Biodiversity 2011–2020, which includes the 20 Aichi Biodiversity Targets. Many of these are presented here in ABO 3 as it tracks the region's commitment towards realising these targets.

Chapter 1 briefly presents the current state of biodiversity in the ASEAN region and the urgent need to address the multiple challenges that imperil the region's rich biodiversity resources. Aligned with international biodiversity conservation frameworks, this section highlights some initiatives in the region that contribute to achieving global targets. It also sets some broad stroke approaches to tackling biodiversity conservation and related issues. The narratives in this section are thoroughly discussed in the succeeding chapters.

Chapter 2 provides assessments of progress towards each of the Aichi Targets including the lessons and challenges that AMS have encountered in implementing their National Biodiversity Strategic Action Plans (NBSAPs). This part of the narrative is largely based on the Sixth National Reports (6NRs) of AMS to the CBD, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Regional Assessments, and other relevant sources of information. Each


Photo by Kimberly Go

Aichi Target is preceded by a visual illustration that presents in a nutshell the current scenario, challenges, and recommendations for the respective target.

To the extent possible, the narratives are accompanied with relevant data and assessment of progress at the regional level. This section also chronicles both the bottlenecks for effective implementation of conservation initiatives and the milestones and identifiable efforts of AMS to highlight innovations and significant programmes for replication.

In Chapter 3, ABO 3 presents a workable framework where responsible regional stewardship and transformative change may be supported by constructive engagements between and among all ASEAN stakeholders, civil society, relevant government institutions, and non-government organisations.

Chapter 3 also provides useful references on which to ground the region's contributions to the post-2020 global biodiversity framework which is set to be implemented in the next 30 years until 2050 and where the *Convention on Biological Diversity's Vision: Living in Harmony with Nature* shall have been realised.


Photo by Myat Zaw Hein

The ASEAN context and framework on biodiversity conservation

Biodiversity loss is a complex problem that cannot be addressed as a stand-alone issue. Rather, biodiversity should be mainstreamed and integrated into national development plans and the whole-of-community approach at the regional level towards the sustainability of the region's biological resources.[1]

The ASEAN Socio-Cultural Community Blueprint 2025 (ASCC Blueprint 2025) guides cooperation on environment around four key priority areas: (1) conservation of sustainable management of biodiversity and natural resources, (2) promotion of environmentally sustainable cities, (3) response to climate change, and (4) sustainable consumption and production.[2]

The ASEAN recognises the importance of sustainable economic development as an integral part of the region's growth strategy and ensures that the protection of the environment and natural resources supports economic growth. With respect to economic-environmental sustainability, the ASCC Blueprint 2025 envisions a sustainable community where social development and environmental protection are promoted through effective mechanisms.

Aligned with global goals and initiatives, the ASEAN region and AMS implement plans, programmes, and various activities to address the driving forces behind biodiversity loss and effect mitigation measures.

Bottom-up and top-down approaches to addressing sectoral concerns such as tourism, infrastructure, health, agriculture, cities and urban development, and business are intended to foster actionable engagement in using biodiversity as a catalyst for sustainable development. The ASEAN region endeavours to apply these conservation approaches through myriad flagship initiatives.

The 21st Meeting of the ASEAN Centre for Biodiversity (ACB) Governing Board in 2019 in Thailand highlighted the region's initiatives like mainstreaming of biodiversity, the ASEAN Heritage Parks Programme (AHP), and protected area management as areas where the region can more significantly input to the post-2020 global biodiversity framework.[3]

National parks and nature reserves are highly recognised for their ecological completeness, biodiversity richness, and conservation importance. The AHP Programme, a flagship initiative in the region, manages a regional network of representative protected areas created to generate greater collaboration and cooperation among AMS in preserving the region's natural heritage.

The 6th AHP Conference (AHP 6), themed *Sustainability and Innovation for Parks and People,* which was held in 2019 in Lao PDR, convened key stakeholders to review action plans and strategies and ensure that AHPs meet the minimum, if not the highest, management standards.[4]

AHP 6 aimed to accelerate progress on Aichi Target 11 which states that by 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures (OECMs), and integrated into the wider landscape and seascape.

ASEAN's rich marine biodiversity contributes to food security, climate change mitigation, and increased disaster resiliency for its people. But the region's marine ecosystem and coastal environments face high risk and rapidly increasing levels of pollution and threats. To address this, the 34th ASEAN Summit in 2019 adopted the Bangkok Declaration on Combating Marine Debris in the ASEAN Region (Bangkok Declaration).[5]

The Bangkok Declaration promotes cooperation for the protection, restoration, and sustainable use of coastal and marine environment. It provides more impetus and guidance for development partners to strengthen efforts to support AMS and the region in ensuring that these are reflected in cross-sectoral policies, and operationalised and realised on the ground.

The ASEAN Green Initiative (AGI), which was launched in August 2021, is a landmark effort that aims to plant 10 million trees in 10 years in 10 AMS. The AGI concretises regional cooperation in promoting the restoration and sustainable use of terrestrial ecosystems, and the adoption of nature-based solutions to address important environmental concerns.[6]

Other regional undertakings that reinforce ASEAN's commitment towards biodiversity conservation like the ASEAN Flyway Network, ASEAN Biodiversity Heroes, and ASEAN Youth Biodiversity Programme are thoroughly discussed in the succeeding sections.

Moving forward, the 3rd ASEAN Conference on Biodiversity held in 2020 discussed the status of biodiversity and synthesised the progress made by AMS to achieve the Aichi Targets. The conference was an opportunity to prepare for ASEAN's unified statement at the CBD COP 15. It also provided a platform for AMS to develop a regional contribution to the post-2020 global biodiversity framework's goals and targets to transform society's relationship with biodiversity by 2050.[7]


Photo by Tran Viet Linh

Transformative approaches are needed in biodiversity management, governance, and conservation to address the needs of a warming world, an expanding population, and increasing economic inequality. AMS need to work closely together to make ASEAN a strong bloc in the CBD COP 15 in 2022. CBD COP 15 will review the achievements and delivery of CBD's Strategic Plan for Biodiversity 2011–2020. The much-awaited final decision on the post-2020 global biodiversity framework will hopefully be made, together with those on capacity building and resource mobilisation.

The post-2020 global biodiversity framework

As the Aichi Biodiversity Targets 2011–2020 timeline has concluded, AMS firms up a regional ASEAN position to input to the post-2020 global biodiversity framework.

The post-2020 global biodiversity framework shall contribute to the implementation of the 2030 Agenda for Sustainable Development, leading towards the achievement of the Sustainable Development Goals (SDGs). The framework's theory of change recognises that urgent policy action globally, regionally, and nationally is required to transform economic, social and financial models so that biodiversity loss will stabilise by 2030 and facilitate the recovery of natural ecosystems in the following 20 years. The framework aligns with CBD's 2050 Vision for Biodiversity—*Living in Harmony with Nature*, and needs to be driven by the transformative change paradigm to make the 2030 and 2040 targets a reality. The targets of the post-2020 global biodiversity framework succeed the Aichi Targets.

The framework can fully align and contribute to the 2030 SDGs and targets. SDG targets with a timeline of 2020 (reflecting current Aichi Targets) may need to be updated and harmonised post-2020. Each national target would best reflect how it connects to and articulates its contribution to the global target for transparency and accountability.

CHAPTER 2

AMS progress towards **Aichi Biodiversity Targets**

Photo by Thin Thin Tun

STRATEGIC GOAL A:

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Photo by Elliot Ong

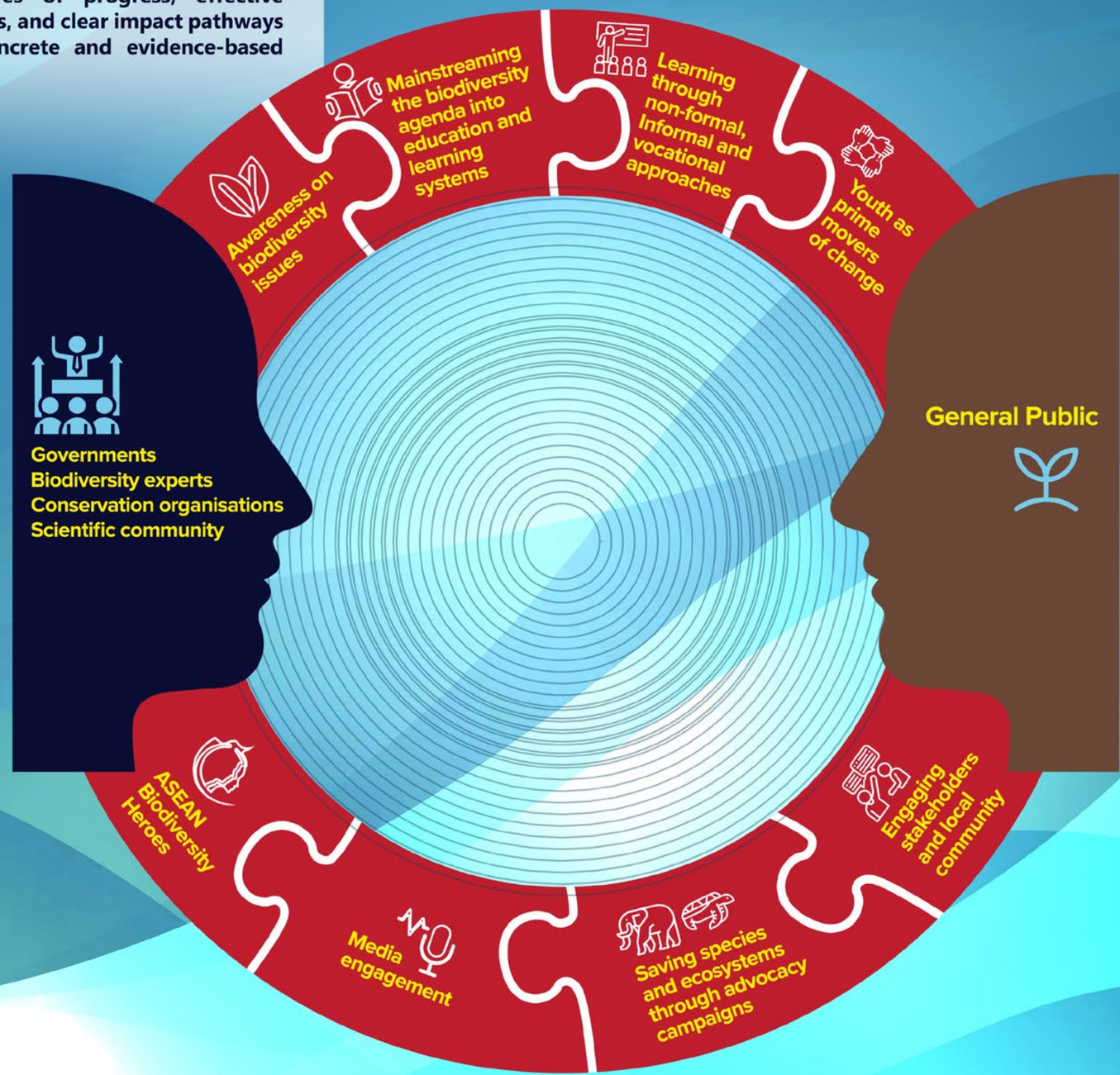
TARGET 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Across all AMS, standard measures of progress, effective monitoring and evaluation approaches, and clear impact pathways have yet to be established for concrete and evidence-based impacts to visibly manifest.

AMS have mainstreamed the Communication, Education, and Public Awareness (CEPA) work programme into their National Biodiversity Strategy and Action Plans (NBSAPs), and have developed work plans to progressively promote biodiversity conservation and sustainable use.

Challenges

- Dissonance between awareness of the importance of biodiversity for human well-being and people's views of biodiversity protection
- Lack of cohesive and comprehensive monitoring mechanisms and indicators
- The dearth of data and information poses a challenge in monitoring and evaluation
- Level of operationalisation and implementation of CEPA varies across AMS
- Effective communication remains a challenge for many national focal points and NBSAP coordinators
- Adequate and sustained funds are needed to ensure that plans are implemented and carried through



Ways Forward

- Conduct a comprehensive region-wide baseline survey
- Standardise indicators and metrics to accurately mainstream CEPA in programmes and plans, and quantify and evaluate progress
- Ensure that decision-makers, policymakers, and stakeholders have access to scientific information
- Create opportunities and provide platforms for knowledge exchange and extract best practices on CEPA implementation and activities
- Integrate and institutionalise national CEPA strategies
- Increase awareness of the global implications of biodiversity loss in the ASEAN

Photo by Aung Thu Ya

Aichi Biodiversity Target 1: Awareness of biodiversity increased

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.

ASEAN Member States or AMS are on track in raising awareness of the value of biodiversity across sectors in their respective countries. Most AMS have mainstreamed the Communication, Education and Public Awareness (CEPA) work programme into their National Biodiversity Strategic Action Plans (NBSAPs) and have drawn up work plans to progressively promote biodiversity conservation and sustainable use.

All AMS have integrated biodiversity values into their educational systems, particularly in the school curricula, mostly through special and diploma courses, and in learning centres. Non-formal approaches and experiential awareness-raising activities directed at specific target groups and purposes such as tourists in ecotourism spots and communities that work in and around these areas complement these initiatives. Supplementary information, education, and communication materials, including translations into the local language to facilitate learning, have been produced.

Intensive environmental awareness campaigns and capacity building to educate stakeholder groups on biodiversity and engage them in policy formulation have reportedly helped increase compliance with conservation laws. The youth, media, local communities, government, and private sector-led campaigns are recognised as prime movers of change in the region.

Alignment with the regional framework increased awareness, participation, and investments by the private sector and enactment of conservation policy, and improved the compliance of extractive industries.

Aichi Target 1 is closely linked with Aichi Target 19: information sharing and knowledge. It also contributes directly to Sustainable Development Goal 4 (SDG): to ensure inclusive and equitable quality education and promote learning opportunities for all, and 12.8 (*By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.*)

Aichi Target 1 addresses the fundamental concern on the lack of awareness and understanding of the myriad benefits from rich biodiversity and healthy ecosystems, ensuring human well-being and survival. An underlying principle can be: If people were better informed, they would become more aware of environmental problems and, consequently, be motivated to behave in an environmentally responsible manner.[1]

The Convention on Biological Diversity (CBD) puts a premium on awareness-raising across all sectors as a prerequisite to accomplishing its goals and targets. Education and communication play crucial roles in positioning biodiversity protection and conservation at the centre of the global agenda, development and scientific discourse, and policy instruments.

Article 13 of the CBD on Public Education and Awareness calls for the formulation and execution of CEPA plans and strategies, the latter being the primary vehicle for the rollout of the NBSAPs of its member states.

CEPA covers the processes, social and communication instruments, and ways of affecting the intellect and influencing the behaviours of people, organisations, and multiple sectors to individually and collectively develop and operationalise the NBSAPs. It helps create the enabling conditions for collaboration so that policies, incentives, and regulations across sectors would encourage biodiversity conservation and sustainable use.[2]

The Global Biodiversity Outlook 5 (GBO 5) assessed that there has been an increase in the understanding of the concept of biodiversity especially among younger people. It reported that one third of people in the most diverse countries have high awareness of both the values of biodiversity and the interventions for its conservation and sustainable use.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) provides a less favourable assessment indicating no significant overall progress across AMS.[3]

The ASEAN Biodiversity Outlook 2 (ABO 2)[4], which was largely based on the Fifth National Reports (5NRs), stated that at least half of AMS have mobilised efforts to mainstream CEPA across diverse audiences. In the 6NRs, most AMS indicated significant progress in CEPA mainstreaming, hence, 50 per cent of them made inroads and have successfully achieved Aichi Target 1.

CEPA mainstreaming in the ASEAN region employs various approaches, notable of which is the deliberate effort to integrate biodiversity conservation into the formal and non-formal educational systems.


Photo by The Perfect Grey Photography, Inc.

Mainstreaming the biodiversity agenda into the educational system

Formal learning starts within the four walls of educational institutions and is a key element to achieving Aichi Target 1. This requires a well-entrenched biodiversity agenda in the instructional system with complementary learning tools and support to ensure an effective, creative, and meaningful learning experience for the youth in the region.

Youth, aged 13–34, numbering 213 million, comprise about 34 per cent of the ASEAN population.[5] Given adequate education, motivation, and support, the youth sector can be formed into a critical mass of influencers and agents of change in driving initiatives and interventions on biodiversity protection and conservation.

Environmental education is the process of helping people, through formal and non-formal/informal education, to acquire understanding, skills, and values that will enable them to participate as active and informed citizens in the development of an ecologically sustainable and socially just society.[6]

The *ASEAN Environmental Education Action Plan* (AEEAP) provides the framework for enhancing public awareness and accelerating the development and advancement of environmental education. The *ASEAN Working Group on Environmental Education* (AWGEE) spearheaded the programmes of the AEEAP.

In view of the ASEAN Socio-Cultural Community (ASCC) Blueprint 2025, AMS operationalised selected elements of the AEEAP in four programmatic areas: ASEAN Eco-school Programme, ASEAN Green Higher Education Programme, Regional CEPA Initiatives, and Sustainable Consumption and Production.

Box 1. Biodiversity awareness studies in some AMS

A recent global study assessed the awareness of people in 193 countries in terms of the use of biodiversity-related keywords in online newspapers, social media, and in the internet real-time. The study showed that countries in the Mekong Delta have relatively low levels of biodiversity awareness: Cambodia ranked 97th, Viet Nam 126th, Thailand 129th, Myanmar 130th, and Lao PDR 140th.

A study conducted from January 2015 to November 2018 in Indonesia using Google trends indicated an increasing trend in the volume of searches for such terms.

Malaysia carried out a biodiversity baseline study in 2018 which revealed that 91 per cent of Malaysians had a poor understanding of biodiversity and its importance. Student respondents comprise the majority of those who exhibited a higher level of understanding.

This shows that understanding of biodiversity and the ecosystem services it provides remains llow, although there is a growing interest in improving such a trend. This reinforces the need for more encompassing and well-laid out CEPA plans and their effective operationalisation across sectors and institutions.

Sources: *6NRs of Lao PDR, Indonesia, and Malaysia*

Photo by Klienne Eco

The *Eco-School Programme*[7] was endorsed by the ASEAN Environment Ministers in 2011 to create a culture that is geared towards environmental protection and conservation. The goal is carried out through environment-friendly plans, policies, and practices in the teaching programmes (curriculums) and co-curricular activities for the benefit of the school and surrounding communities. All AMS have had varying degrees of accomplishment in implementing this in the primary and secondary levels.

As a form of incentive, the *ASEAN Eco-School Award* is conferred to selected schools that adopt and practice the concept of green and sustainable school to ultimately develop a cadre of "environmental citizens." As of 2019, 30 schools have been given this award.

An expanded version of the *Eco-School Programme* is the *ASEAN Green Higher Education Programme*, which was initiated in 2019 with the Philippines as the lead implementor. The programme takes the concept of a green and sustainable environment to higher education institutions.

The *ASEAN Plus Three (+3) Youth Environment Forum* (AYEF) is a region-wide CEPA initiative that was initially hosted by Brunei Darussalam in 2007. It brings together youth from the ASEAN+3 countries in a forum to exchange knowledge and ideas on various biodiversity issues. After the forum, youth participants are encouraged to continue the conversation and interaction through the ASEAN+3 Youth Networking Facebook group. AYEF 2019 was hosted by Thailand.

Aside from recognising learning institutions, the youth's proactive and outstanding work in advancing clean and green projects are recognised through the ASEAN Youth Eco-Champions Award (AYECA). Initiated in 2019 with funding from the Government of Japan and Hanns Seidel Foundation, AYECA, as well as the ASEAN Eco-School Award, held their first awarding ceremony in Cambodia during the celebration of ASEAN Environment Day (AED).

Launched in 2000 in Brunei Darussalam, the ASEAN Environment Year is celebrated every three years to showcase ASEAN's achievements and unwavering commitment to environmental management and protection as well as to promote public awareness of environmental issues in general. After its rebranding into ASEAN Environment Day in 2016, the celebration is now held every two years during the ASEAN Ministerial Meeting on Environment (AMME).

The ASEAN Senior Officials Meeting on Youth (SOMY) developed the ASEAN Work Plan on Youth 2016–2020, which sets action plans directed at holistic youth development

Box 2. The Green School Programme of Indonesia

The **Adiwiyata School Programme** is Indonesia's version of the regionwide Eco-School Programme which promotes EE within the framework of UNESCO's Education for Sustainable Development (ESD).

Implemented by the Ministries of Environment and Education since 2006, the programme cultivates environmental consciousness among students and the citizens by integrating topics in the curriculum and through policy and community participation.

As of 2017, 1,700 schools have become members, of which 463 have been granted the National Adiwiyata Certificate. This comprises 36% of the country's target coverage of 5,000 schools by 2019.

to ensure greater social relevance, broader opportunities for growth in all forms possible, and increased participation in social, economic, and environmental development.

In support of the work plan, the Global Youth Biodiversity Network, the official youth constituency of the CBD, and the ACB initiated the ASEAN Youth Biodiversity Programme (AYBP) in 2018.[8] Funded by the EU through the Biodiversity Conservation and Management of Protected Areas in ASEAN of the ASEAN Centre for Biodiversity (ACB-BCAMP) Project, the AYBP worked on two flagship programmes: Youth Biodiversity Leaders (YBL) Training and Youth Internships in AHPs.

Launched in 2019, the YBL is a year-long training programme that aims to enhance youth-led implementation of the NBSAPs and position youth concerns in the biodiversity agenda and actions through capacity building and mentoring.[9] Each year, two YBLs are selected from each AMS to form a YBL Cohort to undergo guided online learning and in-person training.

The AHP Youth Internship exposes students and young professionals to biodiversity conservation issues and provides hands-on experiences in protected area management and operations.

The ASEAN+3 Leadership Programme on Sustainable Consumption and Production (SCP) is one of ASEAN's flagship activities implemented annually since 2008 under the AEEAP. It convenes policymakers and stakeholders from the ASEAN+3 countries to discuss critical issues, formulate policies, and provide support to small- and medium-sized enterprises (SMEs) in formulating SCP systems.

Over the last decade, the programme has been successfully implemented under the ASEAN+3 cooperation platform and supported by the United Nations University Institute for the Advanced Study of Sustainability, UNEP SWITCH Asia, United Nations Industrial Development Organization (UNIDO), and Hanns Seidel Foundation. With ten successful runs from 2008 to 2017, the programme is being redesigned to build on the broader ASCC Blueprint 2025 and global SCP framework.

The Integrated Coastal Management (ICM) Learning Centres[10], since its inception in 2014, has been providing skills training, workshops, and technical counsel to stakeholders, especially local governments, using the ICM framework and learning-by-doing approach.

The ASEAN region is home to a dense population of coastal and marine species, comprising a third of the world's resource base.

Managing and protecting this threatened coastal and marine resource would need a regionwide and multisectoral approach.

In collaboration with local universities, the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), an intergovernmental organisation that operates in East Asia, has instituted 11 ICM learning centres in Cambodia (1), Indonesia (3), the Philippines (4), Thailand (2), and Viet Nam (1). The objective is to help provide technical assistance to national focal agencies, ICM project sites, local governments, non-governmental organisations (NGOs), and local communities. The learning centres, likewise, serve as venues for knowledge sharing and capacity-building activities on ICM initiatives. All learning centres in the region comprise the PEMSEA Network of Learning Centres, which advances knowledge and scientific information for policy and management interventions in coastal management.

Aside from providing regionwide CEPA initiatives, AMS implement their respective CEPA activities across sectors and address concerns related to various ecosystems.

Table 1. Initiatives of AMS in mainstreaming biodiversity issues in the formal and non-formal educational systems

AMS	Some initiatives in the formal and non-formal educational systems
Brunei Darussalam	• Formulated national policy framework for environmental education • Green Schools and Eco Clubs Initiatives as counterpart programmes of the region-wide Eco-School Programme
Cambodia	• Finalised the Framework of General Education and Technical Education in 2017 as part of the on-going curriculum reform • Developed the National Guideline for Eco-Schools Programme in 2016 • Produced the toolkit on *Learning about biodiversity: Multiple-perspective approaches for lower secondary schools in Tonle Sap Biosphere Reserve*
Indonesia	• Earned favourable feedback from the operation of the Adiwiyata School Programme, a counterpart of the region-wide Eco-School Programme • Implements the Forestry Vocational High School, which trains and prepares mid-level forestry technical workforces for deployment; 5 public vocational high schools and 26 private vocational schools have graduated thousands of students since 2012 • Offers free courses in marine and fisheries in higher education to children of fisherfolks through the One Community Academy with increasing enrolees since 2015 • Adopted the Indonesian Coastal School (SPI) in 37 provinces from 2013–2016 using the 4A concept (Amati/Observe, Analisa/Analyse, Ajarkan/Educated, Aksi/Act)
Lao PDR	• Developed and officially approved the undergraduate curriculum on Forest and Wildlife Protection; developing a master's programme in Resettlement Areas Management • Established a centre for Capacity Building Project on Social Safeguard Education at the National University of Lao PDR (NUoL) • Trained staff of PAs across the country on the Management Effectiveness Tracking Tool (METT). To date, 310 km^2 of PAs have been assessed using METT.
Malaysia	• Mainstreamed SCP practices in the curriculum and co-curriculum in the context of low-carbon lifestyle. The Government Green Procurement is a key programme in expanding the green economy and creating a green market locally. • Rolled out the Eco-School Programme, in partnership with the WWF-Malaysia; now with 180 member schools • Adopted the environmental education curricula since 1990 for the primary and secondary schools • Conducted the annual International Eco-Schools Conference, which brought together school representatives to share and exchange their school's sustainability initiatives • The Sustainable School Environment Award Programme was introduced by the Ministry of Education 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, the Institute for Environment and Development (LESTARI), introduced by the DOE, continues to promote environmental awareness and behaviour in schools.

Myanmar	• Together with the Wildlife Conservation Society and University of Forestry and Environmental Science, the government is improving the existing curricula and developing a special course on biodiversity conservation. • Undertook higher education system reform • Developing curricula on diploma courses with the state Department of Fisheries • Major universities offer courses in conservation science, including marine ecology • Developed educational materials and conducted training for PA staff through the initiative of the Ministry of Environmental Conservation and Forestry • Translated biodiversity materials into the local language to facilitate learning
Philippines	• Mainstreamed environmental education through the Environmental Awareness and Education Act of 2008 or RA 9512 • Organised Youth Summer Camp in celebration of the International Day of Biological Diversity; 150 students participated
Singapore	• Has incorporated elements of biodiversity conservation into the curricula at all levels of education
Thailand	• Included biodiversity context in the curricula, educational tools, and learning facilities of education institutions at various levels as mandated in the National Education Plan for 2017–2036 • At least 939 schools across the country collaborate with various agencies in teaching, curriculum development, and botanical garden projects • 156 state-owned universities actively doing research studies on plant species, forest resources, and environment • The Biodiversity-Based Economy Development Office (BEDO) introduced BioGang, a smart media project to improve access of youth to biodiversity resources data and information.
Viet Nam	• Several universities offer undergraduate, graduate programmes, and post-graduate programmes related to biodiversity. • In 2016, the Ministry of Education and Training mandated universities to consolidate teaching materials on biodiversity conservation.

CEPA initiatives in AMS: Why and to whom they matter?

Policy formulation

Meticulously planned and well-executed CEPA programmes are indispensable in policymaking. Decision-makers and policymakers need to be furnished with robust and science-based data and information for a more in-depth understanding of biodiversity issues towards better decision-making and the formulation of sound policies.

In Myanmar, the Ministry of Natural Resources and Environmental Conservation took deliberate steps to educate leaders, policymakers, and parliamentarians on the value of biodiversity. This could have driven the enactment of the Conservation of Biodiversity and Protected Areas Law in 2018, the drafting of the National Environmental Policy, and the revision of the Forest Law and its ratification in 2018.

Viet Nam's Ministry of Natural Resources and Environment issued Decision No. 200/QD-BTNMT that institutionalised the implementation of awareness-raising programmes from 2015 to 2020 to help prevent and control the spread of invasive alien species (IAS). The growing number of IAS has negatively affected Viet Nam's biodiversity and natural environment.

Resource generation

The Rectangular Strategy is Cambodia's main socio-economic policy agenda. The first three phases of the programme led to gains in biodiversity-related areas of forestry and fisheries and notable progress in attaining Goal 2 on universal primary education, and Goal 7 on environmental sustainability of its Millennium Development Goals.

For Rectangular Strategy Phase 4 (2018-2022), the Royal Government of Cambodia increased its budget almost threefold particularly in

the areas of education, youth and sport, environment, agriculture, forestry, and fisheries. This exemplifies serious government response and prioritisation of the biodiversity agenda in the national plans and programmes. This was one measure that enabled Cambodia to exceed its national budget for biodiversity conservation by 20 per cent.

Stakeholder engagement and mobilisation

Local communities are likely to eke out a living from the resources and ecosystems nearest to them. It is then important to educate them on the multiple benefits that they can derive from these resources and how they can protect, conserve, and ensure their sustainability. Most AMS reported implementing CEPA activities for communities living in and around protected areas.

Myanmar set up community information and learning centres in four wetland protected areas that are now Ramsar sites. They capacitate local communities on park management in public parks.

Cambodia established marine national parks in different zones provided by its Protected Area Law and implemented capacity building activities for local communities, students, tourists, and park workers to stop coral reef decline and to promote their recovery. The law aims to cover 8.4 square kilometres of coral reef under sustainable management by 2019.

These examples are two-pronged strategies in awareness-raising through community and public education on one hand, and livelihood provision on the other.

The botanic gardens of Thailand, eco-tourism parks of Lao PDR and Brunei Darussalam, and nature-based tourism of Singapore serve as learning facilities for academic conferences, public seminars, roadshows, guided tours, and other learning events where the interlink between humans and nature can be better appreciated. The botanic garden in Luang Prabang Province in Lao PDR doubles as a training centre and an *in situ* and *ex situ* flora research site since 2016.

Viet Nam implemented training courses on ecosystem management for nearly 700 women in Thu Thien-Hue Province in 2017. This helped improve the flood resiliency of about 4,800 coastal residents.

Sea turtles are vital to balance the marine food webs and maintain the health of the oceans. Out of seven sea turtle species, six can be found in Indonesia. These are categorised as either vulnerable, endangered, or critically endangered mostly due to accidental capture or bycatch.

A series of training sessions on sea turtle bycatches, from 2013 to 2016, was attended by up to 5,000 individuals from 12 regions. This led to the improved survival rate of sea turtles to more than 95 per cent and enhanced the capacity of trained fishermen by 45 per cent.

Advocacy for species and ecosystems protection and conservation

There has been a growing recognition of the significance of engaging local communities in biodiversity management initiatives. Indonesia established a local community group—Pokmaswas—currently with 1,488 members to monitor sea and coastal use. From 2016 to 2018, 136 groups implemented conservation activities in 40 coastal areas and small islands.

Moreover, Indonesia combined awareness raising, technical guidance, and strict law enforcement in the marine and fisheries sectors. This resulted in an increased compliance percentage of business owners from 82.5 per cent in 2015 to 73.5 per cent in 2017.

In 2009, Malaysia initiated the Rakan Alam Sekitar or Friends of Environment Programme. The programme mobilised more than 300,000 members to rehabilitate and restore, as well as, monitor and report environmental infringements. The Reef Check initiative has been training and certifying divers to be 'EcoDivers' so that they can participate in the annual Reef Check surveys. Data collected from these surveys are channelled into a global dataset that is used to monitor reef health.

Other meaningful advocacy campaigns of the AMS include the Citizen Action for Tigers (CAT) Walk (Malaysia), Protection of Prey Lang Wildlife Sanctuary (Cambodia), and Voices for Momos or elephants (Myanmar). The CAT Walk campaign involves volunteers patrolling the Sungai Yu Wildlife Corridor to dismantle snares, report illegal logging activities, and encroachment in the forest reserves.

The *Be Their Bodhisattva* campaign of Viet Nam sought to protect wildlife, particularly pangolins, elephants, and rhinos against traffickers. It was organised in January 2019 by WildAid and the Centre of Hands-on Actions and Networking for Growth and Environment (CHANGE) in Ho Chi Minh City. The campaign reached about 30 million Vietnamese, comprising 30 per cent of the country's total population, through earned media (meaning, not a single dollar was paid for placement), both on social media and on local news platforms.

Networking and collaboration

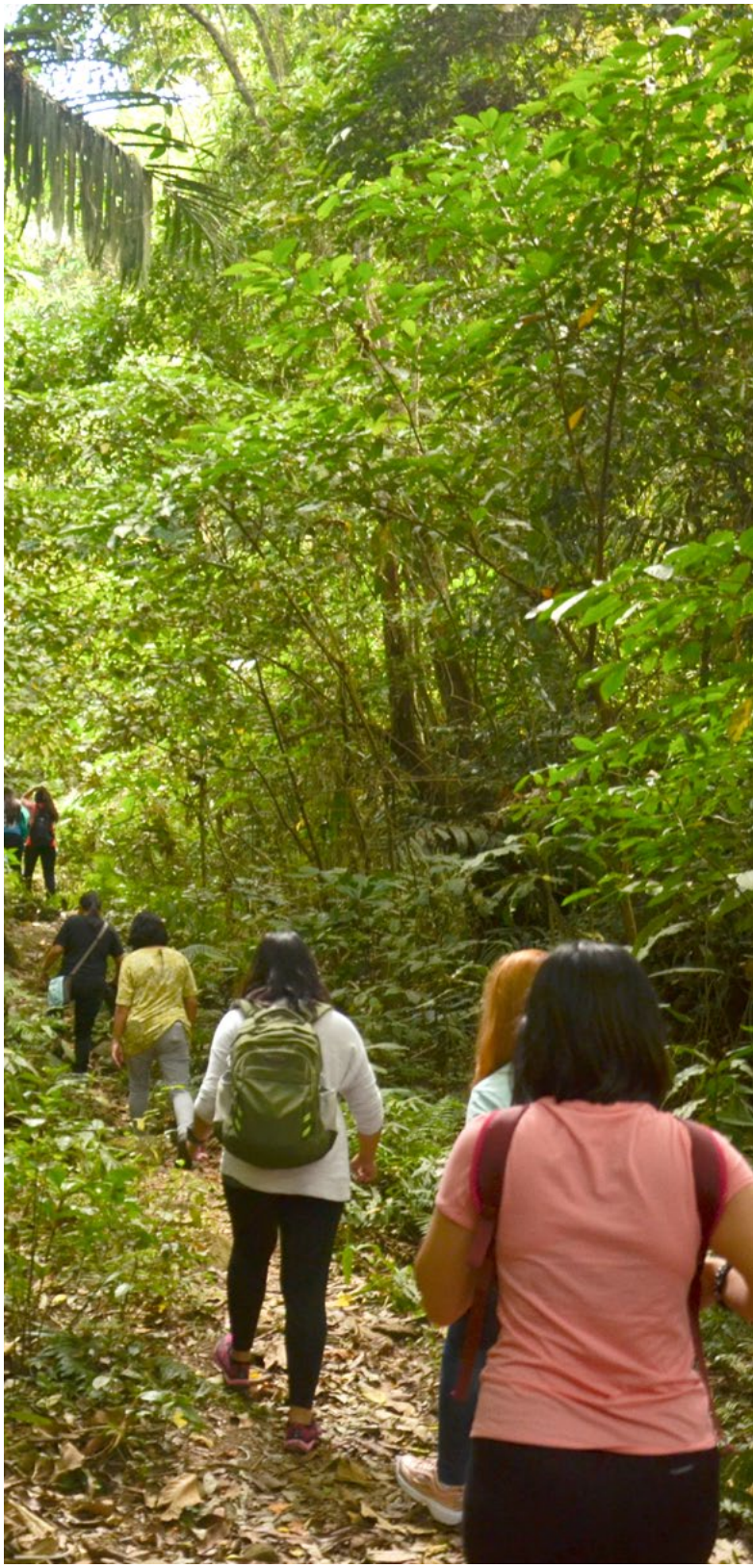
The Economics of Ecosystems and Biodiversity (TEEB) survey conducted by ACB in 2012 among high-ranking AMS officials and environmental groups and organisations revealed that promotion of business and biodiversity were not prioritised by AMS in designing and planning CEPA programmes. The ABO 2 reported that AMS were supposedly aware of the link between nature and the economy, yet, this knowledge was not clearly reflected in their work.

In contrast, the 6NR showed the active involvement of the private sector and civil society in endeavours towards the sustainable use of biodiversity resources.

Businesses in Viet Nam have increasingly become participative in biodiversity conservation as indicated by their financial contributions to relevant projects. Cumulatively, various businesses contributed VND 5.7 billion (USD 248,296) for forest environmental services from 2008 to 2016. The international cement company Holcim, located in Kien Giang, committed to donating USD 1.0 million to conserve the limestone landscape and threatened species, including cacti species and the sarus crane (bird species). The company's staff and the local people were trained in environmental protection.[11]

A survey among biodiversity-related agencies in Thailand revealed that 37 per cent of the respondents have developed biodiversity plans and integrated them into their curriculums and in their learning facilities. These facilities were operated by educational institutes as well as private firms and public organisations like the National Science Museum. There was also a reported increase in biodiversity conservation networks initiated by the civil sector as well as activities and projects for conservation.

Cooperatives and micro, small, and medium enterprises (MSMEs) in Indonesia have been undergoing training in the fields of forestry, agriculture, fisheries, and livestock. In 2016–2017, the number of business groups trained and improved in scale increased to 7,321 from 4,690 in 2015.



Public awareness and education through media

Mainstream media and social media are valuable partners and platforms in communicating biodiversity issues and stories to the public. However, "the biodiversity crisis doesn't get the headlines it deserves."[12] More often than not, biodiversity issues get spotlighted only in cases of negative news.

The ACB partnered with television networks to tackle biodiversity in relation to food and health. In 2019, the TV programme Foodprints, hosted by a popular Filipino food connoisseur, featured historically important and resource-rich places in Myanmar, showcased delectable local dishes, and promoted sustainable tourism. In 2020, the TV programme, RX PLUS, discussed the link between biodiversity and ACB's work vis-a-vis various health issues in 13 episodes.

Honouring biodiversity champions

The vital issue of biodiversity protection and conservation needs to be amplified but the task can be daunting. Accordingly, people who have committed themselves to dealing with such concerns deserve to be recognised.

The ACB, ASEAN Secretariat, the Philippines' Department of Foreign Affairs, the European Union through the *Biodiversity Conservation and Management of Protected Areas in ASEAN* (BCAMP) project, and HARI Foundation, Inc., co-founded the Biodiversity Heroes programme[13] in 2017 to honour biodiversity champions and game-changers in each AMS.

Individuals, whose work have impacted biodiversity concerns and causes in their respective countries and the region, were honoured as Biodiversity Heroes at the 50th anniversary of ASEAN and given medals, trophies, and cash reward worth USD 5,000.

Table 2. ASEAN Biodiversity Heroes 2017

Awardees	Country Represented	Outstanding contribution
Eyad Samhan	Brunei Darussalam	Research on fauna and flora in Brunei Darussalam and the ASEAN region
Sophea Chhin	Cambodia	Research on wildlife in Cambodia
Alex Waisimon	Indonesia	Forest protection in Papua New Guinea
Nitsavanh Louangkhot Pravongviengkham	Lao PDR	Environment-friendly agriculture production and protection of migratory birds and aquatic species
Zakri Abdul Hamid	Malaysia	Methods of analysing and assessing global biodiversity and ecosystem services
Maung Maung Kyi	Myanmar	Community participation towards habitat conservation
Angel C. Alcala	Philippines	Coastal resources management and terrestrial biodiversity conservation
Leo Tan Wee Hin	Singapore	Biodiversity outreach and education
Nonn Panitvong	Thailand	Public awareness of biodiversity through taxonomy
Dang Huy Huynh	Viet Nam	Knowledge exchange and solutions to conserving biodiversity


Photo by Asep Ayat

Challenges

- As reported in GBO 4, there remains a disconnect between awareness of the importance of biodiversity and people's views of biodiversity protection as an important contribution to human well-being. Biodiversity loss may be seen as a global problem but not one that is of great local concern. People are still uncertain which actions negatively impact biodiversity and fewer still can connect specific actions to biodiversity protection.

- Evaluating the progress towards accomplishing Aichi Target 1 is challenging to undertake because of the dearth of data and information to come up with an accurate and definitive assessment.

- The level of operationalisation and implementation of CEPA differs among AMS in terms of resources, capability, and expertise. That being the case, the standards and indicators by which AMS are evaluated may prove to be unrealistic for some.

- Effective communication remains a challenge for many national focal points and NBSAP coordinators who are primarily in-charge of NR submissions and NBSAP implementation. They need to consider not only what to communicate, but especially how to communicate[14] biodiversity issues and concerns. Effective communication is about having clear objectives about the desired change in knowledge, attitudes, and behaviour so that plans and programmes can be truly translated into actions.

- A CEPA plan may be formulated and implemented, but the target outcome of changing behaviour takes time. Adequate and sustained availability of funds are needed to ensure that plans are implemented and followed through until target outcomes become evident.

Ways Forward

- Conduct a comprehensive region-wide baseline survey to determine the level of people's understanding of biodiversity and its value. From there, the AMS may reconstitute a more appropriate CEPA plan and target a more effective rollout.

- Standardise indicators and metrics to more accurately quantify and evaluate the progress of CEPA mainstreaming. Methodologies for data gathering, monitoring, and evaluation need to be established to determine the gaps and opportunities in the process of CEPA implementation.

- Ensure that decision-makers, policymakers, and stakeholders have access to scientifically credible and important information which are necessary to make informed decisions and formulate policies in support of biodiversity protection and conservation.

- Create opportunities and provide platforms for knowledge exchange. Identify best practices on CEPA implementation and activities to avoid reinventing the wheel and make efficient use of resources. Also, the likelihood of success is higher when implementing tried-and-tested CEPA practices.

- AMS need to integrate and institutionalise their national CEPA strategies for a more effective and smoother NBSAP rollout.

- Identify and mobilise champions in each AMS for each of the Aichi Targets.

- Countries and regions outside the ASEAN region need to be made aware of the global implications of biodiversity loss in the region.

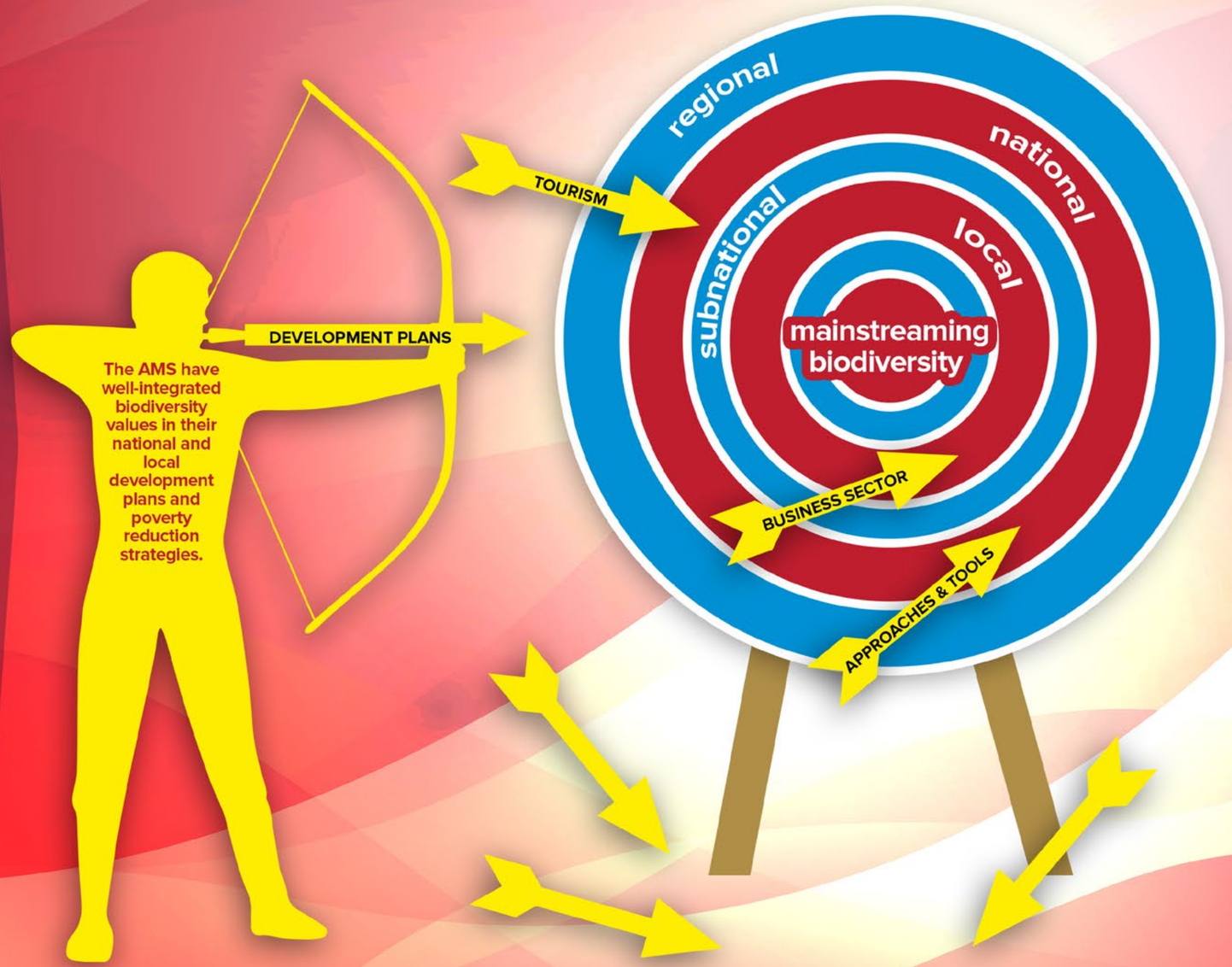
- Communication needs to be strategic, positive, and tailor-fit to different circumstances and cultural situations.

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.

Most AMS are progressing towards this target but at a very moderate rate. Biodiversity mainstreaming is imperative as the attainment of the other Aichi Targets rely on the achievements of this particular target.

Challenges

- Unspecified institutional and legal requirements and lack of a coordinating mechanism
- Nationwide programmes that consistently consider the socio-economic contributions of biodiversity in reducing poverty are not clearly defined
- Low awareness among several public agencies and their role in the implementation
- Assessment activities are seldom carried out
- Lack of concrete actions to ensure the integration of biodiversity issues
- Lack of funds
- Not applying integrated land, water, and seascape approaches
- Valuation, accounting, and reporting need to be improved
- Need for an integrated approach to land-use planning



Ways Forward

- Expedite the mainstreaming process
- Enhance synergy and coordination
- Strengthen the business case on the vast benefits of biodiversity and ecosystem services
- Intensify advocacy campaigns and information dissemination
- Scale-up spheres of influence
- Clearly communicate the benefits of biodiversity and its loss implications
- Identify good entry points for mainstreaming

Aichi Biodiversity Target 2: Biodiversity values integrated

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.

ASEAN Member States or AMS have well-integrated biodiversity values in their national and local development plans and poverty reduction strategies, at varying degrees. Based on the 6NRs, six AMS reported that they are on track towards achieving this Aichi Target while the rest are progressing at an insufficient rate.

Most AMS recognise ecosystem service values associated with agriculture, forestry, fishing, pharmacology, and tourism to be equivalent to billions of dollars. Given their tremendous values, ecosystem services fuel the engine of economic growth in the region.

The region is actively mainstreaming biodiversity at various levels of implementation and governance, from national policies down to the project level. Some policy instruments relate to economic growth and consider ecosystem services, poverty reduction, and development in the context of sustainability and responsible management. All AMS reported of productively decentralising national biodiversity plans to subnational, community, and sectoral levels, thus, bringing conservation initiatives closer to target stakeholders.

AMS are in various stages of adopting land-use plans and reviewing national frameworks and policies and international treaties to consider necessary alignments. At least two AMS have moved towards natural capital accounting and some are implementing a system of environmental economic accounting.

Some AMS have mobilised efforts to raise the awareness of legislators about biodiversity, engage the public and businesses in collaborative planning, and integrate biodiversity in the education system. Stakeholders' training on the importance of biodiversity values and alternative livelihoods, including, or particularly focused on those living in association with protected areas, is a continuing pursuit.

The ASEAN region has been experiencing rapid economic growth and modernisation. In 2020, ASEAN had an estimated total gross domestic product (GDP) of USD 3.08 trillion.[1] The World Economic Forum reported that the region's GDP is increasing annually by 4 per cent over the next decade making it the fourth-largest economy worldwide. By 2030, ASEAN's GDP is projected to reach USD 4.5 trillion.[2]

The main driver of ASEAN's thriving trade is its rich biological diversity. The direct utilisation of the myriad products of biodiversity—food, fibres, fuels, pharmacology, and industrial commodities, *inter alia*—contribute substantially to the region's economy.

However, anthropogenic (e.g., land conversion, illegal wildlife trade, and pollution) and natural factors (e.g., extreme weather events) imperil the region's rich biodiversity and ecosystems. These weaken the capacity of natural ecosystems to provide ecosystem services and benefits to the region's 660 million people. If left unaddressed, environmental degradation and biodiversity loss may derail ASEAN's economic trajectory.

In addressing these ecological and socio-economic challenges, Article 6b of the CBD emphasises the importance of integrating conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans.[3] This sets the premise of Aichi Target 2 to four areas where biodiversity conservation could be integrated and mainstreamed: (1) national and local development and poverty reduction strategies; (2) national and local planning processes; (3) national accounting; and (4) reporting systems.

At the CBD COP 14 in 2018, Parties to the Convention committed to accelerating actions to mainstream biodiversity in full recognition that attaining the CBD objectives is contingent on the full integration of biodiversity across sectors and industries, at all levels—regional, national, and subnational.[4]

Mainstreaming requires that biodiversity agenda is at the core of development targets—sustainable development, poverty reduction, climate change adaptation and mitigation, trade and international cooperation, and sector-specific plans such as agriculture, fishery, forestry, mining,


Photo by Julius Paner

energy, and tourism.[5] It underscores the individual and collective contributions of the government, across all sectors—business and finance sectors, indigenous peoples and local communities (IPLCs), civil society, academia, youth, women, and other relevant stakeholders—in achieving biodiversity objectives.

Most AMS have expressed confidence in meeting this target while others need to heighten efforts towards attaining it. AMS address biodiversity conservation through national and local legislation, policies, and programmes, with varying degrees of progress. Integrating biodiversity concerns into national and local policies, programmes, and plans help determine development opportunities and weigh the trade-offs of conservation initiatives.

In the region, the ACB is a prime mover in mainstreaming global agreements and targets like the CBD and the Aichi Targets. It is mandated to coordinate, facilitate, and bolster cooperation among AMS and international and regional organisations in biodiversity conservation and the equitable and sustainable use of benefits derived from their use. It plays its role as a regional policy and strategy catalyst through flagship programmes like the AHP where it spearheads high-level dialogues, capacity building, CEPA, stakeholder engagement, and knowledge exchange (see Box 3).

As AMS endeavour to achieve their national biodiversity targets, capacitating and empowering programme implementers is an imperative. Thus, under its Secondment Programme, ACB trained 18 senior and junior officials from nine AMS in effective planning and implementation of the CBD and the Aichi Targets.

Conservation policies and measures will be more effective if backed up by sound science. The ACB commissioned four regional studies to assess gender mainstreaming, minimum management standards, climate change resilience, and economic valuation in eight AHPs and two protected areas in the region. Building on these studies, five pilot measures are being implemented in three AMS to capture best practices on the se cross-cutting concerns.

In 2019, the ACB reviewed the NBSAPs via the *High Table on Mainstreaming* to ascertain how biodiversity was contextualised in each of the targets and to clarify issues and provide guidance on how the respective AMS can elevate and accelerate their mainstreaming efforts. The review presented that while biodiversity mainstreaming is evident in all NBSAPs, certain aspects would have to be considered.

- NBSAPs need to provide clear meaning, context, and measures of mainstreaming in their national targets.

Box 3. Regional projects coordinated and facilitated by ACB to facilitate biodiversity mainstreaming:

- ASEAN-EU Biodiversity Conservation and Management of Protected Areas in ASEAN (BCAMP)
- ASEAN-German Cooperation Programme on Biodiversity Conservation (CARE4BioDiv) under the umbrella Development Cooperation Programme
- Biodiversity-based Products (BBP) as an Economic Source for the Improvement of Livelihoods and Biodiversity Protection
- ACB-NBA Cooperation: Capacity building towards Implementing the Nagoya Protocol on ABS, the City Biodiversity Index and the Strategic Plan on Biodiversity
- ASEAN-German Cooperation Programme on Institutional Strengthening of the Biodiversity Sector (ISB)
- Improving Biodiversity Conservation of Wetlands and Migratory Waterbirds in the ASEAN Region
- ASEAN-EU Cooperation: Natural Capital – integrate natural capital and biodiversity into business practices
- ASEAN-ROK Flagship Project on Restoration of Degraded Forest Ecosystem in the Southeast Asian Tropical Regions (AKECOP)

- Mainstreaming efforts on the use of economic instruments, education, local activities and actions, and inter-ministerial mechanisms are entrenched in most NBSAPs. But mainstreaming initiatives in national development and sectoral planning, land use planning, and use of budget instruments and earmarking are usually granular and disjointed.

- Only a few NBSAPS mainstream biodiversity in biotechnology, green procurement, urban biodiversity, water management, infrastructure, energy and mining, and finance and banking.

Entry points for biodiversity mainstreaming in the AMS

Mainstreaming in national and local development plans and poverty reduction strategies

Biodiversity and natural assets are usually valued to the extent that they enhance human well-being and contribute to the national economy. Crucial in this aspect is the depth and breadth by which biodiversity issues are integrated in national, local, and sectoral development programmes and plans. The roll out of programmes and plans are vital to economic development without compromising biodiversity and sustainability.


Photo by Ismail Amin

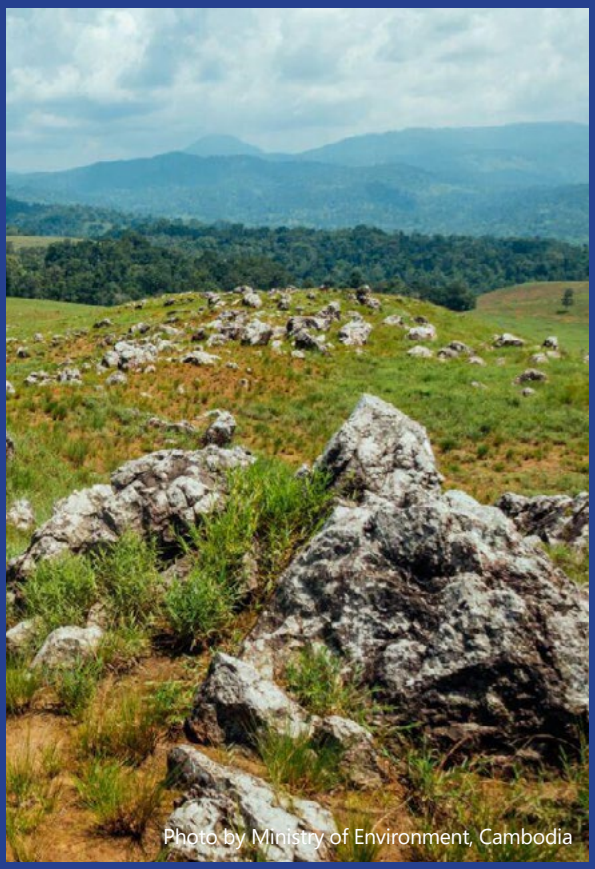


Photo by Ministry of Environment, Cambodia


Photo by Ministry of Environment, Cambodia

Box 4. Biodiversity and Cambodia's development and poverty reduction strategies[6]

Cambodia, in the past decades, underwent massive political and economic reforms. Its economy improved steadily, but much remains to be done to achieve its vision of elevating its status to middle income by 2030 to high income by 2050. To ensure that the country's natural assets are protected and effectively utilised while advancing its development agenda, the government put in place necessary strategies, legislations, and policies.

Cambodia has reflected the biodiversity agenda under Strategy 4 in its Rectangular Strategy IV—Inclusive and Sustainable Development. It focuses on four priority goals: (1) agriculture sector and rural development; (2) sustainable management of natural resource and cultural heritage; (3) urban planning and management; and (4) environmental sustainability and readiness to climate change. Initiatives around these goals have yielded encouraging outcomes.

- Expansion of protected area system to 41 per cent surpassing the global target of 17 per cent, two years before the 2020 target.
- Forest cover maintained at around 60 per cent of the country's land area.
- Withdrawal of 4,100 square kilometres of economic land concessions for social land concession programmes, donation, or reforestation.
- Designation of areas exceeding 9,700 square kilometres as fisheries preservation area, stemming from the abolition of 'fishing lots'.
- Establishment of 610 forestry and fishing associations.
- Registration of cultural heritage sites in the UNESCO World Heritage List: Sambor Prei Kuk Temple, Chapei Dang Veng, Tugging Rituals and Game, and Oral Epic Poem of Reamker Tah krud.
- Adoption and implementation of the National Policy on Land Management.
- Development of the land use plan for Phnom Penh for 2035 and other areas like Tbong Khmum, Sihanoukville, and Battambang.

Box 5. Shared borders, shared response to mainstreaming biodiversity

The Hin Nam No National Protected Area (HNN-NPA)—an 820 square kilometre dissected karst plateau located in central Lao PDR—exemplifies a case of effective NBSAP implementation, strong community engagement, and positive transboundary relation. It has benefitted from the adoption of the Co-Management Plans (2010–2015 and 2016–2020) which support the execution of the NBSAP and adequate institutional and fund support.

The HNN shares borders with Viet Nam, particularly along the contiguous Phong Nha-Ke Bang karst, a designated Natural World Heritage site. It is estimated to be 31 per cent forested with 20 per cent of dense or mature forest. Seven primate species reside in HNN, five of which are globally threatened.

At least 22 villages, most of which are ethnic minorities, rely on the HNN-NPA for subsistence and livelihoods. Pressing challenges that cause undue harm to the park's sensitive ecosystem include unsustainable utilisation of non-timber forest products (NTFPs) and fuelwood; excessive and illegal hunting, snares, and wildlife trade; poaching, illegal logging, and weak enforcement of NPA regulations; and climate change.

To effectively manage the park, the Department of Forestry engaged over 8,000 villagers and relevant stakeholders in the planning and decision-making process, thereby, resulting in some gains.

- Sustainable NTFP harvesting and cropping and livestock raising were organised.
- Local people, HNN-NPA staff, and other stakeholders were trained on ecosystem management where the importance of HNN and its proper utilisation and protection was emphasised.
- Conservation managers and park staff were trained in Integrated Spatial Planning (ISP) and an array of monitoring tools like Open Standard, Adaptive Management, and Management Effectiveness Tracking Tool (METT). This will enable them to generate timely and accurate information and implementation guidelines, apply practical conservation measures, and take accountability and good governance measures.
- Village-assisted research activities by national, regional, and international research entities were carried out.
- Information toolkits on ecotourism were produced.

The Government of Lao PDR and Viet Nam nominated in 2018 the HNN-NPA as a transboundary World Heritage site, a first for Lao PDR.


Photo by Anthony Into


Photo by Aung Ko Oo

Mainstreaming ecosystem-based projects

The *Biodiversity-based Products as an Economic Source for the Improvement of Livelihoods and Biodiversity Protection* (BBP) Project, jointly implemented by the ACB and GIZ, trains and upskills local stakeholders to mainstream biodiversity-based value chains in the manufacturing and processing sectors in the region. It supports the production of bamboo furniture and handicrafts from Lao PDR, and medicinal bath herbs, *giao co lam* tea leaves, *bo khai* vegetables, and honey from Viet Nam. BBP is under the umbrella programme, *Protection of Biological Diversity in the ASEAN Member States in cooperation with the ACB* or the CARE4BioDiv Programme funded by the Federal Government of Germany.

At the country level, the Sabah EU-REDD+ or Reducing Emissions from Deforestation and Forest Degradation Project of Malaysia engages local communities in forest management and rehabilitation and supports their alternative livelihoods. To date, close to 500 households in Gana, Kota Marudu, Kinabatangan, and Bundu Tuhan are involved in community development activities.

The successful *tagal* system of Indonesia—traditional system of protecting natural resources from overextraction, especially fishes—has been a continuing initiative in community co-management to conserve freshwater resources, generate income, and empower IPLCs. 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.

In 2017, the Women's Union of Thua Thien-Hue province in Viet Nam organised communication events which tackled flood resilience and ecosystem-based adaptation. The activities involved nearly 700 women. Union members have organised training courses on management of small-scale community-based ecotourism models to generate economic benefits directly from mangroves. In addition, the organisation established microcredit funds linked to both women's livelihoods and mangrove conservation. As a result, flood resilience has gradually improved.

Mainstreaming in the tourism industry

Tourism is a fast-growing industry in the ASEAN region. Between 2010 and 2018, the region marked an average annual growth of eight per cent in inbound tourism.[7] Collectively, AMS recorded about 135.5 million total visitor arrivals in 2018.

While the tourism industry brings in substantial revenues and provides employment opportunities, its imminent impacts like over-crowding, pollution, and environmental damages may negate the economic benefits. Hence, the importance of the ASEAN Tourism Strategic Plan 2011–2015 in setting the path to a more inclusive, green, and sustainable tourism.

Aligned with the Strategic Plan, the ASEAN introduced standards and guidelines for sound and environment-friendly tourism management through the ASEAN Tourism Standards. The most recent innovation under the programme is the Green Hotel Standard which recognises environmental policy and actions for hotel staff, and environment-friendly practices in collaboration with the local community and organisations. The 2018–2020 ASEAN Tourism Standard recognised 47 hotels across the region as Green Hotels.[8]

At the community level, the Community-Based Tourism (CBT)[9] Standard provides a set of performance indicators to evaluate participating communities in terms of ownership, operation, and management of tourism activities. Fundamental to the programme is bringing harmony between livelihood activities and protection of the natural and socio-cultural heritage of the community. This requires comprehensive training in tourism management of the participating community.

Mainstreaming in the finance sector to leverage funds

Protecting biodiversity is essential for the long-term survival of industries and businesses, hence, the aspiration of sustainable economic development in the region.

In 2019, AMS piloted the ASEAN Catalytic Green Finance Facility (ACGF) under the ASEAN Infrastructure Fund (AIF) with an initial investment of more than USD 1 billion in green infrastructure across the region. The ACGF provides loans and technical assistance for green and climate-friendly infrastructure projects to help mitigate climate change, improve air and water quality, and reduce environmental degradation. These include sustainable transport, clean energy, and resilient water systems.[10]

The ACB and the National Biodiversity Authority of India organised a regional workshop in 2018 on integrating biodiversity with development sectors in AMS. Experts from the region's banking and finance sectors exchanged experiences in promoting biodiversity and environmental conservation in the finance industry. Highlighted in the conversation was the need to shift from business-as-usual banking system models that prioritise profitability and putting a stop to the financing of businesses that harm biodiversity and the environment.


Photo by Taman Negara National Park

An example of an innovative sustainable financing scheme is Thailand's Tree Bank Programme where high-value trees like teak and Burmese rosewood can be presented as collaterals for low-interest loans. Members of the Bank for Agriculture and Agricultural Cooperatives may apply for loan amounts of as much as 80 per cent of the trees' monetary value. During the loan period, high-value trees are not allowed to be cut down. In 2018, around 6,000 communities with 150,000 farmers growing over 11 million trees joined the Tree Bank Programme.[11]

In 2015, the State Bank of Viet Nam issued a policy requiring banks to include environmental and social risk management in their lending criteria. This was in support of green growth development and green credit targets which seek to address climate change mitigation. As a result, HSBC Viet Nam explored solutions to provide loans to households that install solar panels. HSBC is also looking into several renewable power schemes to reduce the utilisation of fossil fuel.


Photo by Tin Min

Three Singaporean banks (DBS, Oversea-Chinese Banking Corporation, and United Overseas Bank) have shifted away from funding coal power projects and focused on financing renewable energy in the ASEAN region. The shift from fossil fuel sends a signal to other ASEAN banks and policymakers that sustainable development and coal-fired energy generation are irreconcilable.[12]

Mainstreaming in the private sector and industries

Conservation programmes would benefit considerably from the participation of the private sector because they have the means, machinery, and capability to finance conservation initiatives. In recent years, the private sector's involvement has moved beyond corporate social responsibility (CSR) activities to long-term conservation programmes.

Since 2020, the Philippines' Securities and Exchange Commission (SEC) has been requiring publicly listed companies to submit sustainability reports using set guidelines. These guidelines enable the SEC to annually review and manage the economic, environmental, and social impacts of companies. At least 22 per cent of companies are reporting their sustainability impacts and performances.

Similarly, the companies registered in the Stock Exchange of Thailand (SET) are included in their Sustainability Investment and encouraged to shift to sustainable business practices. The list includes companies that meet at least 50 per cent of economic, environmental, and social indicators, and the qualification for listing by Dow Jones Sustainability Indices (DJSI), a leading index provider.

Myanmar's Ministry of Natural Resources and Environmental Conservation (MONREC)

and the Shwe Taung Cement Co., Ltd. in 2018 officially agreed to implement a biodiversity offset programme for cement and coal mine concessions. This programme showcases private sector involvement in conservation and compliance with the environmental management plan. In another case, MONREC leased about 4,047 square metres of land at the Lampi Marine National Park to Benchmade Asia Ltd. for ecotourism. In turn, Benchmade Asia allocated 20 per cent of its profits for the protection of the park.

The Myanmar Centre for Responsible Business (MCRB) helps businesses understand how their activities can negatively impact biodiversity and cause losses in ecosystems services. It also makes businesses understand their responsibility to respect human rights in relation to access to these ecosystem services, and thus, to mitigate the potential impacts of their activities. In 2018, MRCB organised a multi-stakeholder consultation and a training course headlined by international experts on biodiversity and environmental impact assessment in Yangon. The MCRB is developing national biodiversity databases mapping protected areas, KBAs, and corridors to assist in the large-scale planning of development.

Mainstreaming approaches and tools

Valuation approaches and tools are vital in that they inform national and subnational policy and decision-making. They also provide a basis for mainstreaming natural capital considerations into socio-economic and investment planning. Determining the tangible and intangible values of ecosystems and biodiversity helps identify conservation priorities and provides the basis for evaluating the trade-offs between conservation and development initiatives.

The Government of Viet Nam has gradually integrated green accounting into the national accounts. Implementation has reached the stage of experimental calculations. For instance, through the project *Removing barriers hindering protected area management effectiveness*, Viet Nam assessed the value of its forests, mangroves, coral reefs, and


Photo by Han Tha

Box 6. Mainstreaming tools in making a business case

The Moeyungyi Wetland is a 103.6 square kilometres wildlife sanctuary in the southern Bago region in Myanmar. Officially declared a Ramsar site in 2004, the wetland provides livelihoods to over 45,000 people in 17 villages within and around the area. These livelihoods include fishing, padoma lotus harvesting, rice cultivation, buffalo and cattle grazing, and duck rearing. The communities also earn from local industries such as production or processing of *ngapi* (fish paste), cheroot (tobacco), lotus textiles, and dried stalks of *pein* (Taro).

In 2015, the ecosystem services derived from this wetland was assessed and valuated using the Toolkit for Ecosystem Site-based Assessment (TESSA).

Ecosystem services in monetary values
(in million USD)

Water	8.5
Food and other harvests	16.2
Rice cultivation	0.4
Tourism	0.07
Offset by:	
Carbon emission	3.1
Management costs	0.2
Conservative net value	22

in direct value (>2000/ha/yr)
plus USD 91.6 million in carbon stored

This builds a strong case for the importance and role of natural systems in providing goods, services, and livelihood to local communities and other stakeholders while continuing to support wildlife and biodiversity.

Source: 6NR of Myanmar

sea grass. The natural capital in Bidoup-Nui Ba National Park in Lam Dong province was computed at USD 1.12 billion; yet, the total financial funding for the park is about 40 billion VND per year (USD 1.73 million) or a mere 0.16 per cent of the value of its natural resources. This illustrates a common scenario where the benefits from natural ecosystems outweigh the investments poured into its management and protection.

Similarly, Myanmar is moving towards natural capital accounting of forests. A study on forestry indicated the considerable economic benefits from investing in forest conservation and sustainable use.

The Natural Capital Project of Singapore likewise demonstrated a direction towards an evidence-based approach to decision making and urban planning. The project, which ran from 2018 to 2021, did an economic valuation of the benefits derived from the country's ecosystems in the context of a tropical and largely urbanised country.

A report on Singapore's natural capital is targeted to be produced to inform and guide policy. It seeks to develop an interactive digital planning tool for use by urban planners, developers, and architects in drawing urban plans and developing natural areas with minimal environmental impacts but optimum benefit. The three-year project is co-led by the Singapore-ETH Centre and National University Singapore and supported by the National Research Foundation.

Spatial and land use plans are indeed tools in formulating conservation and sustainability measures in that they ensure that land and resource use are appropriately situated to maximise production without undermining or degrading biodiversity.

The National Physical Plan 3 (2016–2020) of Malaysia, the current statutory land use plan at the federal level, highlights the policy for using Environmentally Sensitive Areas (ESA) to provide goods, services, and life-support systems such as water purification, pest control, and erosion regulation. A subsidiary legislation approved in 2015 was updated, stipulating the need to prepare Environmental Impact Assessments (EIAs) for 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 highlights the importance of ESAs to biodiversity and the ecosystem services it provides. Through the SSP, ESAs will be integrated into land-use planning to facilitate land legislation.

At the state level, the first marine spatial plan of Malaysia—the Semporna Marine Spatial Plan (SMSP)—was developed by the Sabah Town and Country Planning Department, Semporna District Office and WWF-Malaysia. The SMSP covers the entire 7,680 square kilometres of territorial waters of Semporna District and is located at the apex of the biologically diverse Coral Triangle. Coastal Integrated Vulnerability Assessment Tools (CIVAT) study was conducted in partnership with Universiti Malaysia Sabah (UMS) to assess the vulnerability of coastlines and provide recommendations for climate change adaptation for the community.

In Viet Nam, an NBSAP project was piloted in 2015 in the provinces of Lang Son and Son La to formulate, adjust and integrate biodiversity conservation priorities into local

Box 7. Competing interests of forest degradation for economic activities versus forest conservation[13]

Myanmar is moving towards natural capital accounting of its forests. A valuation study assessed the ecosystem services derived from forests from 2013 with projections to 2031. It compared the economic benefits in conserving the forest and utilising its resources sustainably as against continuous forest degradation and deforestation. The ecosystem services evaluated were wood and non-wood products, tourism, pollination, carbon, mangrove shoreline protection, watershed protection, and mangrove fisheries. Continuous forest degradation showed short-term gains (a span of four years) while projected losses up to 2031 amount to USD 17 billion. In contrast, investing in forest conservation projected gains of around USD 22 billion by 2031.

land-use planning so it can be taken up to legislation (Circular No. 29/2014/TT-BTNMT of 2014).

In the Philippines, the Comprehensive Land Use Plan (CLUP)—main land-use planning instrument—provides analytic tools and processes in the study of the ecosystem. In 2013, the Philippines incorporated the framework and methods for mainstreaming biodiversity in the CLUP under the Biodiversity Partnership Programme (BPP) of the United Nations Development Programme/Global Environmental Finance and the Department of Environment and Natural Resources and Housing and Land Use Regulatory Board.

As part of the action plan under its National Target 4, Myanmar completed in 2018, the Strategic Environmental Assessment (SEA) for the hydropower industry, which includes sections on biodiversity issues. Important aspects of the SEA on hydropower is identifying appropriate river stretches or sub-watersheds for medium/large-scale hydropower, those to be retained in their existing state, and enabling new projects to be sited to avoid significant adverse environmental and/or social impacts. Meanwhile, work on the SEA for the mining sector, oil and gas, and marine spatial planning are on-going.

Singapore mainstreams conservation efforts through science-based and systematic land use planning. The National Parks Board of Singapore, the lead agency in biodiversity conservation, works closely with the Urban Redevelopment Authority, which takes charge of land use planning, to ensure the optimum utilisation and effective safeguarding of

Box 8. Singapore's blueprint for building green cities[14]

The Building and Construction Authority (BCA) launched the third Green Building Masterplan in 2014 which maps out a holistic strategy to accelerate the "greening" of existing buildings and encourage building owners, managers, and occupants to play a greater role in the green building movement.

The project trained 20,000 specialists in the green building sector in 2020. Three major initiatives of the third Green Building Masterplan are a USD 52 million fund for the Green Buildings Innovation Cluster, a USD 50 million Green Mark Incentive Scheme for Existing Buildings and Premises, and a new award – the Green Mark Pearl Award – to recognise developers and building owners who have actively engaged their tenants to reduce their energy consumption.

Source: Singapore. Ministry of the Environment and Water Resources; Singapore. Ministry of National Development. (2014.). Our home, our environment, our future : sustainable Singapore blueprint 2015. https://sustainabledevelopment.un.org/content/documents/1537Sustainable_Singapore_Blueprint_2015.pdf

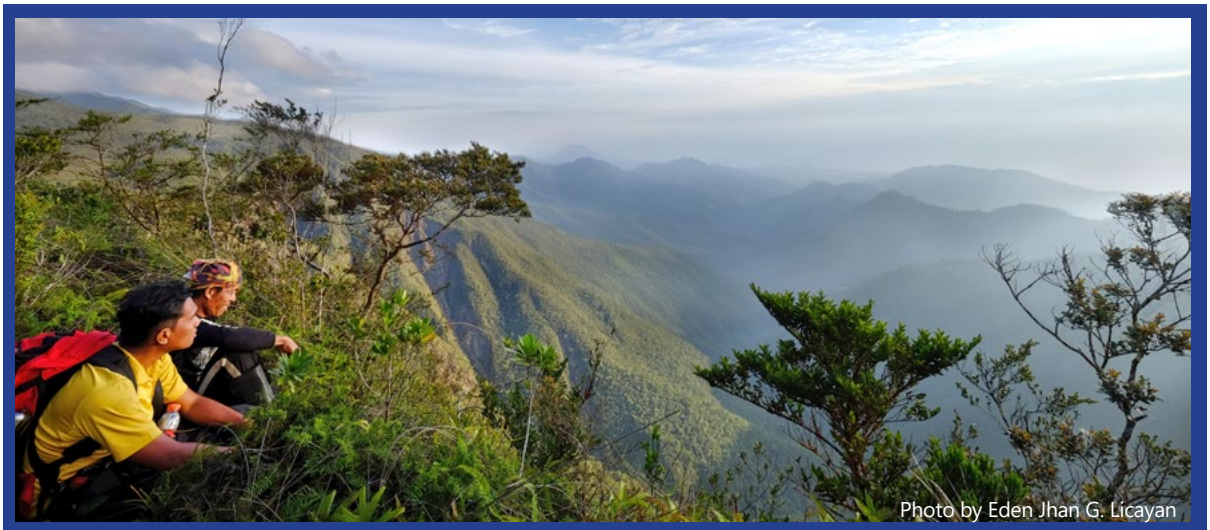


Photo by Eden Jhan G. Licayan

Box 9. The Philippine roadmap for mainstreaming biodiversity in the national programme

The Philippine Government approved in 2014 the Enhanced CLUP which takes into account climate change adaptation, disaster risk reduction, biodiversity conservation, and sustainable use in land-use planning. Under Republic Act No. 7160, local government units (LGUs) were mandated in 2016 to update or prepare their respective CLUP and Comprehensive Development Plans (CDP) with the enhancements taken into account. The *Framework and Methods for Mainstreaming Biodiversity in the CLUP* project was piloted for critical biogeographic regions that cover protected areas and Key Biodiversity Areas (KBAs).

Complementary training among LGUs on biodiversity conservation, programme planning, and implementation were conducted. As a compliance incentive, approved CLUP and CDP would entitle the LGU to vie for the Seal of Good Local Governance—a badge of honour symbolising integrity and good performance in service areas, including environmental protection.

At project closure in 2017, 56 per cent of the LGUs have integrated biodiversity conservation zoning (protected area or KBA zoning) in their CLUPs. However, only 257 out of 1,634 cities and municipalities or 16 per cent have revised their CLUPs as of 2018.

What factors led to this low turnout? While the LGUs are in different stages of drafting, revising, or submitting their CLUPs, LGU feedback points to inadequate knowledge of biodiversity, access to updated information and maps, funds, manpower, and expertise as a roadblock to improved compliance.

Source: 6NR of the Philippines

natural and man-made vegetated areas. Under the Planning Act, development projects need to undergo a thorough Environmental Impact Assessment (EIA) especially if they are proposed to be located near sensitive areas like nature reserves, nature areas, and marine areas of significant biodiversity, or development proposals that have potential transboundary impact. A consultation process with relevant agencies takes place to assess in greater detail potential impacts and mitigating measures of projects on the environment. Recently, as a result of the EIA frameworks review, findings were made publicly available to further strengthen the EIA process and minimise the impacts of development projects.

The Department of Statistics of Malaysia collaborated with the United Nations Statistics Division on a pilot initiative that adopts the System of Environmental Accounting (SEEA) for energy, water, air emission (energy use), and agriculture. Under the initiative, indicators for a green economy are identified as part of its economy-wide framework. As a result, Malaysia now has available accounts for water and energy, and has defined 79 green economy indicators. The accessibility of data enables a more effective monitoring and implementation of economic activities in consideration of the benefits derived from and their impacts on the environment.


Photo by Eduardo S. Seastres

Challenges

- The mention of biodiversity mainstreaming within NBSAPs is often broad and does not specify the institutional and legal requirements that are needed to achieve the aspirational objectives. This factor, combined with a lack of a coordinating mechanism, creates a significant barrier to implementation.[15]

- Improvements to include biodiversity values into sector legislation, policies, and strategies occur mainly at the national level. Nationwide programmes that consistently consider the socio-economic contributions of biodiversity in reducing poverty are not clearly defined. In many cases, the integration of biodiversity and environment protection into socio-economic development programmes has begun, but full implementation across sectors and at different levels has been slow.

- The review of previous policies and plans on biological diversity revealed the need for enhanced involvement and coordination with several public agencies and clarification of their roles in the implementation of such policies and plans. This shortcoming was particularly prevalent in local agencies where biodiversity content was found to be absent in provincial development plans.

- Assessment activities are seldom carried out, if at all, on a wide scale (i.e., nationwide, across landscape/seascape) usually due to lack of expertise, staff, and fund support. Valuable data and information obtained from assessment should form the bases for data-driven policies, programmes, and services for higher economic and environmental impact.

- Concrete actions are needed to ensure the integration of biodiversity considerations into the language and enforcement of laws, regulations, measures, and mechanisms that are related to the promotion of and the creation of incentives for conservation, restoration, and sustainable use of biological diversity.

- In laying down plans of action towards actual plan execution, a common concern of the AMS is resource mobilisation. Case in point is the large financing gap to implement the NBSAP as reported by the BIOFIN.[16] In the Philippines, about PHP 24 billion (USD 530 million) per year is needed to implement the NBSAP. It is important to mobilise funding by improving the business case for biodiversity and green investments. This requires anchoring the natural capital in companies' non-financial reporting to influence the decision made by executives and investors and skirt sectoral investment flows in a more biodiversity-friendly direction.[17]

Ways Forward

- There is a need to expedite mainstreaming processes as several other Aichi Biodiversity Targets depend on the integration of biodiversity into national and local development plans and strategies.[18]

- Synergistic and coordinated approaches in and among biodiversity conservation projects, programmes, agencies, and other sectors to complement efforts and produce positive outcomes are recommended.[19]

- Strengthen the business case for biodiversity and ecosystem services by incorporating biodiversity in the strategy, governance, impact assessment, risk management, due diligence, disclosure and external reporting, industry standards, labels and certification schemes, and communication.[20]

- In many cases, the integration of biodiversity and environment protection into socio-economic development programmes has started. There is a growing recognition of biodiversity and its values resulting from intensified advocacy campaigns that target a wider audience that now includes policymakers, youth, media, and the general public.

- There is a need to expand the spheres of influence of biodiversity knowledge, mobilise multi-sectoral implementation of biodiversity-friendly strategies, and support biodiversity champions from among non-traditional partners including IPLCs, and the private and business sectors.

- Communicate clearly the benefits of biodiversity and the implications of its loss in the ASEAN and beyond.


Photo by You BunChan

- Gather data and analytics that illustrate ecotourism trends, and identify pain points to address and bright spots to pursue.
- Apply integrated land, water, and seascape approaches to reap the benefits of ecosystem services, deal with cross-sectoral issues, protect the interests of smallholders, and improve current conservation efforts.[21]
- Significantly improve the valuation, accounting, and reporting of biodiversity and ecosystem-related use, impacts, and risks.[22]
- Take an integrated approach to land-use planning that includes sectoral interests, smallholders and local communities, improve land tenure security for smallholders, and realise the coupling of payments for ecosystem services.[23]

Photo by Kyaw Kyaw Winn

TARGET 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

Most AMS have exerted efforts in reviewing and restructuring their laws and strategies. Incentives offer opportunities to mainstream biodiversity conservation into their social and economic agenda, but mechanisms to eliminate those that are harmful to biodiversity have yet to be established.

Challenges

- Mechanisms to eliminate, phase out, or reform subsidies that are harmful to biodiversity have yet to be established across AMS.
- There is a need to review the impacts of perverse incentives relating to the sectors of energy, livestock, agriculture, aquaculture, tourism, forestry, and mining, and eliminate or reform those which impact biodiversity resources negatively.
- Instruments which can incentivise or disincentivise conservation initiatives include tenure and customary rights, rewards and awards, market-based instruments like taxes, fees, charges, subsidies, tradable permits, eco-labelling, certifications; Other incentives: improved livelihoods, capacity building

CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY

Some AMS have revised and redesigned laws and policies to enable community management of forests, and address concerns on local land tenure.

Some AMS recognise the need to develop and implement needs-based design for incentive mechanisms to control the anthropogenic impacts on biodiversity; means of phasing out perverse incentives; and development and implementation of performance-based incentives to encourage sustainable agricultural practices.

Incentives for biodiversity-friendly performance are demonstrated through awards and recognitions for exemplary environmental actions in different sectors.

Market-based incentives like the Payment for Environmental Services (PES) are increasingly being utilised across the region.

Ways Forward

- Review and analyse policies and programmes on incentive mechanisms
- Formulate and implement policies on ecosystem services valuation
- Capitalise on and scale up the use of positive incentives
- Incentivise participation in conservation initiatives especially among IPLCs
- Ensure the active involvement of IPLCs, and other rights-holder groups
- Strengthen positive incentives by ensuring that parties in conservation initiatives directly benefit from them
- Intensify the monitoring, compliance, and enforcement of incentive measures
- Explore other innovative economic and social incentives

Photo by Sharkawi Che Din

Aichi Biodiversity Target 3: Incentives reformed

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Some AMS have been developing and implementing needs-based design for incentive mechanisms that control anthropogenic impacts on biodiversity, means of phasing out perverse incentives, and performance-based incentives to encourage sustainable agriculture practices. In at least two AMS, some laws and policies have been revised, rewritten, and redesigned to enable community management of forests and address local land tenure. Several projects have been mobilised to implement these innovations. Some forms of incentives for biodiversity-friendly performance are demonstrated through giving of recognition and awards for exemplary environmental performance.

Photo by Dwight Jason Ronan

Incentive[1] can be any inducement which is specifically intended to motivate governments and local people to conserve biological diversity, use biological resources sustainably, and equitably share the benefits arising from the use of genetic resources. Incentives may take the form of property rights, market-based instruments (e.g. taxes, subsidies, and financial mechanisms), fiscal instruments, and livelihood support.

Disincentive can be any inducement or mechanism designed to discourage governments, local people, or corporations from depleting biological diversity.

Agricultural systems depend largely on bees, birds, bats and other animals to pollinate crops. Humans, for centuries, have been dependent on natural resources to produce medicines for the treatment of many illnesses. Every year, healthy coral reefs in the ASEAN region attract millions of tourists, generating billions of dollars from "on-reef" activities like diving and snorkeling. These economic activities utilise biodiversity resources to address developmental issues and basic human needs—food, health, and livelihood. However, the escalating economic activities in the ASEAN region have placed the sustainability of its biodiversity resources at risk.

Article 11 of the CBD on incentive measures requires Parties to "as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of biological diversity".[2] This is articulated in Aichi Target 3, which aims to reduce the impact of negative subsidies and incentives on biodiversity and enhance the development and application of positive incentives for better conservation practice.

Through Decision III/18, COP 3 of 1997, the CBD resolved that incentive measures should be integrated into the sectoral and thematic items of its work programme. It tasked the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to provide scientific, technical, and technological advice to the COP to ensure its implementation.[3] At its Sixth Meeting in 2002, the CBD adopted a programme of work on incentive measures that were incorporated to the Strategic Plan for Biodiversity 2011–2020.[4]

Incentives are intentionally designed to attain specific objectives and usually attached to a system of rewards to stimulate action and participation of target stakeholders. For instance, private companies may opt to engage in conservation programmes to avail themselves of tax rebates. Increased compliance may be elicited among local government units to merit a seal of excellence for good performance, which may mean an increase in budgetary allocation from the national government.

Photo by Adel D. Samson

A well-designed system of positive incentives can encourage better stewardship of the land, inland waters, and oceans; conversely, the best conservation policies can easily be undermined by incentives that encourage overexploitation of resources.[5] Hence, it is important to constantly examine incentive measures if they remain aligned with set objectives; and applicable and beneficial to stakeholders. On the other hand, incentives that generate unfavourable outcomes should be reformed or eliminated.

The GBO 4 states that there is limited progress toward this target particularly on eliminating or changing incentives that are harmful to biodiversity. But countries are gaining more ground in developing and implementing positive incentives.

Gauging regional progress towards this target is a challenge because data and information, especially on non-financial incentives, are hard to measure and are inadequate.[6] But the common initiative indicated in the 6NRs is the continuous review and, to some, revision of relevant legislations, agreements, and programmes to ensure that incentive schemes actually provide benefits and are not deterrent to forestry management, alternative and healthier crop production, green growth, ecotourism, and other nature-based livelihood options. Some AMS have enhanced their NBSAPs by embedding and implementing innovative incentive schemes in conservation programmes. Incentive mechanisms like Payment for Ecosystem Services (PES), village or community fund, and reward system are being implemented with varying results.

Reflecting incentives in national policy frameworks and sectoral programmes

The National Voluntary Land Degradation Neutrality Targets and Measures for 2030 of Cambodia underscored the PES approach as an effective incentive scheme in the context of poverty reduction, species and ecosystems conservation and restoration, sustainable agriculture and tourism, and climate change mitigation through the Reducing emissions from deforestation and forest degradation (REDD+) programme. The Wildlife-Friendly Ibis Rice Project (Ibis Rice) illustrates that economic progress and biodiversity conservation can work hand in hand with desirable and acceptable incentives.

Lao PDR has focused on examining the incentive structures in the mining and hydropower sectors as these industries have proven track record of high environmental compliance, contributing funds for village-level projects, and supporting alternative livelihood improvements.


Photo from Hoang Lien National Park


Photo by Kyaw Kyaw Winn

The evaluation of the Indonesian Biodiversity Strategy and Action Plan (IBSAP) 2003–2020 gave rise to the national target which addresses the need to develop incentive and funding schemes in the business sector to control the impacts of anthropogenic activities on biodiversity.

Through Malaysia's National Green Growth Strategy, harmful subsidies on selected crops were reviewed in order to rationalise incentive schemes. They also implement performance-based incentives to encourage sustainable agriculture practices. In the fisheries subsector, the Fisheries Development Authority is mandated to improve the fisheries industry and look after the welfare of fishermen by improving their livelihoods through better infrastructure facilities (e.g., fish landing jetties, etc.) and social and financial incentives (e.g., catch incentives, fuel subsidies, living allowance, and life insurance).

The conservation strategy of Myanmar, contextualised in its national legal framework, highlights tenure rights, including community tenure and management rights, especially for fisheries and forestry. As a result, the Forestry Law was rewritten, in part, to enable community management of forests and recognise local rights. The Land Law is likewise being redesigned in consideration of local land tenure to ensure the success of forest restoration programmes.

The Department of Thai Traditional and Alternative Medicine developed a National Masterplan on the Development of Herbal Plants (2017–2021) towards their sustainable management and utilisation, by implementing community-based economic forests, and by protecting plant species' genetic diversity in the wild. The Department of Local Administration issued policies and guidance in managing local resources and conducting inventories of the biological, physical, and cultural/intellectual resources in their areas of jurisdiction to feed into its management and conservation plans.

The promotion of organic agriculture in Thailand hinges on the National Organic Agriculture Development Strategy (2017–2021), a 5-year programme that aims to increase agricultural productivity and establish the country as a local and international hub for organic agricultural products.


Photo by Arkar Tun Kyaw

Incentivising stakeholder engagement through involvement in conservation initiatives

Across the region, there is a growing recognition of the important roles of IPLCs in ecosystem-based resource management initiatives. Forest management by IPLCs is proving to be effective in conserving the natural ecosystems. All these approaches primarily aim to alleviate poverty, halt biodiversity loss, and settle land conflicts.

Myanmar's forest laws and policies have continued to evolve along with its need to address the diminishing forest resources. The 1992 Forest Law focuses on conservation initiatives while the 1995 Forest Policy gave rise to the institution of Community Forestry Instructions (CFI) and the introduction of community forestry (CF). CF entitles rural communities to co-manage and protect forests where they obtain subsistence. Since then, the paradigm on forest use for its commercial value has shifted to greater recognition of the ecosystem services and benefits those forests provide. The CFI Law allows Community Forest User Groups (CFUG) a 30-year leasehold agreement. This opens up better opportunities for people to engage in forest-related enterprises.

In recent developments, the Government of Myanmar aimed to expand its forest areas under CF to 1,300 and 9,190 square kilometres by 2020 and 2030, respectively. As of 2019, 2,487.11 square kilometres have been certified by the Forestry Department, covering 4,707 CFUGs comprising 119,355 households.[7]

With the new Forest Law enacted in 2018, more stringent measures are now being implemented to protect Myanmar's forest resources. For instance, individuals, including forest officials and staff, or groups who are found to accept bribes or participate in the extraction, transfer, or possession of illegally cut logs and forest products shall be imprisoned by up to 15 years.[8]

The concept of social forestry espouses the thinking that the people who benefit from

forest resources are more likely to manage them sustainably to ensure long-term benefits.

In 2016, the Social Forestry Programme (SFP) of Indonesia expanded its scope for forest land under community management, from the previous 17,000 square kilometres to 127,000 square kilometres. This major reform aimed for three main objectives: (1) settle tenure disputes; (2) promote community well-being; and (3) conserve forest functions. The SFP builds on patterns of empowerment like the development of conservation villages, grant of access to forest resources, and facilitation of partnerships.

Viet Nam's Environment Law 2015 underscores environmental protection in the development and implementation of plans in natural resources use and protection and sustainable development of forestry resources. The government, through policies and incentives, supports local communities living in and around the protected areas' buffer zones so that they can effectively participate in conservation and livelihoods development.

In the fisheries subsector, Malaysia's Fisheries Development Authority is mandated to improve the country's fisheries industry. It looks after the welfare of fishermen and helps improve livelihoods by making available good infrastructure facilities (e.g., fish landing jetties, etc.) and by providing social and financial incentives (e.g., catch incentives, fuel subsidies, living allowance, and life insurance).

Box 10. IBIS Rice Project of Cambodia: Improving people's livelihoods while protecting biodiversity resources[9]

The forests and wetlands of northern Cambodia and the Tonle Sap Biosphere Reserve are natural habitats for 30 globally threatened species including eight Critically Endangered (CR) species, among which include the Giant Ibis (*Thaumatibis gigantea*), Cambodia's national bird. They are also home to the poorest of the poor communities who rely on farming and the forest resources for subsistence. Local communities co-exist and compete with wildlife for the use of the ecosystem. These people may own small parcels of land or none at all, and have limited knowledge and capability when it comes to agriculture production and marketing, more so, biodiversity conservation.

In 2009, the Wildlife Conservation Society (WCS), an international non-government organisation (INGO), partnered with Sansom Mlup Prey (SMP), a local NGO, in starting the Ibis Rice, a not-for-profit conservation enterprise involving local farmers. They introduced PES scheme wherein WCS and SMP buy the farmers' rice produce at a premium price with certain agreements and on conditions of strict compliance with conservation measures for the protection of species and the protected area.

What were the agreements?

- The local community developed a land-use plan and defined clear demarcations on areas where the cultivation of rice and other crops is allowed to prevent conversion of wetlands for farming purposes.
- The community agreed to prohibit the hunting and collection of rare water birds.
- The farmers commit themselves to zero poaching.
- A locally elected natural resource management committee (NRMC), composed of representatives from the village, was established to craft and implement policies. Governance in the hands of the local community instilled a high degree of ownership resulting in increased compliance and cooperation.

Milestones:

- A Village Marketing Network (VMN) was formed to procure rice from the farmers and consolidate the produce. Under NRMC's supervision, it verifies farmers' compliance with set agreements.
- SMP and WCS transport, process, and package the Ibis Rice for selling.
- The participating rice-farming families, branded as "Wildlife Friendly," increased their income.
- From 141 participating families across seven villages in 2011, the figure grew to 339 families across 11 villages in 2014. The target is to expand the project in 15 villages.
- The Giant Ibis population has been slowly recovering, along with other threatened species.
- WCS Cambodia has received certification from the Wildlife Friendly Enterprise Network for Ibis Rice, labelling it as Wildlife Friendly™.


Photo by Ivy Marie Mangadlao

The Ecosystem-Based Conservation of Myanmar's Southern Coastal Zone (MyCoast) Project, which began in 2018, supports fisheries and forestry communities to improve the coastal and marine management in the regions of Taninthayi and Myeik. This collaborative project of the UN FAO and the Department of Fisheries, funded under the GEF, endeavoured to help conserve hundreds of thousands of hectares of mangroves, seagrass, and other coastal zone resources.

The Promotion of Marine and Coastal Resources Management Act (2015) of Thailand brings to light the participation of public and local communities in conservation efforts. Through the legal framework, local communities have actively taken part in formulating and implementing measures to protect marine and coastal resources like surveillance activities on encroachment of mangrove forests, exploitation of resources, and dumping of wastes in coastal areas. The revised act paved the way for the creation of provincial committees to help regulate and protect marine and coastal resources in every coastal province and to facilitate the development of a local plan for marine and coastal resources management.

In Viet Nam, a report by the Provincial Department of Natural Resources and Environment in Thua Thien Hue states that from 2015 onwards, 23 fishery community-based protection zones with total land area of 6.14 square kilometres were established in Tam Giang and Cau Hai lagoons. Local fishermen have been actively supporting this community-based management model and followed the developed plan and guidelines for implementation.

Biodiversity conservation through market-based incentives

The PES concept is proven to be an effective incentive mechanism in programmes on poverty reduction, biodiversity conservation, and resource generation commonly carried out through community-based ecosystem management. Defined, PES are compensation given to farmers, landowners, or communities for properly managing lands or watersheds to provide ecological service.

In Lao PDR, the PES concept is being considered for hydropower (e.g., Theun Hin Boun Hydropower, Nam Theun Hydropower Company), ecotourism activities (e.g., Nam Nern PA Night Safari), and in at least eight REDD+ projects in six provinces.

REDD+ is a framework created by the UNFCCC Conference of the Parties (COP) to guide activities in reducing emissions from deforestation and forest degradation, as well as the sustainable management and conservation of forests, and enhancement of forest carbon stocks in developing countries.[11]

Box 11. Viet Nam's PFES scheme breaks ground in addressing cross-sectoral issues[10]

Building on the PES concept, Viet Nam in 2014 initiated the Payment for Forest Environmental Services (PFES) across the country to mobilise financial resources from service users, mainly industries, and facilitate community engagement in watershed forest protection and nature conservation. The Government of Viet Nam supported this programme with solid legislations articulated in a number of decrees that provide guidance on payment monitoring and principles and methods of verifying forest areas incorporated into PFES, among other facets.

The country's pioneering attempt at applying PFES was in 2008 in the provinces of Lam Dong and Son La. Water users, including hydropower plants, bottled water companies, and other entities, were required to pay for environmental services. From 2012 to 2014, the total PFES collected amounted to USD 157 million (VND 3,329 billion), coming from hydropower plants (97%), bottled water facilities (2%), and tourism businesses (less than 1%). By mid-2016, the total revenue was USD 269 million (VND 5,700 billion), of which USD 198,000 (VND 4,549 billion) was paid to both forest and non-forest owners.

To date, the PFES approach has generated nearly USD 400 million. This ground-breaking initiative is well-recognised by the country's forestry, agriculture, and rural development sectors.

However, payments to rural forest owners in form of cash have been a concern as it poses security risks and presents an opportunity for corruption. To address these concerns and ensure transparency, the PFES e-payment or cashless payment was introduced in the two pilot provinces with support from USAID's Viet Nam Forests and Deltas (VFD) Programme, Viet Nam Forest Protection and Development Fund, and the Viettel Group (telecommunications company).

In 2019, the Cat Tien National Park in Lam Dong province was the first to successfully payout 258 households who work to protect the forests. The e-payment scheme shall be expanded to 12,000 additional households. Through the Ministry of Agriculture and Rural Development, guidance on the use of e-payments under the PFES scheme across the country shall be fine-tuned and broadened to around 500,000 households.

All AMS, except Singapore and Brunei Darussalam, have participated in the UN-led REDD+ framework. Since its inception in 2008, REDD+ has provided financial incentives for sustainable forest management and climate change mitigation in developing countries by way of reducing net emissions of greenhouse gases through enhanced forest management.[12]

Cambodia applies PES schemes in its national programmes in the context of species and ecosystems conservation, sustainable agriculture and tourism, and the REDD+ programme. The Nest Protection and the Ibid Rice Programmes have shown promise even though a specific law or regulatory framework on PES has yet to be established. A key to this is the small scope of the programmes and the relatively simple payment systems.

Fiscal incentives are important components in sustaining conservation projects which usually undergo complex processes and take time for outcomes to manifest.

Conservation-related activities in Viet Nam receive financial support at different levels. In 2005, the World Bank, GEF, and the Dutch Government started the Viet Nam Conservation Fund (VCF), a non-refundable aid and trust amounting to USD 15 million for forest management. The Fund has supported about 70 protected areas and small protected areas that have limited capital sources. From the VCF, Trust Funds were established for the implementation of the Viet Nam Forestry Development Strategy 2006–2020.

At the community level, the Community Development Fund (CDF) small grant was initiated by FAO, International Fund for Agricultural Development (IFAD), ADB, and Japan International Cooperation Agency (JICA) for projects on poverty reduction, environmental protection and capacity


Photo by Yan Naung Latt

building of local people. This scheme is being implemented in Viet Nam's national parks such as Cat Ba, Xuan Thuy, Ba Be, Na Hang and Bidoup-Nui Ba.

Through the ADB-funded Biodiversity Conservation Corridors (BCC) project (2011–2019) in Lao PDR, 67 villages in the southern provinces of Attapeu, Champasak, and Sekong were granted USD 5,000 each as development fund that can be accessed by organised production groups. At least 316 production groups composed of 1,139 individuals implemented various projects on livelihood and forest conservation. The project was assessed to have achieved its objectives based on ADB's performance rating system, particularly in terms of land-use planning and fund strategy. The country has likewise instituted the Environment Protection Fund, which complements the Forest Resource Development Fund, to finance conservation projects through PFES initiatives.

Thailand's Environment Fund was established through the National Environmental Quality Promotion and Preservation Act B.E. 2535. It provides direct funds and low-interest loans to public agencies, local administrations, state enterprises, private organisations, and NGOs that engage in environmental protection activities. Thailand started the innovative financing scheme called the Tree Bank where trees can be used as alternative business collaterals among private and public land owners. The scheme was endorsed through a Cabinet Decision on July 2018.

The Biodiversity-Based Economy Development Office (BEDO)—a public organisation—supports the Community BioBanks in capacitating community organisations in the gathering and storing of biological information. This is especially helpful in planning and implementing viable conservation mechanisms and sustainable use of genetic resources, thus, contributing to the country's bioeconomy.

Other incentive mechanisms

As lengthily discussed in Aichi Target 1, all AMS carry out Eco-School Programmes which offer recognition and awards to formal and informal learning institutions that have mainstreamed environmental education and biodiversity conservation activities in their academic and non-academic programmes.

The ASEAN Biodiversity Heroes (ABH) that the ACB-BCAMP and the HARI foundation, Inc. co-founded honours game-changers in each AMS in terms of biodiversity conservation and restoration.

In the tourism sector, the ASEAN Tourism Standard offers awards and incentives to industry stakeholders who have been


Photo by Arvin B. Tonogbanua

promoting and practicing environment-friendly practices and complying with standards and practices of sustainable tourism management.

Thailand received the Green Globe Award of PTT PLC for groups of individuals, communities, and commercial companies that promote conservation and sustainable use of biodiversity. Lao PDR's Annual Environmental Recognition Awards Programme recognises outstanding national and local civil servants and private citizens who advocate environmental protection. The Philippines' Galing Pook Award, initiated by the Galing Pook Foundation, Department of the Interior and Local Government (DILG), and the Local Government Academy, recognises and promotes innovation and excellence in local governance.

Certification is another form of market-based incentive. In Indonesia, the Marine Stewardship Council and the Aquaculture Stewardship Council implemented certification for at least 34 fishery commodities like tuna, Portunid crab, red snapper, grouper, and tiger shrimp. To regulate the palm oil industry, the Ministry of Agriculture Regulation No. 1 requires companies to work for certification, with threat of sanctions (as a disincentive) in the form of degradation of the plantation level to class IV, to revocation of plantation Business Permit.

Initiatives to restructure or eliminate harmful incentives

Most AMS reviewed, revised, or updated their legislative frameworks and policies to make sure that the set incentives continue to serve the purpose for which they are conceived. But so far, few countries have taken steps towards identifying and reforming or eliminating harmful incentives.

The Government of Viet Nam instituted measures to eliminate harmful incentives particularly in agro-industry. For instance, by 2020, industries and public facilities that are causing severe environmental pollution will be eliminated or sanctioned. There are also regulations that emphasise the responsibilities of mining companies and hydropower projects in using the local land, water, and forest resources effectively and sustainably.

In the case of Myanmar, subsidies are provided in the energy, livestock, rubber, and agriculture sectors; although, little work has been done on the environmental impacts associated with these subsidies. A report by Kenney-Lazar in 2016[13] indicated notable impacts of subsidised rubber plantations on biodiversity. Certification of forest areas would have helped protect biodiversity but only small areas of land and few community forests have been certified by international accreditation

Photo by Roman Napeñas Fornesa

organisations. Myanmar continues to work on increasing the area of certified forests. No incentives, other than enforcement, are used to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) or Ramsar Convention in Myanmar.

Thailand issued guidance for phasing out incentives that are harmful to biodiversity and promoted positive incentives for the conservation and sustainable use of biodiversity in both the public and private sectors. To simplify the bureaucratic processes on forest management, a number of forest laws were revised. An example is the abolition on the ban to possess economically valuable trees in privately-owned properties in order to promote planting of the species and contribute to efforts to expand forest cover.

The Royal Thai Government created a framework for performing an inventory of undisturbed and encroached areas in conservation forests to address the issue of local settlement in these places. The creation of databases, which will be used to guide plans for the effective management of conservation forests and safeguard them against encroachment, involved communities, public agencies, and the corporate sector. This participatory method in conservation planning enables shared understanding in forest management and, to some extent, permits local settlements, but only within the confines of predetermined norms and regulations agreed upon in the participatory planning process.

Employing a participatory planning approach reduces conflicts derived from competing utilisation of resources, enables peaceful co-existence between communities and nature, and prevents future encroachment on rehabilitated forests.

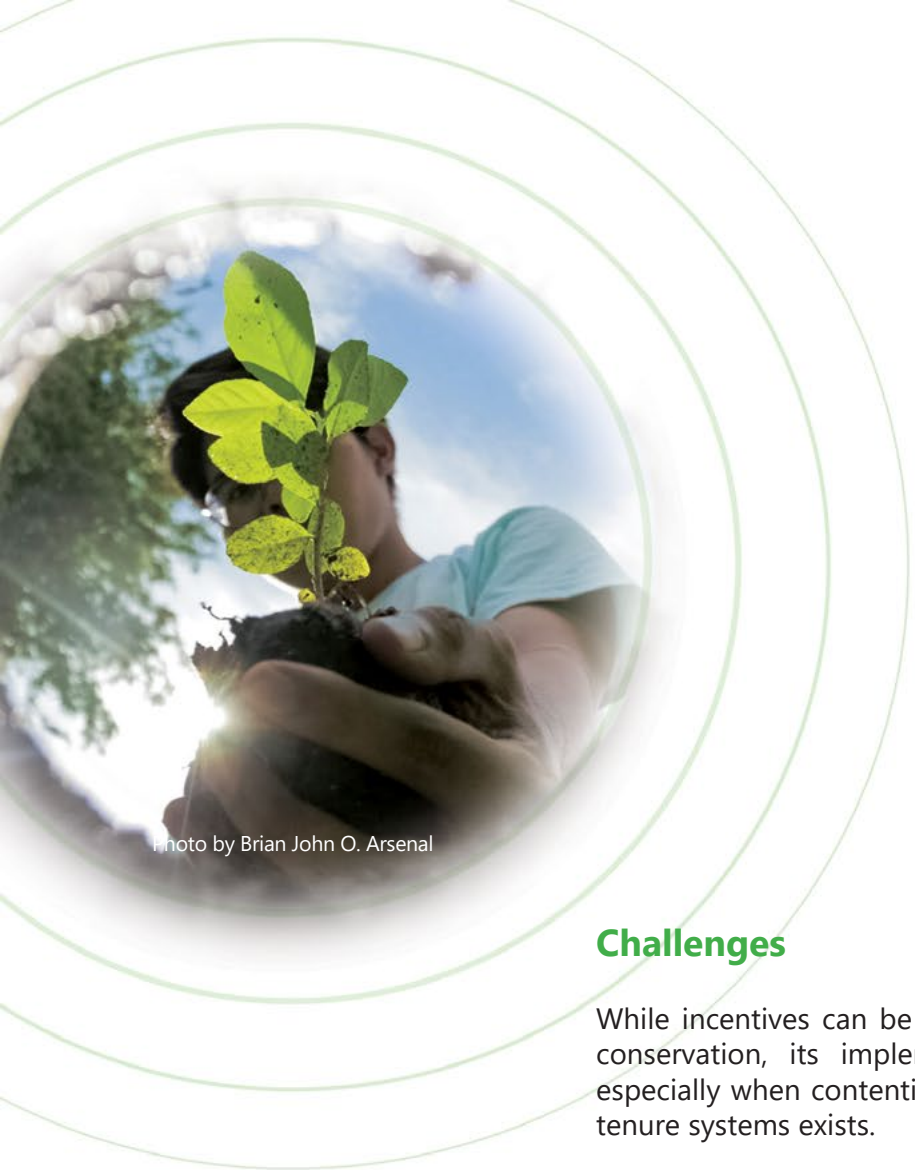


Photo by Brian John O. Arsenal

Challenges

While incentives can be effective approaches to biodiversity conservation, its implementation can go the other way especially when contentious issues like unclear or inoperable tenure systems exists.

Tenure systems, including customary rights and access to natural resources, are fundamental requisites for PES projects, especially those involving rural areas that have a limited asset base. Lessons from the forest landscape restoration projects in Kampong Thom, Preah Vihear, and Siem Reap provinces in Cambodia indicate that long-term success requires some level of land security. Securing tenure for local communities creates strong incentives for sustainable management while insecure and open access tenure promotes rapid resource extraction for short-term gain.[14] Local communities are willing and able to manage their natural resources sustainably when land tenure is secured, and policy incentives are in place.

The Oddar Meanchey Community Forestry REDD+ Project of Cambodia is another case that teaches myriad lessons on the nuances of incentive measures. It started in 2008 with the aim of protecting and restoring 678.53 square kilometres of forest land in the province of Oddar Meanchey which had deteriorated due to commercial and illegal logging, forest fire, land concessions, and encroachment. With the participation

of 25 Community Forestry Groups (CFG) and 58 villages, it is envisaged to sequester 7.1 million metric tons of CO_2 over 30 years. The project offers opportunities for local people to have income stream through carbon financing, along with other gainful ventures like ecotourism and non-timber forest product enterprises.[15]

Some key lessons from the pilot phase were the importance of:

- instituting measures that seriously consider indigenous rights and ensure the "full and effective participation" of local communities;
- well-understood mechanisms for benefit-sharing among stakeholders; and
- achieving clarity on how the voluntary carbon market functions, particularly the need to actively pursue sales.

The Oddar Meanchey Community Forestry REDD+ Project is considered the first and most advanced demonstration of all REDD+ projects in the country earning dual validation with the Verified Carbon Standard and the Climate Community and Biodiversity Alliance. These are global certifications for projects that simultaneously address climate change, support local communities and smallholders, and conserve biodiversity.


Photo by Julius Paner

Opportunities for sustainable subsidies

Agricultural subsidies have become an integral part of Malaysia's agricultural policy to achieve socio-economic objectives. The paddy and rice subsector takes up the largest share of the agricultural subsidies in form of fertilisers, seed, price, production, hill paddy (pesticides) aimed at improving 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 fertilisers 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 such input to maintain yield. The study also found that rice production has been stagnated despite increasing cost of subsidies, thus, the minimal gain in productivity and little improvement in the income of farmers.[16]

Malaysia's Ministry of Agriculture and Agro-based Industry (MOA) and Ministry of Economic Affairs (MEA) are in the initial stages of reforming the incentive structure including subsidy and incentive mechanisms, programmes and projects, regulations and institutional structure, rice imports, and social obligations and duties. In addition, performance-based incentives were implemented to encourage farmers to adopt sustainable agriculture practices especially by complying with the Malaysian Good Agricultural Practices (myGAP) and myOrganic certification.

Photo by Sai Thu

Box 12. Economic and conservation trade-offs: The case of Kutai National Park in Indonesia[17]

The Kutai National Park (KNP) presents a highly complex challenge on how to balance economic interests, human needs, and biodiversity conservation.

KNP, a national park, is home to the CE endemic orangutan *Pongo pygmaeus morio* and around 80 mammal, 330 bird, and 1,000 plant species. From the initial 20,000 square kilometres of natural reserve in the 1930s, it is now reduced to about 2,000 square kilometres of land. The botanically rich forests of KNP are among the few remaining intact forest canopies in East Kalimantan. It has high economic value with its vast deposit of high grade coal (possibly 50 per cent of the park).

Park management has been difficult in the outset primarily due to logging, small-scale mining, poaching, and encroachment of settlers. The entry of large-scale mining companies and related industries in the 1990s boosted the local economy. Ecological and social problems emerged with the rise in migrant employees and settlers, land conversion from agriculture to commercial and industrial sites, and the construction of infrastructure (e.g. roads, residences, gasoline stations, etc.). Recently, climate change can be observed with the escalation of drought incidences and forest fires.

At one point, the park management calculated the conservation benefits derived from the park ecosystem which included: protection of watershed and water supply, conservation of 220 medicinal plant species and other important animal and plant species, ecotourism development, and carbon storage. But these ecosystem services were perceived to be miniscule compared to the financial gains. Mining and logging deliver tangible, immediate and more significant economic benefits, thus, the propensity to exploit the park and overshadow conservation initiatives and their long-term benefits.

A workshop hosted by the International Union for Conservation of Nature (IUCN) in 2018 identified and prioritised the pressing issues that affect restoration initiatives in KNP. The "very high" priority issues were encroachment/land invasion, and fire prevention; while the "high" priority issues were community conflict, unsuitable government regulations, and availability of seed and source plants for important naturally occurring species.

A study by Limberg et al in 2009 provides lessons in cases such as this where resource management is challenged by competing interests of resource conservation versus exploitation.

- Minimising the threats to protected areas and increasing their chance to continuously provide public goods require measures that allay opportunistic behaviours.
- Rules must be recognised and strictly enforced. Rules must build on inclusive negotiations among key stakeholders. Participation of the local people in the rule- and decision-making processes promotes long-term conservation of the protected area.
- Political will at the national and district level is vital to balance development needs and address the social context affecting the conservation of the national park. Better enforcement of the spatial plan will enhance the balancing and integration of development and conservation.

Further to this, a report by CIFOR advocated for the creation of "special use zones" where local communities can exercise some rights to use forest resources while following rules and helping to conserve the protected areas. This would be a viable solution in addressing the complex problems of encroachment/ land invasion and community conflict.

Ways Forward

- Review and analyse current policies and programmes relative to incentive mechanisms to clearly identify which ones provide real benefits and which are actually harmful in the long-run.
- Formulate and implement policies that accurately valuate biodiversity as these will likely create incentives that align behaviours with economic-ecological objectives.
- Capitalise on and broaden the use of positive incentives in achieving other Aichi Targets, especially 4, 7, and 15.
- Incentivise participation in conservation initiatives especially among IPLCs through strengthened and clear property rights.
- Ensure the active involvement of IPLCs, and other rights-holder groups in the design and implementation of incentive reforms.
- Strengthen positive incentives by ensuring that parties in conservation initiatives directly benefit from them.
- Strengthen the monitoring, compliance, and enforcement of incentive measures.
- Explore other innovative economic and social incentives that render multiple benefits but reduce negative impacts.


Photo by Jon Andrew Cabiles

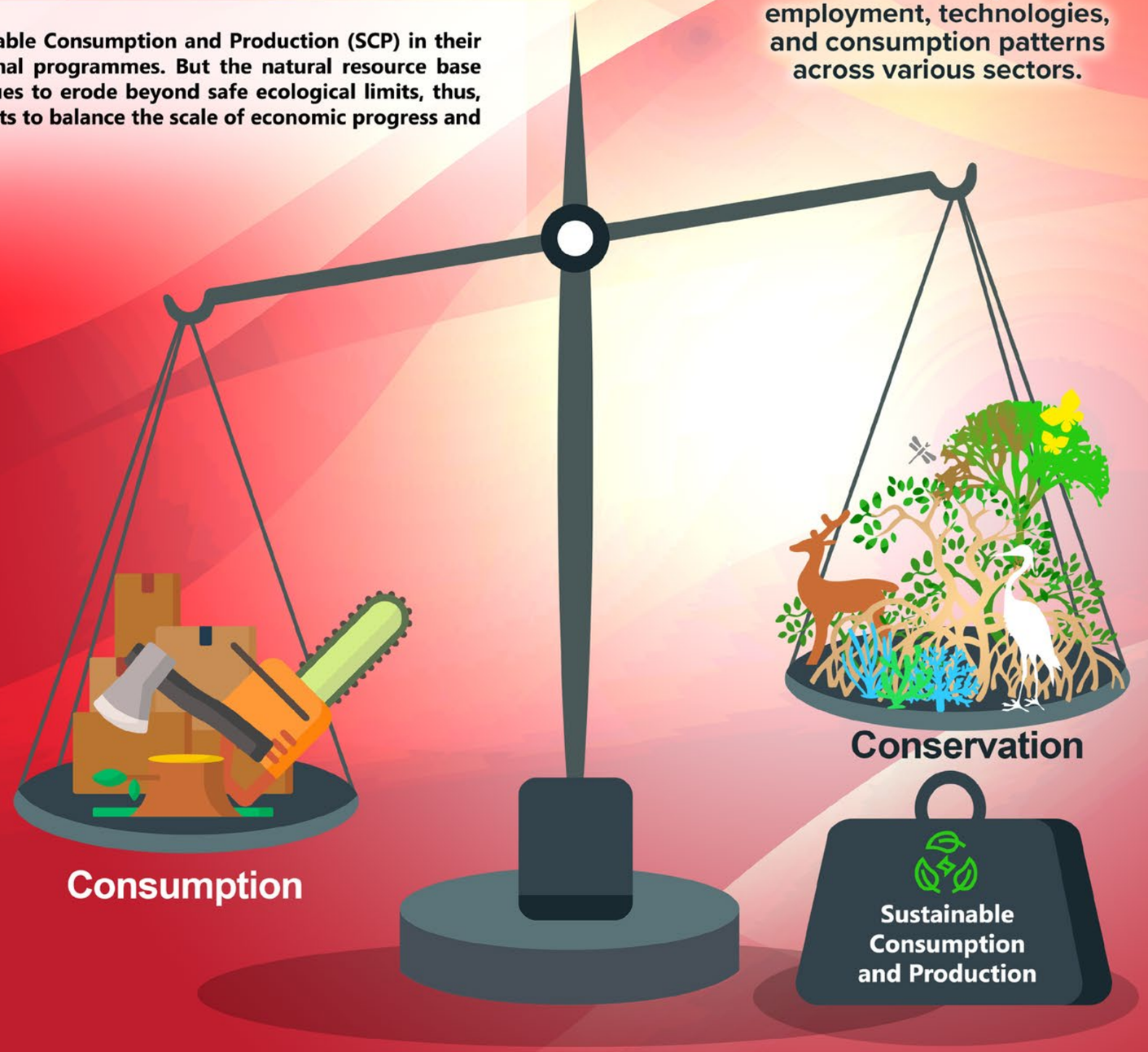
TARGET 4: By 2020, at the latest, governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

All AMS have integrated Sustainable Consumption and Production (SCP) in their legislative framework and national programmes. But the natural resource base across the ASEAN region continues to erode beyond safe ecological limits, thus, require deliberate and swift efforts to balance the scale of economic progress and environmental sustainability.

AMS put in place policies that are aimed to develop a green and circular economy by creating a culture of sustainability in employment, technologies, and consumption patterns across various sectors.

Challenges

- Increasing demand and consumption
- Considerable increases in forest product consumption, cropping percentages, and harvests of fisheries and wildlife
- Inadequate legal frameworks, policy enforcement, and implementation of national policies and programmes
- Lack of knowledge and awareness on SCP among consumer protection authorities, businesses, and consumers



Ways Forward

- Revisit, examine, and, if needed, reform existing policies and design best-fit programmes
- Call for creative and pragmatic schemes and platforms for SCP
- Coordinate with and among stakeholders for urgent and integrated responses to achieve SCP
- Implement CEPA activities for consumer education
- Adopt innovative approaches towards sustainability

Photo by Sai Thu

Aichi Biodiversity Target 4: Sustainable production and consumption
By 2020, at the latest, governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

AMS reported putting in place policies, roadmaps, national plans, and national ecotourism plans that are aimed at developing a green economy by creating a culture of sustainability in employment, technologies, and consumption patterns across various sectors. Examples of such policies are the National Green Growth Roadmap of Cambodia and the National Roadmap for Social Forestry of Malaysia. Community Forestry policies also play a big role towards achieving sustainable forest management.

Photo by Aye Lwin


Photo by Htay Lwin

Sustainable consumption and production is "the use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations".[1]

Sustainable consumption and production (SCP) was highlighted as an important development agenda in the UN Conference on Environment and Development in 1992. But it was in the 1994 Oslo Symposium on Sustainable Consumption when it was clearly defined.

SCP, embodied in Goal 12 of the SDGs, aims to enhance resource use efficiency and reduce wastes and pollutants that cause adverse impacts on biodiversity.[2] In the ASEAN region, the SCP concept gained attention in the light of rapid economic progress, which has changed the people's consumption behaviour and put more pressure on constrained resources.

After two decades of robust economic growth, millions of people in the ASEAN region have successfully moved up from poverty to urban middle class with more spending power. The rapid urbanisation in the region will continue to sustain the upsurge of the consuming class. By 2022, the 50 million new middle-class consumers in Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam will contribute to USD 300 billion middle-class disposable income.[3]

This growth in the middle-class population across the region has led to escalating consumption and more resource-intensive lifestyles. Expectedly, these aggravate current environmental issues such as degradation of ecosystems, pollution, and proliferation of wastes. Increasing income levels and consumption could also offset improvements in energy and resource efficiency[4] due to a rise in per capita energy consumption, motorisation, proliferation of consumer electronics and household appliances, and higher food consumption. As more people are able to afford more products, the resulting pressure on the use of public service and natural resources will increase.

Outscaling sustainable consumption and production in the region

Strategic Goal 3 of the ASEAN Strategic Action Plan for Consumer Protection (ASAPCP) 2016–2025 serves as the roadmap of SCP implementation in the region mainly through high-level policy dialogues, awareness campaigns, development of information and knowledge products, and network building. The ASAPCP was endorsed at the 48th ASEAN Economic Ministers' Meeting in 2016, under the auspices of the ASEAN Committee on Consumer Protection (ACCP). The ACCP is tasked to "ensure that consumer protection legislation is in place in all AMS, consumer access to information is enhanced, mechanisms for consumer redress and recalls are effective and running and institutional capacity is strengthened."[5]

To fortify and intensify efforts on sustainable consumption, economic and regulatory tools, and policy reforms, the ACCP, with support from the ASEAN Australia Development Cooperation Programme, published the *ASEAN Capacity Building Roadmap for Consumer Protection for 2020–2025*

(Roadmap 2025) which is the primary capacity building tool on consumer protection regimes at the regional and sub-regional levels and among AMS.

To enrich their knowledge on and practice of SCP, policymakers take part in the *ASEAN+3 Leadership Programme on Sustainable Consumption and Production*. The annual programme, supported by UNEP-SWITCH Asia, UNU-IAS Hanns Seidel Foundation, and UNIDO, provides the platform to learn and share knowledge on practical SCP cases and demonstrate the change process from a business-as-usual scenario to the shift to SCP approach to natural resources conservation.[6]

The *Asia-Pacific Roundtable on Sustainable Consumption and Production* (APRSCP), a non-governmental network institution, has been a significant partner in forging regional cooperation in the development of plans and strategies and implementation of SCP in the Asia-Pacific. Started in 1997, APRSCP involves governments, industry, non-government organisations (NGOs), and academia in partnership with international organisations like the United Nations Environment Programme (UNEP).[7]

The 10-year global project on *Advancing and Measuring Sustainable Consumption and Production (SCP) for a Low-Carbon Economy in Middle-Income and Newly Industrialized Countries* (Advance SCP)[8], launched in 2015, aims to increase awareness, institutional support, and technical capabilities in formulating sustainability information policies and developing tools towards low-carbon consumption and production patterns. It seeks to integrate climate-friendly criteria into the eco-labels and promote green procurement in Indonesia, Malaysia, the Philippines, and Thailand. The project is funded by the International Climate Initiative (IKI) of the Federal Ministry for the Environment and Nature Conservation and Nuclear Safety (BMU).

Some achievements of the project:

- Integration and collaboration on climate-friendly criteria of eco-labels.
- Capacity development and awareness-raising for governments and certifiers.
- Development of recommendations of economic, financial, or tax incentives for Green Public Procurement (GPP)/eco-labels with particular view to reach out to business.
- Development of proposals for integrating social aspects in GPP/eco-labels in the focal countries.
- Identification of opportunities to develop SCP-related Nationally Appropriate Mitigation Actions (NAMAs).
- Fostering South-South exchange and peer-to-peer learning.

Important policies and programmes on SCP

Across the region, policies and programmes have been vital in advancing SCP through strategies, certifications, and investments towards achieving sustainability objectives.

Photo by Jesson Morata

Aichi Target 4 has two main requirements to achieve progress toward this target: (1) steps have been taken to achieve SCP or plans have been implemented and (2) the impacts of use of natural resources are kept within safe ecological limits. The 6NRs indicate that majority of the AMS have achieved the first component.

Brunei Darussalam Environmental Protection and Management Order (EPMO2016) provides for the prevention, control, and abatement of pollution and environmental harm and for the conservation, preservation, protection, enhancement, and management of the environment.

Cambodia has no law specific on SCP but its National Green Growth Roadmap promotes and develops a green economy. It integrates ideas and projects on green growth into national strategic development, thus, creating the basis for environmentally sound economic development through, among other things, the promotion of SCP.

The *10-Year Sustainable Consumption and Production Framework (2013–2023)* of Indonesia, which includes its SCP roadmap, endeavours to improve the quality of life of Indonesian people through environment-friendly and sustainable changes in production and consumption behaviour.

The SCP initiatives of Lao PDR are integrated in programmes that address priority sectors, namely, forestry and water.

Malaysia's National SCP Blueprint 2016–2030 underlines a major programme—Government Green Procurement (GGP)—which seeks to expand the green economy and create green market locally. The *MyHijau (MyGreen)* programme was initiated in 2012 to enhance GGP and green technology. Under this, the MyHijau Label and MyHijau Directory are implemented as tools to promote the outsourcing, as well as the purchase of environmentally friendly goods and services. The short-term target is by 2020, 20 per cent of the Federal Government's procurement should already be rated as green.


Photo by Nurul Ain Hamdan


Photo by Vu Thi Chinh

The Philippines has established policies that support sectoral priorities like, *inter alia*, forestry, fisheries, waste management, and wildlife protection. Its *National Greening Programme* (EO 26, s. 2011) focuses on forest rehabilitation via planting 1.5 billion trees covering 15,000 square kilometres from 2011 to 2016 in forestlands, mangroves and protected areas, ancestral domains, civil and military reservations, urban areas, inactive and abandoned mine sites, and other suitable lands.

Similarly, Thailand has integrated biodiversity management in several national policies, plans, and measures. The *20-Year National Strategy (2018–2038)* serves as the roadmap towards being "a developed country with security, prosperity, and sustainability in accordance with the Sufficiency Economy Philosophy."

The *National Strategy for Green Growth in 2011–2020, vision to 2050* of Viet Nam aims to restructure the economic system toward green growth, apply technology to enhance efficient use of resources, reduce greenhouse gas emission, and ensure an environmental-friendly lifestyle through green industries, and green infrastructures. Viet Nam also implemented the *National Action Plan on Sustainable Consumption and Production to 2020, Vision to 2030* which targets to gradually change existing production and consumption patterns towards more efficient use of resources and energy.

While AMS have carried out steps to advance SCP, much remains to be accomplished in anticipation of the further decline in the state of their ecosystem parallel with economic progress. Figure 2 shows that the region's ecological footprint had significantly outpaced its biocapacity, since the 1990s, and the gap continues to widen over time. This indicates that the ASEAN region has overdrawn from its natural capital assets or is ecologically deficit as its footprint is greater than its biocapacity. AMS that have ecological deficit have overshot their resources causing depletion of natural capital and a build-up of waste. Meanwhile, Lao PDR and Myanmar have posted ecological reserves (Figure 2).

This is the complex reality that the region needs to contend with and overturn. Policy and institutional support, coupled with appropriate actions on the ground, are crucial to balance economic progress and sustainability of resources. Concerted actions of relevant stakeholders, from governments to various sectors to individuals across all levels and economic status are vital. While sustainable development needs to be tackled collectively, the contribution of individual persons cannot be undermined because SCP is best approached by changing consumer behaviour.

Biodiversity-based products and sustainable livelihoods for communities in Cambodia, Lao PDR, and Viet Nam

In 2018, the *Biodiversity-based Products as an Economic Source for the Improvement of Livelihoods and Biodiversity Protection* (BBP) Project was implemented by the GFA Consulting Group in collaboration with the ACB through its *CARE4BioDiv Programme*, with funding support from the Federal Government of Germany through GIZ. The project aimed to develop the economic potential of biodiversity into marketable products and achieve economic growth with biodiversity protection.[9] The BBP Project piloted biodiversity-based value chains implemented by the communities themselves with assistance both from their governments and from the project team in the buffer zones of protected areas in Cambodia, Lao PDR, and Viet Nam.

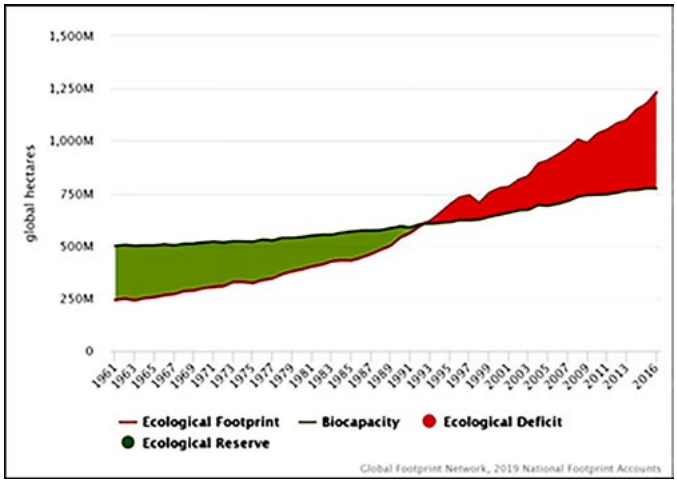
In Cambodia, the black ginger (*Kaempferia parviflora*) which abundantly grows in the Phnom Kulen National Park is being promoted for its many health benefits. The BBP project supported the black ginger value chain from production, processing, packaging, labelling, and marketing. The Anlong Thom and Thmor Chrunh villages supported the black ginger value chain development to generate additional income and enhance biodiversity protection around the Phnom Kulen National Park.[10]

A similar model for bamboo furniture and handicraft was established in Had Nalaeng Village in the Nam Ha National Protected Area in Lao PDR. With about 150 bamboo species in the country, the sustainable commercial production can generate additional household income for the locals while conserving the environment through community-based solutions such as organised training in bamboo forest and forest management, awareness-raising of the benefits of protecting bamboo forests, and community capacity building for bamboo product design and commercialisation. In 2019, the project received product certification from the government.[11]

The BBP Project in Viet Nam's Hoang Lien Sa Pa helped communities in Hoang Lien


Photo by Filiberto A. Pollisco, Jr.

Figure 2. Ecological reserve and deficit trend in the ASEAN region



Source: Global Footprint Network, 2016 at https://www.footprintnetwork.org/

Figure 3. Ecological Footprint of AMS

Source: Global Source: Global Footprint Network, National Footprint Accounts, 2019 Edition Downloaded [April 2020] from http://data.footprintnetwork.org.

National Park establish their own home gardens of the seven-leaf *giao co lam* trees found only in the park. The tree is highly prized for the medicinal benefits of its leaves in stabilising blood pressure, preventing atherosclerosis, reducing blood sugar, and preventing diabetes complications.[12]

In Ba Be National Park, the BBP Project aims to upgrade the honey and *bo khai* (*Erythropalum scandens*) value chains. The project is developing an organisational structure for beekeepers and promoting advanced techniques to brand their locally manufactured honey, and enhance links between producers and traders. The honey value chain in Ba Be includes input suppliers (wax, glass bottles, and sugars), harvest/production and processing made by beekeepers in the park or bee hunters in other districts, distribution by buyers in the communes or small local shops, and consumption by users in the region or visiting tourists.[13]

Eradicating wastes in the region

A negative by-product of consumer consumption and production of goods and services is waste. In many developing countries, the waste management infrastructure is unable to cope with the magnitude of the problem.

In Asia, solid waste generation is expected to rise from 0.76 million tons per day in 2000 to 1.8 million tons in 2025 despite recycling efforts. Plastic wastes, in particular, have become problematic as they either pile up in lands or clog waterways which cause flooding and other health problems.[24] Some wastes are easily washed up into streams and rivers until they reach the oceans, thus, polluting waters, destroying aquatic habitats, and eventually killing marine species. The Ocean Conservancy reported that between 55 to 60 per cent of plastic waste entering the oceans comes from Indonesia, the Philippines, Thailand, and Viet Nam, and China.[14]

Thus, the ASEAN strongly supports the movement to reduce plastic wastes. At the country level, all AMS have been actively

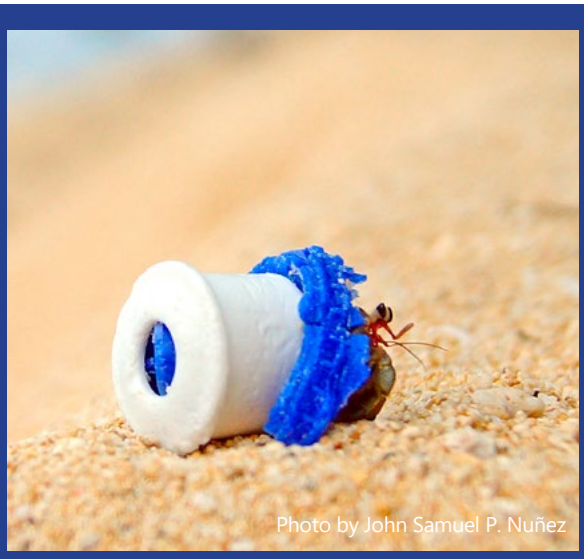


Photo by John Samuel P. Nuñez

Box 14. Plastic pollution: A heap of a problem[21]

A UNEP-WRI Report looked into the underlying reasons why plastic pollution remains a huge global problem despite efforts of at least 127 countries to either totally ban, gradually phase out, or regulate the use of single-use plastics. The study revealed that:

1. Most countries fail to regulate plastic through its life cycle.
2. Countries favour partial bans over full bans.
3. Virtually no countries restrict plastic bag manufacturing/ production.
4. Exemptions are numerous.
5. Incentives are not offered for alternatives to single use plastic bags.

implementing programmes toward this objective.

Brunei Darussalam aimed for 15 per cent recycling level by 2020. They have the *No Plastic Bag Everyday* campaign where at least 50 participating stores reported to have saved USD 2,000 per month from reduced plastic use. Indonesia, Malaysia, and Myanmar have banned and/or imposed taxes on the use of plastic bags. Similarly, Thailand has drafted an action plan which targets to ban single-use plastics by 2022, and single-use plastic cups and straws by 2025.

Cambodia, Lao PDR, and the Philippines, through the *Bring Your Own Bag* scheme, encourage the recycling or reuse of shopping bags. In Viet Nam, businesses and enterprises have introduced eco-friendly bags for shoppers, and the government imposes environmental tax on plastic bags at USD 1.76 per kilogram. Singapore envisions being a *Zero Waste Nation* through recycling and reusing of materials.

But problems that are as complex as waste management require holistic approaches and concerted effort among stakeholders especially the private sector. The concept of Extended Producer Responsibility (EPR) takes waste management beyond current policy and regulatory frameworks. The EPR paradigm highlights the role of producers and their responsibility for the recycling of their products. EPR considers the appropriate management of plastic pollution for the entire life cycle of the product and especially recycling, and final disposal. To some extent, AMS have been applying this approach. But more pragmatic and broad actions have yet to be implemented.[15]

Enhanced policy and institutional support for healthier ecosystems

Forest conservation and rehabilitation activities render ecosystem landscape healthier and sustainable. Contributing to this progress is a strengthened community forestry approach that entrusts forest stewardship and governance to local communities and peoples.

Viet Nam's *3-Year Programme for Sustainable Forestry Development* (Decision No. 886/2017/QD-TTg) signed in 2017 effected significant progress in decreasing the area of damaged forests, increasing the forest area under protection by communities and individuals, reducing the number of forest violations, and maintaining 25 million regular jobs, thus, reducing poverty and increasing incomes of people working in forestry. Under the plan, the 2020 targets were: 5.5-6 per cent growth rate of forestry production per year; national forest cover will be 42 per cent and the forest

area will be 144,000 square kilometres; average plantation productivity of 20 m^3/hectares/year; and elevate the value of wood and forest products exports to USD 8 billion to USD 8.5 billion; and maintenance of 25 million regular jobs.

In the Rio Summit in 1992, Malaysia committed to maintain at least 50 per cent of its land under forest and tree cover. As of 2014, the Government of Malaysia remained resolute in its pledge by maintaining 55.3 per cent of forest cover, which contributes to the global emission control. Currently, the Ministry of Energy and Natural Resources (KATS) is finalising the *National Roadmap for Social Forestry* with target publication in 2019. Social Forestry initiatives have advanced in Sabah and Sarawak, with forest departments overseeing the scheme. The roadmap shall be the guidepost in ensuring that forest operations are socially responsible. These packets of effort will feed into the broader goal of rendering timber and timber products sustainably managed through certification schemes by 2025.

The *New Forest Law* (2018) of Myanmar, and Cambodia's *Production Forest Strategic Plan* (PFSP) 2018–2032 underscore the community forestry approach as an effective mechanism in forest protection and rehabilitation. Central to Cambodia's PFSP is the guidance for the future development and sustainable management of production forests for their contribution to poverty alleviation, livelihoods, and economic growth. The Plan represents the first comprehensive strategic document for production forests in Cambodia. Under the National Forestry Programme, at least 20,000 square kilometres of forestland have been allocated for community forestry with approximately 1,000 community forestry groups fully recognised with community forestry agreements.

Good agricultural practice for safer and healthier food

Agriculture remains to be the bedrock of the ASEAN economy. Hence, it would benefit the sector to adapt technologies and practices that will revitalise the sector into a smarter and more efficient producer.

Malaysia established in 2013 the Malaysian Good Agricultural Practice (myGAP) certification scheme which covers the crop, aquaculture, and livestock sectors. Its certification scheme covers practices that prevent or minimise the risks in four important areas of production: food safety, animal health and welfare, environmental integrity, and socio-economic aspects.

Photo by Truong Quang Cuong


Photo by Bianca Schlegel

Viet Nam lists organic agriculture as a priority initiative with 33 provinces and cities participating in large-scale production.

Sustainable rice production through limited inputs and proper soil, water, and crops management has been the focus of the Government of Myanmar. Tools including precision nutrient application, improved soil management, alternate wetting and drying of paddy fields, and integrated pest management minimised harmful inputs and increased yields and resilience. The System of Rice Intensification (SRI), a suite of flexible cropping principles, is one of the methods adopted to improve rice sustainability and reduce the environmental impacts of rice production on the environment.

In the fisheries sector, experts in Cambodia and Lao PDR assessed the fish stocks in the transboundary waters of Mekong and Sekong Rivers in 2019. Based on the assessment, a 10 per cent increase in fish abundance was projected to be achievable by 2021 through a 50 per cent reduction in illegal fishing activities in the conservation pool and elimination of the use of traditional but illegal fishing gear by 80 per cent. Indonesia reported that a total of 20 fish species are managed through the establishment of limited protection status and trade arrangements through its utilisation quotas.

Meanwhile, in Viet Nam, the Institute for Seafood Research assessed the status of its seafood resources, especially in coastal areas in 2016. The study showed that their seafood have been excessively exploited, and the production volumes were observed to be made up of relatively small fish which indicates that fishes are harvested before they even reach maturity.

In 2017, a stock assessment was conducted in Malaysia which revealed that the majority of the demersal and pelagic fish stocks in the coastal area have been exploited beyond maximum sustainable yield and that the depleted stocks have yet to recover. A fisheries assessment conducted since 1997 by the Department of Fisheries Malaysia (DOFM) already presented the same result.

ASEAN has been a rich source of fish and fishery products in the global market. Of the world's top 15 producers of marine capture fisheries, six are from the ASEAN namely, Indonesia, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam.

In order to enhance the traceability of marine capture fishes and curb illegal, unreported, and unregulated (IUU) fishing, the ASEAN Catch Documentation Scheme (ACDS) was established. This regional initiative operates under the ASEAN-Southeast Asian Fisheries Development Centre (SEAFDEC) Strategic Partnership Mechanism (ASSP).

The ACDS enhances intra-regional and international trade and is an essential part of the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU


Photo by Zaw Hlaing Htoo

Fishing Activities into the Supply Chain to be adopted by AMS.[16]

Sustainable business brings good returns

The SCP espouses ecologically sound business practices throughout the value chain so as not to impair the capacity of ecosystems to deliver goods and services.

The past years saw the textile and garment industry in Myanmar expanding from an export value of USD 900 million in 2012 to USD 2.7 billion in 2017 and employing over a million workers. The expanding garment industry benefits from the support that the EU has been providing under the *SMART Myanmar* project.[17] The project, which is supported by international garment retailers, promotes good business practices and environmental standards in the garment business.

Branded as SMART Textile and Garments of SMART TaG (2019-2022), the EU collaborated with the private sectors and NGO Sequa, Amfori, Confederation of Trade Unions Myanmar and the Centre for Economic and Social Development to further upscale, expand, and strengthen responsible and sustainable production processes with emphasis on resource efficiency and social responsibility. The multi-sectoral partnership works together to provide technical expertise to SMART TaG in terms of operations, training, and research and development.

The environmental management teams of SMART Myanmar have issued 350 improvement recommendations to 23 garment and textile factories as part of their consultancy and coaching programmes. In 2017, the major focus was energy and water module, chemical management, and chemical risk management.

Photo by John Rey Cuyos

In the Philippines, the Department of Trade and Industry is implementing an array of projects in partnership with the Philippine Center for Environmental Protection and Sustainable Development, Inc. (PCEPSDI), an NGO, and the *National Ecolabelling Programme–Green Choice Philippines* (NELP-GCP). NELP-GCP is a voluntary, multiple criteria-based, and third-party programme that aims to encourage clean manufacturing practices and consumption of environmentally preferable products and services.

Under this umbrella programme, PCEPSDI and NELP-GCP oversee the *Kalikasan Green Productivity, Green Purchasing Towards Green Philippines*, the *Green Choice Philippines Seal of Approval*, and the P*hilippine Green Pages*, the country's first and only eco-resource publication for finding the best green business, products, and services offered in the market.[18]


Photo by Aung Myo Khaing

Challenges

- Economic development and the growing population have resulted in an increasing demand for and consumption of ecological resources and services in the region. The region's natural resource base has long been suffering from over extraction as evidenced by a majority of AMS overshooting their ecologic limits, thus, veering away from sustainability objectives and targets. The considerable increases in forest product consumption, cropping percentages, and harvests of fisheries and all wildlife pointed towards this trend.

- While AMS have taken steps in putting SCP as a priority agenda, current scenarios seem to indicate that legal frameworks, policy enforcement, and implementation of national policies and programmes remain inadequate.

- The 15th ASEAN Committee on Consumer Protection Meeting in 2017 noted that a lack of knowledge and awareness on SCP among consumer protection authorities, businesses, and consumers led to its being often disregarded.[32]

- Relevant sectors have yet to fully mainstream SCP tools, mechanisms, and guidelines to create more meaningful and impactful contributions to the sustainable use of biodiversity resources.

- Most AMS have instituted policy and legal frameworks on SCP, and yet, across the region, natural resources continue to diminish at an alarming rate.

Ways Forward

- There is a need to revisit, examine, and, if needed, reform existing policies and design best-fit programmes on SCP that would address economic objectives and genuinely protect the fragile ecosystem.

- The SCP is a relatively new approach to achieve conservation and restoration objectives in the region. Hence, the situation calls for creative and pragmatic schemes and platforms that would pave the way for more opportunities to advance the SCP agenda across multiple sectors.

- Coordination among stakeholders is of utmost importance and urgent integrated responses imperative.

- Measures that promote resource-efficient and cleaner production that can support a healthy environment are a basic right of consumers, although, consumer education is equally important.

- Sustainable consumption needs to focus more on the environment agenda and encompass the lifestyle of consumers; and consumer education on pertinent topics need to be included in programmes, information, education, and communication mechanisms of laws for consumer and environmental protection.

Photo by Mark Jovan Bricia

- Novel approaches towards sustainability could be adopted, such as the Tree Bank initiative of Thailand, whereby reforestation is promoted by using trees as collateral in different forms of lending. Another policy being developed is the Malaysia Fish Stock Sustainability Index, which aims to manage the rising harvests in the fisheries sector. Significantly, the AMS have put in place many different policies to address sustainability in forestry, fisheries, wildlife, and ecotourism. Since these sectors have been identified as main contributors to a country's income, sustainability therein will be paramount to moving forward.


Photo by Pamela Q. Reblora

STRATEGIC GOAL B:

Reduce the direct pressures on biodiversity and promote sustainable use

Photo by Roger A. Tingle

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.

The forest cover in ASEAN comprises almost 15 per cent of the world's tropical forests and houses irreplaceable biodiversity.

Forests in the ASEAN region remain under grave threat by the growing demand for timber products, and the conversion of land for agricultural use and human settlement. This is the case even with several programmes and projects that the ASEAN Member States (AMS) are implementing for the adequate management of the region's natural resources on a sustainable level.

The ASEAN region is classified as a "deforestation hotspot".	Critical ecosystems restoration
SEA has the highest rate of mangrove losses globally	Wetland protection
SEA is a primary source of high-value wood.	Sustainable forest management and forest plantation
Anthropogenic activities cause the unprecedented loss of tropical habitats.	*In situ* and *ex situ* biodiversity management
SEA's tropical forest is reduced at a rate of 8 million hectares annually.	Sustainable community-based livelihood approaches

Challenges

- Deforestation and illegal logging
- Forest fragmentation
- Land conversion due to agricultural expansion, human settlement
- Increasing regional population with increasing demand for forest and agriculture products
- Coastal development
- Improper waste disposal

Ways Forward

- Strike a balance between conservation and consumption
- Align plans to accomplish the Strategic Plan of Food and Agriculture and Forestry
- Address land use conflicts
- Collaborate among key stakeholders
- Employ innovative and effective financing mechanisms
- Expand protected areas
- Enhance mechanisms for natural resource governance

Aichi Biodiversity Target 5: Habitat loss halved or reduced

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.

Economic growth, anthropogenic activities, and climate change threaten ASEAN's biodiversity-rich areas, in scope and quality. The ecological crisis has led to species extinction, diminishing natural resources, and deteriorating ecosystems. Against this backdrop, ASEAN Member States (AMS) need to set ambitious goals and radical measures to achieve this Aichi Target because the time to restore and recover these biodiverse areas is fast running out.

Based on country assessments reflected in the Sixth National Reports (6NRs), six AMS are on course in bringing down the rate of habitat loss while four AMS are moving in that same direction, but at a pace that makes them less likely to meet their national targets. On the other hand, third-party assessments of progress towards this Aichi Target indicate that substantial loss in forest, wetlands, and coastal habitats remain apparent in the region.[1] AMS have conservation plans in place and are implementing measures to stem the further decline of natural habitats. Several AMS have committed to significant reforestation targets including an increase in mangrove cover.

Cambodia has expanded its terrestrial protected area system including the extended network of biodiversity conservation corridors. For this, the country exceeded by 24 per cent the global target of 17 per cent. Indonesia's IBSAP 2015–2020 promotes *in situ* and *ex situ* biodiversity conservation to maintain the existence of biodiversity and its optimal benefits for the present and future. The Government of Lao PDR enacted the Prime Ministerial Order (PM 15) in 2016 to control the extraction and exportation of wood products from the forests. This has been supported by the initiation of the Forest Law Enforcement, Governance and Trade (FLEGT) Voluntary Partnership Agreement (VPA) in 2017.

Malaysia has its Sustainable Forest Management (SFM) and forest plantation to minimise forest loss and degradation, and is mapping vulnerable ecosystems. The Heart of Borneo is a government-initiated, tripartite project which also collaborates with the Coral Triangle

Initiative (CTI) to improve protected area gazettement, sustainable natural resource management, eco-tourism development, capacity building, sustainable fisheries management, climate change adaptation, as well as the establishment and management of priority seascapes.

Over the past few years, Myanmar increased wetlands under protection, with four new areas recognised as Ramsar sites between 2015 and 2018, thus, exceeding its target. Locally managed marine areas (LMMAs) and sustainable forest management through community forests in the Taninthayi Region and Kachin Areas were established.

The Philippines increased its forest cover within forestlands which may have resulted from the National Greening Programme (NGP), which aimed to plant 1.5 billion trees in about 15,000 square kilometres between 2011–2016.

Thailand has been making progress in reducing the loss of natural habitats but still does not meet the indicative national target of 50 per cent of the country's total area. But with the strong cooperation from all sectors, there is a high possibility that it will meet its target

According to Viet Nam's NBSAP, the primary target is to improve the quality and increase the area of its protected natural ecosystems. As a result, primary forest remains at 5,700 square kilometres with effective protection plans, while mangrove forests, seagrass beds, and coral reefs are maintained at current levels and 15 per cent of these degraded critical ecosystems are restored.


Photo by Jose Raul D. Garbo

Aichi Target 5 puts a premium on the conservation, rehabilitation, and restoration of natural habitats because their decline, in extent and integrity, would result in biodiversity loss. It underscores the importance of reducing and eventually stopping the rate of loss of natural habitats. If this is left unchecked, the drivers of habitat loss will undermine the ability of ecosystems to provide services—provisioning, regulating, and cultural. Thus, resource utilisation should not reach the "tipping point" and must be kept to sustainable level.

Achievements in this target could either benefit or provide support to the realisation of the majority of the Aichi Targets and the Sustainable Development Goals (SDGs), namely: SDG 7 (affordable and clean energy), 13 (climate action), 14 (life below water), and 15 (life on land.)

Forest ecosystems in the ASEAN region

Forests are crucial in maintaining the delicate environmental balance that makes life on Earth possible. The forest ecosystems significantly contribute to agriculture and food security, livelihoods and poverty alleviation, economic growth and equality, and health and nutrition.

They provide a living space for 80 per cent of the world's plant and animal species on the planet, many of which serve as valuable raw materials used for energy, pharmaceuticals, and various industries. Other ecosystems also depend on forests as a source of freshwater and nourishment.

The ASEAN region is covered by over 2 million square kilometres of forests.[2] These forest ecosystems, including mangrove covers, are under severe pressure stemming from continuous economic growth, rising demand for forest and non-timber forest products,

Table 3. Forest cover in the ASEAN region, 2000–2020

AMS	Land Area[a] (km²)	Forest Area (km²)[b]			Forest Cover (% Forest Area to Total Land Area)			Net Annual Change (%)[c]	
		2000	2010	2020	2000	2010	2020	2000-2010	2010-2020
Brunei Darussalam	5,270	3,970	3,800	3,800	75.33	72.11	72.11	(0.44)	0.00
Cambodia	176,520	107,810	105,890	80,680	61.08	59.99	45.71	(0.18)	(2.68)
Indonesia	1,877,519	1,012,800	996,590	921,330	53.94	53.08	49.07	(0.16)	(0.78)
Lao PDR	230,800	174,250	169,410	165,960	75.50	73.40	71.91	(0.28)	(0.21)
Malaysia	328,550	196,910	189,480	191,140	59.93	57.67	58.18	(0.38)	0.09
Myanmar	652,670	348,680	314,410	285,440	53.41	48.16	43.73	(1.03)	(0.96)
Philippines	298,170	73,090	68,400	71,890	24.51	22.94	24.11	(0.66)	0.50
Singapore	718	170	180	160	23.98	25.39	22.57	0.42	(1.30)
Thailand	510,890	189,980	200,730	198,730	37.19	39.29	38.90	0.55	(0.10)
Viet Nam	313,429	117,840	133,880	146,430	37.00	43.18	47.22	1.28	0.90
ASEAN	4,394,536	2,225,500	2,182,770	2,065,560	50.29	49.52	47.35		

[a]The World Bank. 2020. https://data.worldbank.org/indicator/AG.LND.TOTL.K2?locations=Z4;
[b,c] Food and Agriculture Organisation (FAO) Global Forest Resource Assessment (GFRA), 2020

and various anthropogenic activities that include agriculture, logging, mining, and hunting.

The forest ecosystems in the ASEAN region cover about 47 per cent of the total land area as of 2020 (Table 3). The region's forest cover has suffered a significant decline in recent decades, hence, it is categorised as a "deforestation hotspot", while the neighbouring East and South Asia have marked an overall increase. Between 2000 and 2020, the region's forest cover declined by 160,000 square kilometres or at a rate of about 8,000 square kilometres annually while the global rate of deforestation was at 100,000 square kilometres per year in 2015–2020.[3]

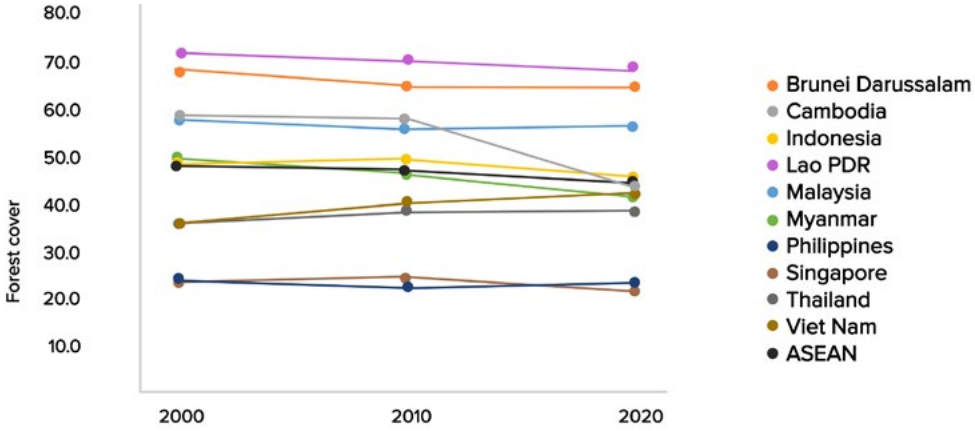
This conjures a bleak scenario considering that the region houses almost 15 per cent of the world's tropical forests. Additionally, massive deforestation causes tons of the stored carbon to be released back into the atmosphere as carbon dioxide further fueling the climate change emergency.

Against this backdrop, a significant consideration on biodiversity conservation are intact forest landscapes (IFL) or unbroken natural landscapes. IFLs are crucial for mitigating climate change, maintaining water supply, safeguarding biodiversity, and protecting human health. As IFLs become isolated patches, the dispersal of plants and movement of animals are constrained, thus, inhibiting breeding and gene flow. Eventually, highly fragmented forests become unsuitable habitats for forest-dependent native plants and wildlife, in terms of both individual numbers and species diversity, and deteriorate beyond recovery.[4]

Southeast Asia has 383,000 square kilometres of IFLs, accounting for about 19 per cent of the region's total forest cover in 2015.[5] While there have been positive net changes attributed to reforestation efforts in some AMS, the region's forest landscapes remain vulnerable to fragmentation and depletion.

The country assessments in the 6NRs indicate that Brunei Darussalam, Cambodia, Indonesia, Lao PDR, the Philippines, and Singapore have been progressing adequately towards this Aichi Target of halving the rate of loss and significantly reducing degradation and fragmentation of all natural habitats.

Figure 4. Forest cover trend in the ASEAN region, 2000–2020.



However, based on the Global Forest Resource Assessment (GFRA) data (Table 3), Indonesia, Myanmar, Cambodia, and Lao PDR had net forest losses of 91,470, 63,240, 27,130, and 8,290 square kilometres, respectively, between 2000 and 2020. These figures were partially offset by forest gains in Viet Nam and Thailand with 28,590 and 8,750 square kilometres over the same period. Figure 4 illustrates these trends.

Brunei Darussalam was able to maintain its forest cover at 3,800 square kilometres between 2010 and 2020. Viet Nam has been progressively steering its forest expansion and rehabilitation measures as illustrated by the steady increase in forest cover from 2000 to 2020. Malaysia and the Philippines registered a slight decline in forest cover between 2000 and 2010 but gradually shifted to a positive trajectory between 2010 and 2020.

Mangrove forest ecosystems provide the ideal environment for a large variety of animals ranging from mammals, birds, reptiles to fish, crab, shrimp, and mollusc species to live and thrive. They also serve as nurseries for many fish species. Mangroves also provide natural defences against storm surges and protection for coastal communities. Moreover, mangrove ecosystems sequester 14 per cent of carbon from the ocean,[6] thus, present a valuable intervention in mitigating climate change.

The ASEAN region suffers the highest rates of mangrove losses in the world. Between 1980 and 2020, 63,000 square kilometres or 33 per cent of its mangrove forests has been depleted. What is left of its mangrove area—43,000 square kilometres—is less than what it had lost.[7] Indonesia loses around 5,200 square kilometres of mangrove forest annually to large-scale shrimp industry valued at USD 1.5 billion.[8] Myanmar, which has the third largest area of mangroves in the region after Indonesia and Malaysia, has shown significant declines in mangrove forests area at a rate of about 22 square kilometres per year up to 2015. The Philippines, where at least 50 per cent of the world's total mangrove species can be found, has been losing a significant portion of its mangrove cover due to land conversion, urbanisation, and human settlement.

Wetlands are equally important habitats for many species of birds and mammals, fish, amphibians, shellfish, and insects. They are rich food sources and breeding grounds for fishes and also serve as stopover sites for migratory waterbirds. The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention on Wetlands) is the international treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

The ASEAN region has declared a total of 26,592 square kilometres as Wetlands of International Importance or Ramsar Sites.

Table 4. Number of Ramsar Sites in the ASEAN region

AMS	Accession Year	No. of Ramsar Sites	Area (km^2)
Cambodia	1999	5	852.35
Indonesia	1992	7	13,729.76
Lao PDR	2010	2	147.60
Malaysia	1995	7	1,341.82
Myanmar	2005	6	2,786.79
Philippines	1994	8	2,476.48
Thailand	1998	15	4,052.19
Viet Nam	1989	9	1,205.49
TOTAL		**59**	**26,592.48**

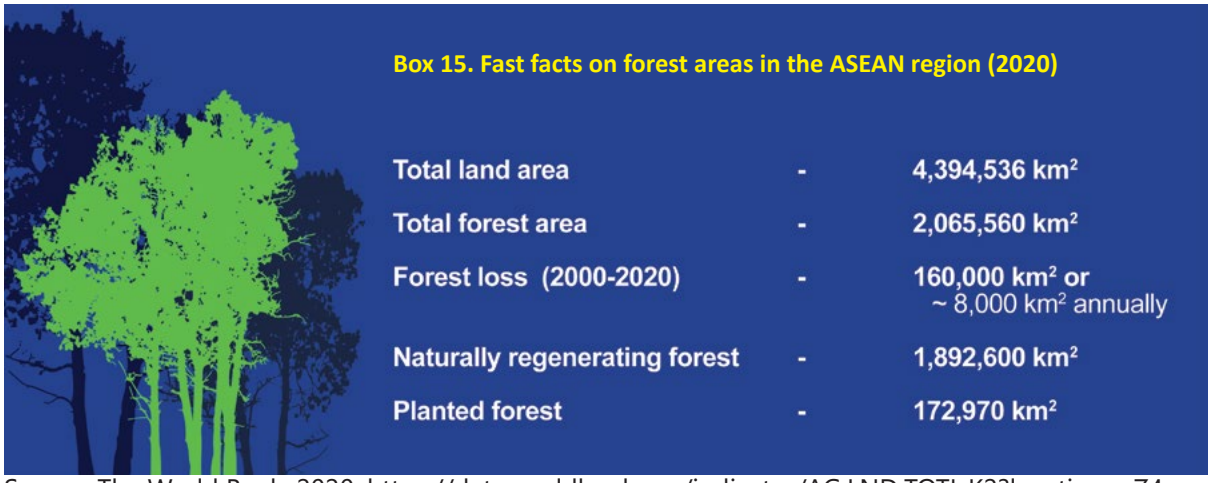
Source: https://www.ramsar.org/

Thailand has the most number of Ramsar sites (15), followed by Viet Nam (9) and the Philippines (8). But, in terms of area, Indonesia encompasses the broadest wetland area with 13,729 square kilometres, followed by Thailand, and Myanmar (Table 4). While Brunei Darussalam is yet to become a Party to the Ramsar Convention, it has potential sites that traverse Brunei Bay and extends to Malaysia. The whole stretch is suitable to be established as a single transboundary Ramsar site. Similarly, Singapore is not a Contracting Party, but the country has policies and programmes for wetland conservation and sustainability.

Regional initiatives to significantly reduce, or at best, halt forest decline

The *ASEAN Community's Post-2015 Vision, the Vision and Strategic Plan for ASEAN Cooperation in Food, Agriculture, and Forestry (SP-FAF) 2016–2025* serves as the guidepost in supporting and achieving the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs). Under Strategic Thrust 7, AMS committed to promote the implementation of sustainable forest management, enhance competitiveness and eradicate unsustainable practices including combatting illegal logging and its associated trade, through, amongst others, strengthening law enforcement and governance, improving the livelihood of communities living in and surrounding the forest, and building their capacity and enhancing public awareness.

A report on *Southeast Asia: Prospects and Challenges* stated that the ASEAN region has increased agricultural productivity at an



Source: The World Bank. 2020. https://data.worldbank.org/indicator/AG.LND.TOTL.K2?locations=Z4; Food and Agriculture Organisation (FAO) Global Forest Resource Assessment (GFRA), 2020

average annual rate of 2.2 per cent since 1991 as a result of agricultural expansion, which led to the increase of agricultural land by almost 40 per cent across the region between 1980 and 2014.

While food security is an important component of national security and economic development, increased agricultural production poses a substantial threat to biodiversity. In addition, habitat conversion from natural ecosystems to agricultural lands has been one of the principal drivers of global biodiversity loss.

The 2016 Mid-term Review of Progress towards the Aichi Biodiversity Targets reported a considerable loss of tropical forest habitat in the ASEAN region particularly to single-species plantations and industrial agriculture.[9] With the high and surging demand for vegetable oils, biofuels, fruits, rubber, timber, and other products, biodiversity-rich forests are expected to continuously diminish to make room for plantations and agricultural lands. Industries are allegedly being held responsible for displacing indigenous peoples, emitting carbon into the atmosphere, and driving the extinction of many animal species, and important pollinators.

The palm oil industry in the region has been helping meet 12 of the 17 UN SDGs such as poverty eradication, eliminating starvation, and ensuring the affordability of clean energy. Indonesia and Malaysia contribute 85-90 per cent of palm oil to the global market. In Indonesia alone, the export value of palm oil in 2017 reached USD 23 billion. The industry contributed 17 per cent of the agricultural gross domestic product (GDP) in 2014. The industry employs up to 7.8 million labourers.[11]

Natural rubber is another major plantation crop in the ASEAN region. It serves as raw material to over 40,000 products like medical devices and aircraft and car tires. The aggregate rubber production of Thailand, Indonesia, Vietnam, and Malaysia accounted for 70 per cent or around 9.6 million metric tons of the global production in 2021.[12] In terms of export value, Cambodia, Myanmar, and Lao PDR were among the top ten exporters globally, with 2.4, 1.7, and 1.5 per cent shares, respectively.[13] Relative to these figures, it should be noted that between 2003 and 2014, huge areas of natural forests in Cambodia (28,738 square kilometres), Lao PDR (7,291 square kilometres), and Myanmar (2,866 square kilometres) were converted to rubber plantations.

While the above scenarios spell economic progress for most of AMS, they also point to the importance of strengthening policies, improving strategies, and harmonising initiatives to augment biodiversity loss resulting from the aforementioned developments .

How do AMS address the conservation challenges in the forest ecosystems?

The National Forest Policy (NFP) of Brunei Darussalam implements five strategies to conserve, develop, and manage its forestry resources. The *National Master Plan for Vision 2035* reinforces the NFP by institutionalising state funding in conservation projects. These measures contribute to achieving the country's commitment of allocating and conserving 58 per cent of its total land area as forest areas through programmes like the *Heart of Borneo* (HoB). The forest products in Brunei Darussalam are strictly for local consumption and limited only to 100,000 cubic metres annually. Beyond the local demand, wood products are supplied through importation. A total of 2,369 square kilometres or 41 per cent of Brunei Darussalam's total area was gazetted as reserved forests.

Cambodia has expanded its protected area system to 41 per cent of the country's area including the extended network of biodiversity conservation corridors. This is 24 per cent more than the global target of 17 per cent. Pivotal to this was the jurisdictional reform in 2016 where management of the country's natural resources was transferred from the Ministry of Agriculture, Forestry and Fisheries (MAFF) to the Ministry of Environment (MoE). Additionally, the country

has put in place the necessary legislation, policies and guidelines for the conservation of specific ecosystems and sustainable production and consumption.

The Environment and Natural Resources Code of Cambodia and the National Protected Area Strategic Management Plan (NPASMP) prominently integrates the protection and restoration of biodiversity corridors and protected areas in national development goals and strategies. Through these policy frameworks and strategies, the protected area system of Cambodia increased in 2016 by 12.8 per cent from the 1999 figure. In 2017, a sub-decree established the conservation corridor network which covers 14,280 square kilometres or 7.9 per cent of the total unprotected land area. This has enabled protected species more mobility and provided broader ground where they could thrive.


Photo by Antonio Rojas Jr.

Since 2016, the rate of primary forest loss in Indonesia has been decreasing. The rate of forest loss in 2019 was 5 per cent lower than in 2018. Conservation measures and governing policies like the moratorium on permits for the use of primary natural forests have provided some breathing space for forest utilisation. As a result of the moratorium, no rights to production or other use are granted on a forest area of 664,000 square kilometres.[14] In 2017, there was an observed progress with the restoration of 259 square kilometres of degraded areas and 6,228 square kilometres of natural forests, and rehabilitation of 527 square kilometres of protected areas.

The Indonesian Biodiversity Strategy and Action Plan (IBSAP) 2015–2020 puts a premium on *in situ* and *ex situ* conservation in order to improve knowledge in and preserve the existing biodiversity resource in the specific region. Management strategies like greening and development of biodiversity park and other relevant *ex situ* conservation areas enable better appreciation and sustainable utilisation of biodiversity.

The Forest Strategy to 2020 of Lao PDR aimed to increase the country's forest cover to 58 per cent of the total land area in 2015. This has been amended and further increased to 70 per cent or 170,000 square kilometres by 2020 as indicated in Target 1 of its NBSAP. However, widespread deforestation continues to be a challenge to the country and prevents it from achieving this target.

Lao PDR has implemented multiple interventions to attain the said similar target. One is the establishment of the National

Forest Information System (NFIS). Conducted every 10 years, the NFIS provides an up-to-date quantitative assessment of forest cover change and carbon stock change every five years based on the national forest inventory system and the methodology of the Forest Carbon Partnership Facility (FCPF).

The third national forest inventory was launched in 2019 where the state of forest carbon stock and estimations of the country's greenhouse gas emissions from selective logging was determined. Results of the survey provided inputs to the development of Lao PDR's MRV report and shall inform and guide plans and programmes on forest conservation.

In 2017, the Ministry of Agriculture and Forestry (MAF) of Lao PDR reported to have regenerated and rehabilitated around 1,082 square kilometres of natural forest through tree planting activities under the Biodiversity Conservation Corridors Project (BCCP), led by the Asian Development Bank, and the private sector. In 2019, over 22 million seedlings were projected to be produced to help deal with the fragmentation of forest landscapes in southern Lao PDR. Land-use planning has also been carried out in a total of 315 villages, which cover more than 10,000 square kilometres. The BCCP and The Agrobiodiversity Initiative (TABI) projects aspire for the sustainable management of multi-functional landscape while providing livelihoods and alleviating poverty in most, if not all, of these villages.

Under the *National Policy of Biological Biodiversity 2016–2025* (NPBD) of Malaysia, the National Target 7 articulates the protection and restoration of valuable ecosystems and habitats by 2025. The country aimed to maintain at least 50 per cent of its land under forest and tree cover; as of 2020, its forest cover was at 58.18 per cent. One way by which this target is being realised is through the establishment of protected areas. As of 2020, the country had about 44,205 square kilometres of terrestrial areas and 14,930 square kilometres of coastal and marine areas under protected area coverage (Refer to section on Aichi Target 11). These figures translate to 13.33 and 3.31 per cent of terrestrial and marine areas, respectively, under protected management.

The problem of habitat fragmentation is effectively being addressed by Malaysia's flagship projects like the Central Forest Spine (CFS). Led by the United Nations Development Programme, with funding from the Global Environment Facility (GEF) and the Malaysian Government, the CFS initiative sought to contribute to the gazettement of ecological corridors, wildlife inventories, strengthening the Sustainable Forestry Management (SFM), and forest rehabilitation.

As a result, the CSF has enabled the gazettement of 28 square kilometres of the ecological corridor as Permanent Reserve Forests by the end of 2018. These gazetted areas are protection forests where commercial forest harvesting is prohibited. Moreover, the *Heart of Borneo* (HoB), a multilateral


Photo by Aniza Binti Yusup

initiative among Malaysia, Brunei Darussalam and Indonesia, implements transboundary conservation measures in a total of 19,616 square kilometres that is currently under protected area management.

The Myanmar Sustainable Development Plan (2018–2030) recognises the importance of biodiversity in realising sustainable development and continuous provision of ecosystem services. This is being operationalised in part through the 10-year Myanmar Reforestation and Rehabilitation Programme (MRRP), which was launched in 2017. Under the programme, the government plans to rehabilitate 323-400 square kilometres of forests every year and establish 2,830 square kilometres of community forests and private plantations.

In terms of wetlands protection, four new Ramsar sites have been designated since 2017. Ramsar sites are habitats, specifically wetlands, that are considered internationally important if they support vulnerable, endangered, or critically endangered species or threatened ecological communities. A Ramsar site is afforded with higher level of protection through established management plans and state support.

Recognising the importance of engaging local communities in conservation efforts, Myanmar has established community forests with the help of government agencies, international development organisations, and non-government organisations like the BANCA and Flora and Fauna International (FFI). Around 60 community forests have been instituted by forming Community Forest User Groups (CFUGs) that are either certified or in the process of certification by the Forest Department. The new National Land Use Policy which took effect in 2016 set a positive momentum as it espouses a bottom-up approach to land decisions including representations by ethnic groups and a dispute resolution mechanism. This policy is the first step towards a land law, which is under development, to protect land rights.

The Philippines set out to restore 10,000 square kilometres of degraded ecosystems by 2028. In 2016, the *National Action Plan for Ecosystem Restoration and Species Extinction Prevention* (NPAERSEP) was developed as a supplement to the PBSAP and serves as the roadmap for the recovery and rehabilitation of various ecosystems. The N*ational Greening Program* (NGP) in 2016 has been the overarching programme for the country's reforestation programmes. In 2016, the scope of the NGP was expanded to include the reforestation of 71,000 square kilometres of unproductive, denuded, and degraded forestlands from 2016 to 2028. Between 2011 and 2017, over 18,000 square kilometres has been successfully reforested. The greening programme recognises the importance of engaging civil society organisations and private sectors in conservation and rehabilitation efforts.

Singapore endeavours to protect and retain 7.5 per cent of its land as natural areas covering four legally gazetted Nature Reserves and 20 Nature Areas. In 2018, the country's natural areas were calculated at 7.56 per cent, thus, meeting its national target. This feat can be attributed to the country's robust greening programmes, strong political will, and well- planned conservation initiatives.

The National Parks Board of Singapore spearheads the pragmatic implementation and monitoring of environmental programmes in the country. National Parks Board of Singapore implements science-based land-use planning in collaboration with the Urban Redevelopment Authority

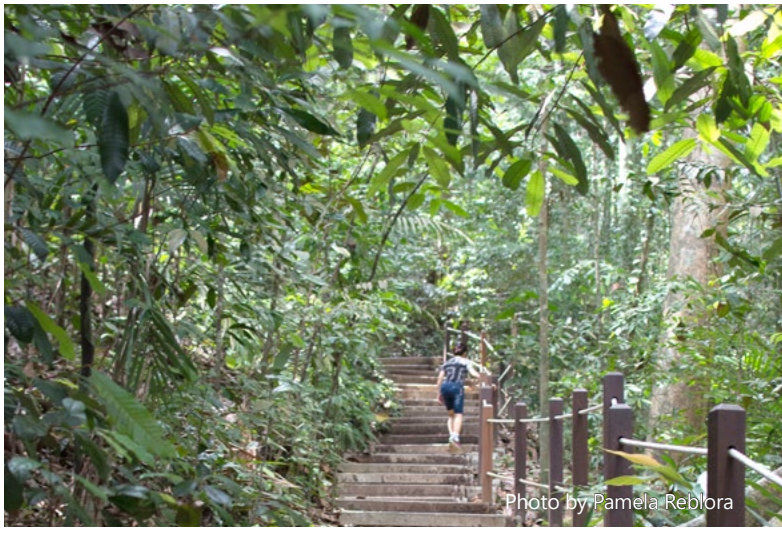


Photo by Pamela Reblora

Box 16. Restoring ecological landscapes and biodiversity corridors


Photo by Rhia Galsim

The Heart of Borneo (HoB) is a transboundary collaboration signed in 2007 by Brunei Darussalam, Indonesia, and Malaysia to protect the single largest stretch of rainforest in the ASEAN region and the third largest rainforest on earth. The proposed corridor encompasses 220,000 square kilometres of biodiversity, ecosystems, and natural resources across the Borneo Island and spans millions of hectares.

Brunei Darussalam has committed 58 per cent of its total land area to forest conservation under the HoB initiative. Sabah in Malaysia has pledged to further expand its Totally Protected Areas (TPAs) to at least 30 per cent of the state's total land area by 2025.

Most of the protected areas in Borneo exist in isolation and are separated by national borders and managed under different national policy management systems. In 2015, connectivity between protected areas was created and the groundwork for a cohesive framework across the three countries was established.

In 2017, World Wildlife Fund (WWF)-Malaysia signed a Memorandum of Understanding (MoU) with the Sabah Forestry Department and Sabah Wildlife Department to secure the southern landscape on the Sabah side of the corridor which serves as the Elephant Transboundary Landscape between Sabah and North Kalimantan. Through the MoU, all parties sought to maintain, establish, and restore landscape connectivity for animals, plants and communities by harmonising and balancing the competing land uses within the area.

At the 13th Heart of Borneo Trilateral Meeting in 2019, Brunei Darussalam identified sites in Belait and Temburong District to become biodiversity corridors, spanning over 2,000 kilometres across Borneo, which will link existing protected areas in Brunei Darussalam, Indonesia, and Malaysia. As of 2019, a total of 19,616 square kilometres in Sabah and Sarawak has been protected within the HoB landscape. As of 2020, the total forest land that has been gazetted as TPAs in Sabah was 19,000 square kilometres or 25 per cent of the state.

(URA). Over the years, the environmental impact assessment (EIA) process on projects has been improved and reviewed, thus, minimising the environmental impact of development projects. Singapore has also been conducting research such as modelling of least resistance pathways or agent-based modelling using geographic information systems (GIS) to provide science-based guidelines in countering habitat fragmentation in this island state.

Thailand aims to increase its forest areas to 40 per cent of the total land area. As of 2017, it was able to reach 31.58 per cent. The expansion of forest areas remains to be a priority target among government agencies. Milestones in habitat protection and rehabilitation can be observed in mangrove areas, coral reefs, and wetlands. Across the country, natural habitats were evaluated to be in Level 3 or progress is in operation but inadequate to meet the indicative national target of 50 per cent. The revised forest law of Thailand articulates the lifting of the ban on possession of economically valuable trees in privately-owned properties to encourage planting of valuable species and expand forest cover.

Viet Nam has about 2,250 square kilometres of its land area under sustainable forest management and afforested annually since 2018. Around 90 per cent of this area are production forests, 1,390 square kilometres plantation forests, and 8.6 square kilometres natural forests.

Currently, Viet Nam has 172 protected areas covering 24,938 square kilometres which include 33 national parks, 65 natural reserves, 18 species and habitat conservation areas, and 56 landscape protection areas.

Viet Nam reported on the successful implementation of Payment for Forest Environmental Services (PFES) schemes in terms of increasing household incomes, hence,

Box 17. Sustainable management of the green rubber


Photo by Rhia Galsim

In the last 20 years, the demand for rubber has increased, which in turn, has driven deforestation. In response, global tire manufacturers have started initiatives to mitigate deforestation with the expansion of rubber plantations.

In 2015, the International Rubber Study Group, a voluntary and collaborative inter-governmental organisation of rubber producers and consumers, launched the Sustainable Natural Rubber Initiative (SNR-i) to ensure that the rubber industry can build on its best practices, and advocate for these throughout the natural rubber value chain. The Association of Natural Rubber Producing Countries that include Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam supports SNR-i.

In 2018, the World Business Council for Sustainable Development Tire Industry Project launched the Global Platform for Sustainable Natural Rubber (GPSNR) to protect the forests, biodiversity, and water resources of rubber-producing countries. It also aims to work against land-grabbing and increase the transparency and traceability of the industry's supply chain. A big industry player developed a new natural rubber procurement policy that reflects responsible sourcing of raw materials. It also came out with a Business Conduct Manual and Supplier Code of Conduct which provides guidance on the development of a long-term, sustainable supply chain.

incentivising participation in forest protection, increasing the value of forestry production, and improving the efficiency of forest protection. On average, the country earns over VND 1,200 billion annually from PFES for over 50,000 square kilometres of forests. In 2017, Viet Nam gained over VND 1,675,581 billion, achieving 101.5 per cent of the set target for 2017, and 130 per cent in 2016.

Mechanisms for forest resource governance

The ASEAN's forests are primary sources of high-value wood, including red sandalwood, teak, and rosewood, for various uses, from furniture and plywood to paper and pulp. The high global demand for timber has caused the rapid depletion of the region's natural forest resources[15] due mainly to over extraction and illegal logging for timber and fuel.

Forest certification is a mechanism that fosters sustainable forestry practices. Certified forest products denote that forest-based products and by-products are produced with minimal ecological impact. The changing consumer values toward production processes that are environment-friendly increases the competitiveness and value of forest products. Indonesia and Malaysia, the two major palm oil producers in the region and the global market, have been implementing certification schemes to what end?

Under the Ministry of Agriculture Regulation No. 11, the Indonesian Sustainable Palm Oil Certification System (ISPO) warrants companies to be certified, otherwise, they can be downscaled to Class IV plantation or may suffer revocation of Business Permit. As of 2016, as many as 226 companies have obtained ISPO certification with a total area of 14,300 square kilometres. In the same light, the Malaysia Sustainable Palm Oil (MSPO) certification mandates the accreditation of all oil palm plantations. As of 2019, 54.6 per cent or 31,920 square kilometres has been certified.

The Forest Stewardship Council (FSC) certification system is a global certification process that supports and verifies environmentally, socially, and economically beneficial forest management practices. Some principles and criteria that FSC certification considers are community relations and worker's rights, environmental

impacts, management plan, and monitoring and assessment. Indonesia, Lao PDR, Malaysia, Thailand, and Viet Nam subscribe to the FSC certification system. It is worthy to note that the Deramakot Forest Reserve (DFR) in Sabah has earned recognition as a model forest for best forest management practices as certified by the FSC in 1997. It has reached its 5th certification period which lasts until 2019, thus, making it the longest certified tropical rainforest in the world.

Some AMS have developed their national forest certification system. Indonesia has the Sustainable Production Forest Management (PHPL) program which ensures the sustainable production of legal timber or non-timber forest products. The forest area managed through PHPL has reached 688,310 square kilometres as of 2017. The country also implements the Timber Legality Verification System (SVLK). Malaysia has committed that by 2025, all its timber and timber products shall be under sustainable management through certification schemes like the Malaysian Timber Certification Scheme (MTCS) and the FSC. Consequently, Malaysia has the largest forest area certified as sustainably managed in the ASEAN region and is on track to achieving its target. As of 2019, at least 30 per cent of its Permanent Reserved Forest (PRF) has been certified under the MTCS.

Another intervention that increases the integrity of supply chains and hinders illegal harvesting and trade of timber products and improve forest governance is the Voluntary Partnership Agreement (VPA) on *Forest Law Enforcement, Governance, and Trade* (FLEGT).[17] Lao PDR, Indonesia, Myanmar, Malaysia, Thailand, and Viet Nam are signatories to VPA-FLEGT.

Malaysia was the first among member states to negotiate a VPA-FLEGT in 2007 but the country's complex and decentralised political structure has stalled the process. Thailand started negotiating the VPA process in 2013. The following year, it traded timber with EU amounting to USD 267 million. A second VPA negotiation was held in 2018.

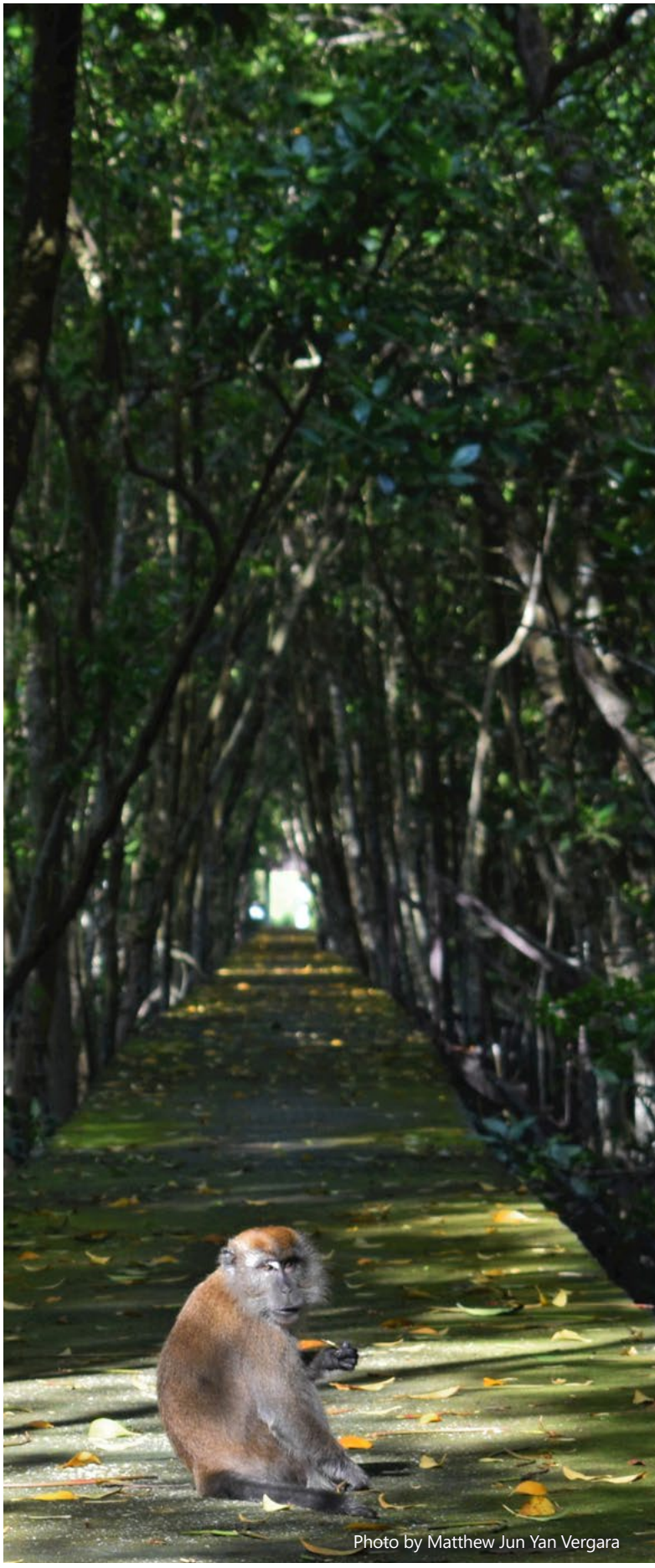


Photo by Matthew Jun Yan Vergara

Myanmar started the VPA process with the EU in 2013. In 2018, a national Multi-Stakeholder Group was formally established to steer the FLEGT-related activities of forestry stakeholders. This group has been expanded in states and regions to ensure that local situations and concerns are heard and addressed.

Indonesia signed the VPA-FLEGT in 2016 and this move has empowered stakeholders, NGOs, and civil society sectors with full participation at the negotiating table. The country has also issued its first FLEGT timber export licences to verified legal timber producers. The licensing system provides legal wood producers with a "green lane" into the EU and exempts them from the procedures that non-licensed EU timber imports must follow.[17]

In 2017, Lao PDR initiated FLEGT-VPA negotiations with the EU including the multi-stakeholder process of defining and agreeing on Lao PDR's Timber Legality Definition (TLD) and development of a Timber Legality Assurance System (TLAS). In 2018, Viet Nam and the EU signed the FLEGT agreement, which took effect in June 2019.


Photo by Tluang Hmung Thang

AMS in the Mekong region—Lao PDR, Myanmar, Thailand, and Viet Nam—actively involved and consulted with small and micro- sized enterprises (SmEs) in the timber industry. With support from the Swedish International Development Agency (Sida), the EU FLEGT Facility assessed 14 supply chains from 2017–2018 to gather baseline information, identify related supply chains, or their level of compliance with relevant regulations.[18]

The assessment found that individual tree growers comprise a majority of the timber producers in the four countries. These growers cater to local markets and are mostly unregistered, often resulting in their exclusion from the legally registered supply chains pursuant to the definition of timber legality in national laws on VPA-FLEGT of their respective countries.

The study also found that tree growers do not belong to any organised groups or associations from which they could potentially derive common benefits. From these findings, some policy recommendations are proposed.

- Clarify and improve legal frameworks through processes aimed at defining timber legality (ASEAN response: ASEAN Standard for Legality of Timber and the Revised ASEAN Criteria and Indicators for Legality of Timber).
- Support the creation of SmE groups and their organisational structures to increase their competitiveness.
- Provide incentives and technical support to SmEs that reach the registration thresholds to register their businesses.
- Support synergies among relevant initiatives led by national stakeholders/ beneficiaries and where relevant, partner-led initiatives
- Identify and support alternative timber sourcing and production options for SmEs

In the absence of a VPA-FLEGT and Trade Voluntary Partnership Agreement and Timber Legality Assurance System, the Chamber

of Furniture Industries of the Philippines, Inc. has drafted a guidebook to support programmes against illegal sourcing of wood materials. The guidebook, developed jointly with FAO, Department of Trade and Industry-Export Marketing Bureau, and Department of Environment and Natural Resources-Forest Management Bureau, includes a legality verification process to help the furniture industry sector identify necessary information and documents to ensure the legality of wood materials and provides the timber industry with legal compliance requirements.[19]

Illegal logging is yet another major driver of massive deforestation. It is estimated to account for 15 to 30 per cent of all timber traded worldwide with an estimated annual value of USD 51 to 152 billion, according to 2019 Interpol data.[20] Indonesia is losing an estimated 16,000 to 28,000 square kilometres annually to illegal logging and land conversion, mostly in Sumatra and Kalimantan.[21] Large-scale illegal logging has been identified in the northern provinces of Ratanakiri and Mondulkiri in Cambodia where rosewood trees are abundant and easily transported into Viet Nam.[22] Myanmar has been losing high-value timber species, including teak.

The heightened vigilance to protect the ASEAN's forests requires stricter law enforcement, strong political will, public awareness, aerial and ground surveys, modern log tracking technology, reliable documentation and verification, information reporting systems, the creation of a third inspection body, and improvement in the judicial system.

The action plan for combatting illegal logging of Myanmar's Forest Department's Protection and Inspection Division (FDPID) underlines community monitoring and reporting to ease timber trafficking.

The country's Forest Protecting Operation Centre stepped up its efforts to curb illegal logging with the help of Network Centric Anti-Poaching System cameras. With these cameras, coordinators of the alleged largest illegal logging ring in the country, which


Photo by Ma. Angelita Rabanal

Box 18. Myanmar strengthens policing of illegal logging activities

Deputising Forest Police under the FDPID has been an effective move in forest governance. Since 2014, Myanmar seizes an average of 40,000 tonnes of illegal wood a year over the past 10 years. The value of seized wood has increased from USD 122,000 to more than USD 7 million in 2017.

There has been an annual increase in the amount of illegal wood seized since 2014 although it is not established if this also reflects an increase in illegal logging. Illegal logging continues owing in large part to a willing market north and west of Myanmar and an insufficient capacity for enforcement.


Photo by Wai Phyoe Maung

targets endangered Siamese rosewood trees, were arrested in 2018. The investigation was later expanded, involving the police and its Natural Resources and Crime Suppression Division and the military.

Forestry of the ASEAN people, by the ASEAN people, for the ASEAN people (SFM)

Over the past decades, social forestry has been increasingly recognised to effectively address the problems of poverty alleviation, improving incomes, and forest conservation and management. But, despite its effectiveness in conserving and managing forest resources, uptake has generally been slow. The area of state forest land managed under official social forestry agreements or communal land titles in the region is approximately 1,100,784 square kilometres for each country and the area under social forestry has increased by only 13,612 square kilometres since 2013.

Efforts to position social forestry in the conservation agenda included the 1st ASEAN Working Group on Social Forestry (AWG-SF) which convened over 200 representatives from government, civil society organisations (CSOs), development partners, private sector, and academic institutions.[23]

In the same light, the Network of Indigenous Peoples in Thailand (NIPT) issued a call to harnessing the community-centred principles of social forestry so that social forestry for a meaningful contribution towards achieving the goals and targets of the SDGs and work under inclusive ASEAN cooperation in social forestry.[24]

The NIPT statement highlighted that, for many generations, indigenous peoples and local communities (IPLCs) have taken care of the forests that they depend on for survival. Thus, there should be strong measures to protect IPLCs from any harm or negative impacts of illegal encroachment, extractive industries, large-scale plantations, and infrastructure development projects.

In 2016, structural and institutional reforms in Cambodia paved the way for improved sustainable management of forests and more inclusive participation of IPLCs in such efforts. One of these was the transfer of jurisdiction of protected forests and fisheries from the Ministry of Environment (MoE) to the Ministry of Agriculture, Forestry, and Fisheries (MAFF). MoE has taken charge of at least 45,000 square kilometres of new protected areas and conservation areas. In 2017, 610 communities covering 244 square kilometres were under community forests where local communities served as stewards of the forest. However, studies indicate that more actions are needed to curb illegal selective logging of valuable timber trees.

Myanmar's community forestry-based enterprises underscore best practices like

Box 19 . Characterising Social Forestry

The ASEAN Working Group on Social Forestry (AWG-SF) characterises social forestry as that which:

- engages communities living in and around forests in sustainable forest use and management;
- empowers communities through awareness raising, capacity building, participatory policy development, and recognition of their rights and systems of knowledge; and
- provides communities with benefits and access to forest resources for their participation in sustainable forest management (AWG-SF 2017).

Social forestry presents a valuable opportunity to contribute to programmes around climate change mitigation and adaptation and sustainable forest management.

Photo by Veosavanh Seosavanh

the nationwide greening of dry zones and forest landscape restoration, promotion of biodiversity, mangrove rehabilitation and coastal management, and reform strategy to boost private sector investments in social forestry/community forestry. The country's successful community forestry initiatives included innovations in value-adding for traditional products like Thanaka, bamboo, palm and toddy, coconut, plum, tamarind, and organic tea. The Forest Law of Myanmar was amended to integrate tenure rights in the national legal framework of forest management. The law was redesigned to increase the participation of local communities and recognise local rights.[25]

The 2nd AWG-SF Conference in 2018 urged AMS to adapt the social forestry approach to effectively elicit and increase stakeholders' involvement in forestry activities.

In 2020, two community-based groups, the Boon Reuang Wetland Conservation Group of Thailand and the Prey Lang Community Network of Cambodia, received global distinctions for their wide-scale, community-based forest conservation schemes.

Box 20. Vanguards of forest landscapes

The Boon Reuang Wetland Conservation Group (BRWCG) was conferred the 2020 Equator Prize by the United Nations Development Programme (UNDP) for staunchly defending this 483-hectare forest wetland against plans to convert the area into Special Economic Zones.

Unremitting in their advocacy work, the BRWCG has convinced the local government in 2018 to abandon the land conversion plans and leave Boon Reuang in its natural, productive state. Currently, the BRWFCG is vying for the inclusion of Boon Reuang wetland to the Ramsar Convention to permanently safeguard the wetland from destructive ecosystem alterations.

Photo by Boon Reuang Wetland Conservation Group

Challenges

Improving and maintaining the health of ecosystems in the ASEAN is an enormous challenge in the face of rapid economic growth and burgeoning regional population. Apart from these, the continuing conversion of natural habitats in agriculture, aquaculture, infrastructure, industries, and nature-based livelihoods remain largely unresolved.

Despite responses in the form of policies and programmes, the regional trend in forest cover continues to decline, indicating that current actions are inadequate. This means that ending, and, if possible, reversing, the trend of deforestation, is a high-priority target. *The New York Declaration on Forests*, *The Paris Agreement*, *The Bonn Challenge*, the *UN 2030 Agenda for Sustainable Development*, and the CBD call for complementary global efforts to protect and restore millions of forest ecosystems by 2020.


Photo by Nadine Adellia Ledesma

The goal for the region's forestry sector is to enhance forest management approaches in a balanced and sustainable way. These can ensure the continuous production of forest goods and services, forest protection, and biological diversity conservation and efficiency in forest and forest products utilisation that are compatible with social and ecological sustainability.

At the *34th ASEAN Summit* in Thailand in 2019, the *Chairman's Statement* recognised the challenges of biodiversity conservation and the impact of climate change in the region.[26] AMS have different ways of managing their forests and other natural ecosystems based on economic and national development interests, thus, making it difficult to synergise approaches towards achieving the ambitious global targets. The challenge is to continuously monitor regional and country commitments and programmes designed and implemented to protect forests and other natural habitats and determine their effectiveness.

Table 5. Biodiversity Habitat Index by AMS with annual rate of change

ASEAN Member States	2005	2010	2015	Annual rate of change
Brunei Darussalam	0.626	0.617	0.588	-0.624%
Cambodia	0.501	0.508	0.491	-0.196%
Indonesia	0.676	0.672	0.662	-0.196%
Lao PDR	0.582	0.582	0.576	-0.133%
Malaysia	0.608	0.603	0.571	-0.619%
Myanmar	0.549	0.545	0.548	-0.011%
Philippines	0.495	0.489	0.485	-0.206%
Singapore	0.481	0.480	0.451	-0.629%
Thailand	0.482	0.493	0.482	0.002%
Viet Nam	0.505	0.514	0.508	0.031%

Source: Biodiversity dashboard: https://bipdashboard.natureserve.org/bip_metadata/biodiversity-habitat-index-forests

Table 5 shows the rate of loss of all natural habitats, including forests, in the ASEAN region using the *Biodiversity Habitat Index* (BHI) developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The BHI represents the proportion of biodiversity retained within a given area (such as a country or an ecoregion) with the degree of habitat loss, degradation, and fragmentation experienced. The CSIRO computed the BHI based on remote sensing data and other studies of ecological diversity. "The BHI indicator ranges from 0-1. Values closer to one (1) for a given spatial reporting unit (e.g., a particular country, hydro-basin or region) indicate that finely-mapped environments supporting relatively distinct assemblages of species within that unit are, on average, well covered by intact natural habitat. Values closer to 0 indicate that very little natural habitat remains across most of the distinctive environments occurring within a given reporting unit."[27]

Data shows that from 2005 to 2015, Brunei Darussalam, Indonesia, and Malaysia scored close to one (1) indicating lesser incidences of habitat loss or degradation compared to other AMS. On the other hand, the Philippines, Singapore, and Thailand had greater incidences of habitat loss or degradation for the periods under consideration.


Photo by Marinella Lomotan


Photo by Christopher Andres

Ways Forward

This narrative provides the context and current state of the ASEAN's natural habitats which are characterised by modest gains and heavy losses. But options exist to bend the conservation trajectory to a positive slope towards the restoration of the region's forests and habitats for the benefit of all. While there are reasons to remain hopeful, the improvement and sustainability of the region's natural habitats reside on both the collective and individual responses of AMS.

Now is the time to build on the current efforts of AMS and enhance them with more effective measures that will:

- Strike a balance between conservation and consumption. At the 22nd meeting of ASOF in 2019, top ASEAN forestry officials were urged to strike a balance between preserving the region's limited forest resources and stability of the environment and meeting the needs of its growing population. These forestry leaders were called upon to transform the strategic direction of sustainable forest management, competitiveness for foreign products, forest rectification, forest law and enforcement in government, and other forestry concerns into actions, aligned towards accomplishing the Strategic Plan of Food and Agriculture and Forestry.

- Address land use conflicts. The demarcation, classification and registration of forest land boundaries are identified as an essential step to the resolution of many land-use conflicts and one of the enabling factors to achieve the sustainable management of forest resources.

- Forge strong collaboration among stakeholders. Effective collaboration between the government and private sectors can promote the sharing of expertise, capacities, and funds for conservation efforts.

- Employ innovative and effective financing mechanisms like PES, REDD+, debt for nature swap, etc.

- Expand protected areas and MPAs. Protected area and MPA expansion were also mentioned as an effective step towards biodiversity and ecosystem protection and restoration.

- Enhance mechanisms for natural resource governance. Some countries in the region have been the early adopters of the community-based forest management approach. Modest gains, effective models, and best practices in using this approach can be piloted and/or replicated at scale elsewhere in the region.

- Concerning international policies: (1) create and standardise metrics in measuring forest intactness to help governments prioritise areas that are the most intact and (2) embed the concept of intact forest in reports produced by the UN Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on climate Change (IPCC) to help ensure that international commitments supporting the Paris Agreement will include and prioritise the conservation of intact forests.

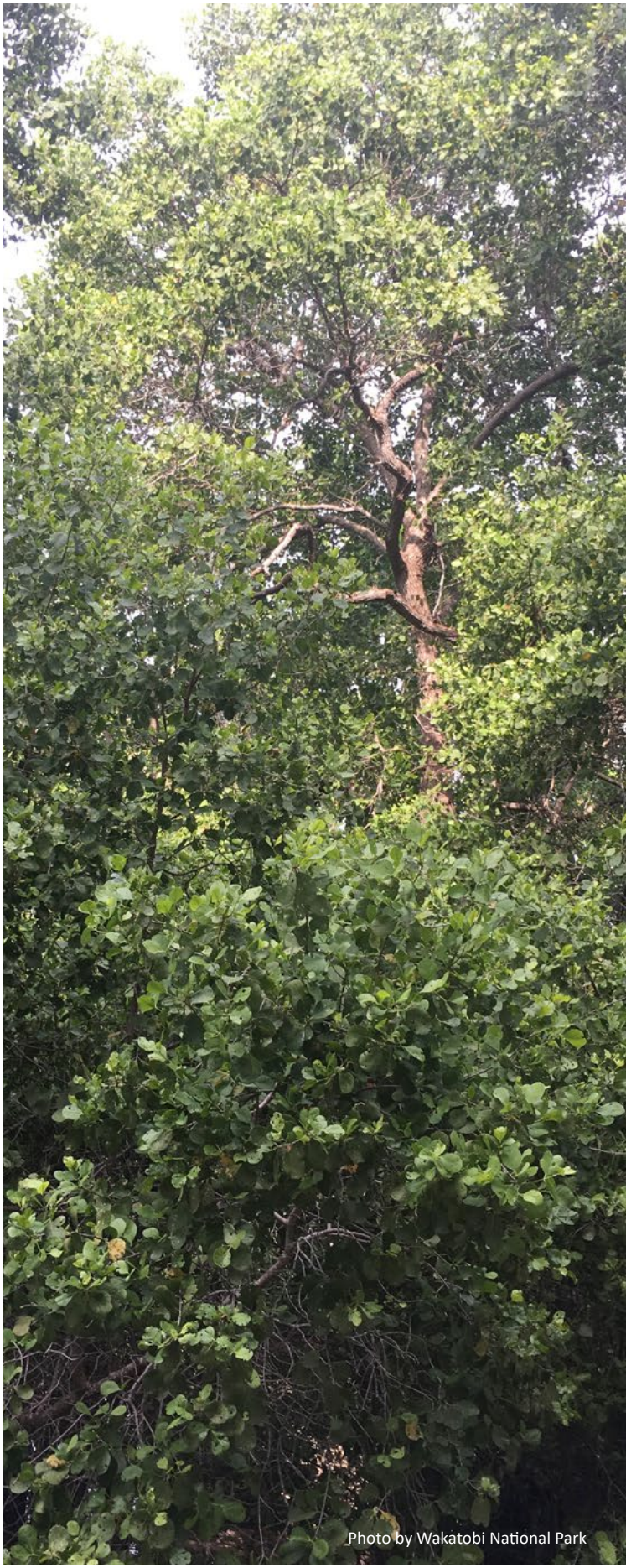


Photo by Wakatobi National Park

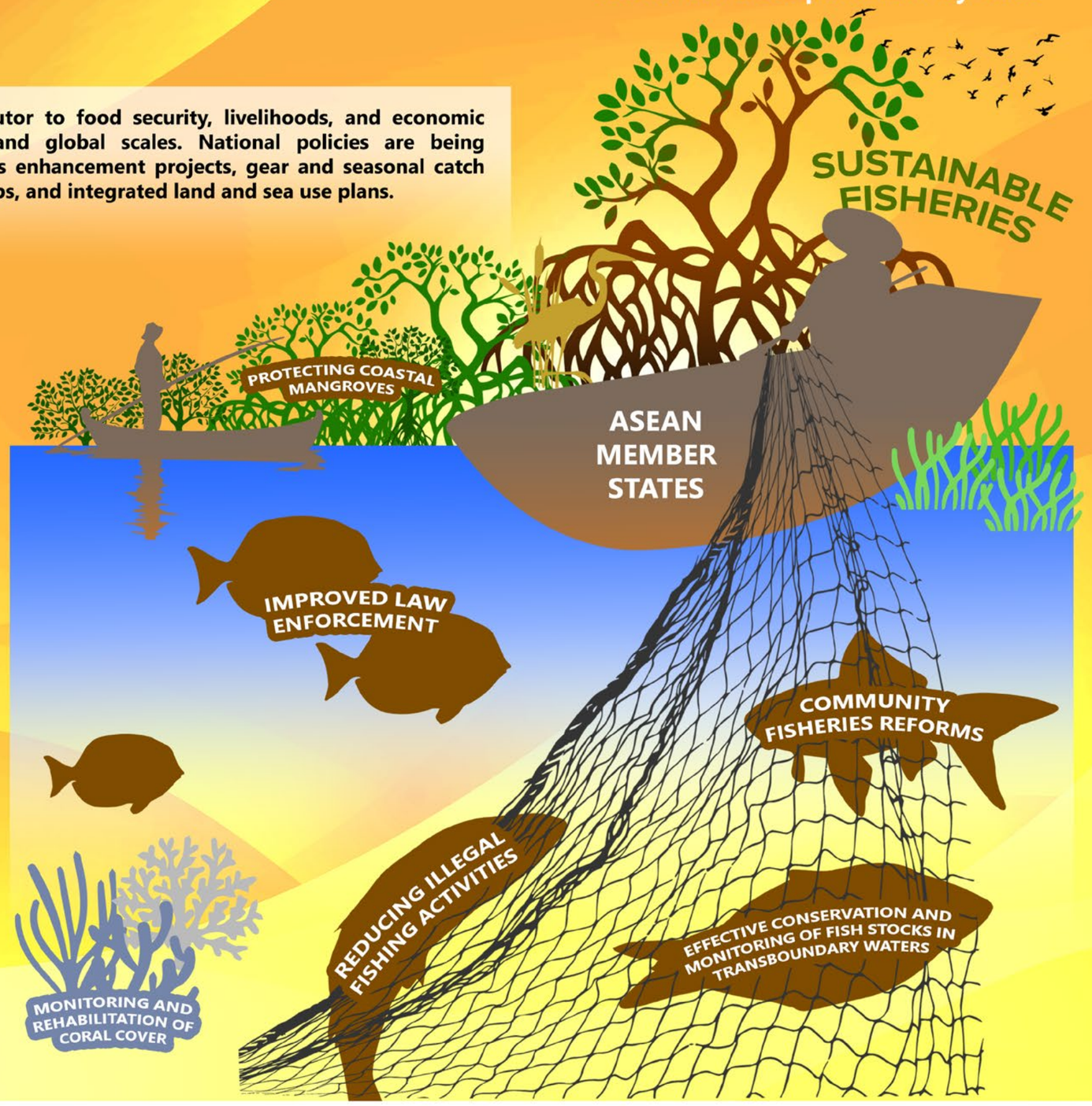
TARGET 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally, and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species, and vulnerable ecosystems and the impacts of fisheries on stocks, species, and ecosystems are within safe ecological limits.

ASEAN fishery is a key contributor to food security, livelihoods, and economic development at the regional and global scales. National policies are being implemented to support fisheries enhancement projects, gear and seasonal catch controls, conservation partnerships, and integrated land and sea use plans.

Efforts to prevent species and production decline of fishery resources need to scale up, else, extreme depletion in wild-caught fish stocks will be experienced by 2048

Challenges

- Illegal, unreported, and unregulated fishing
- Loose enforcement of domestic and international laws
- Overfishing and unsustainable fishing practices
- High fishing pressure, pollution, and reef damage
- Threat of climate change and natural disasters



Ways Forward

- **Implement an inclusive and integrated approach to the management of coastal and marine environment**
- **Address the "triple bottom line" dimensions of fisheries sustainability**
- **Craft a regional long-term prospect for sustainability**
- **Establish effective monitoring, control, and surveillance systems**
- **Develop inclusive and participatory frameworks for the planning, development, and management of sustainable fisheries and aquaculture**


Photo by Fahreza Ahmad

Aichi Biodiversity Target 6: Sustainable management of aquatic living resources
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.

ASEAN fishery is a key contributor to food security, livelihoods, and economic development at the regional and global scales. Regional and national policies have been implemented to support fisheries enhancement projects, gear and seasonal catch controls, conservation partnerships, and integrated land and sea use plans.

The success of Cambodia's community fisheries reforms is recognised regionally and globally. Experts from Cambodia and Lao PDR work together on the conservation and monitoring of fish stocks in transboundary waters. This partnership aims for a 10 per cent increase in fish abundance in the Mekong and Sekong Rivers by 2021.

Similarly, Malaysia and the Philippines enhanced conservation efforts by implementing the Ecosystem Approach for Fisheries Management (EAFM) which entails the monitoring and rehabilitation of coral cover and coastal mangroves. Myanmar's 6NR showed that initiatives in aquaculture, including improved enforcement, reduced fishing season length, establishment of three locally-managed marine areas (LMMAs), and the registration of vessels, have reduced the harvest of wild marine biodiversity.

In its 6NR, the Philippines stated some progress in preventing illegal, unreported, and unregulated fishing (IUUF) through policy and administrative reforms. The acquisition of more up-to-date monitoring equipment has been useful in combatting illegal fishing, monitoring and surveillance, and protecting marine biodiversity. Aiming towards aquatic biodiversity conservation, and sustainable exploitation and use of fishery resources, Viet Nam developed and promulgated a number of legal documents including its *Law on Fisheries* and the establishment of 10 additional marine protected areas (MPAs). Initiatives on ecosystem-based resource

management projects, control and handling of illegal activities, and the establishment of fisheries conservation areas contributed to the achievement of Aichi Target 6.

The UN Food and Agriculture Organization's (FAO) *State of Fisheries and Aquaculture* reported that six AMS—Indonesia, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam—contribute 23.08 per cent of the entire global production of marine capture fisheries in 2016.[1] Notwithstanding the status of the region as a major fisheries producer, its fisheries sector is unstable with its fish species and stocks declining at alarming levels. With the demand for fisheries resources in the ASEAN region constantly increasing, the sustainability of fisheries and fishery products needs to be on top of the development and economic agenda. This could be the right direction to undertake especially because based on AMS' country assessments, the ASEAN region's collective progress towards achieving Aichi Target 6 appears to be insufficient.

Fishery resource endowments in the region

The ASEAN region has 173,000 kilometres of coastline and over 25,000 islands, where more than 50 per cent of the population in the region lives. Fish is the primary sources of protein for the majority of the ASEAN region's population, accounting for at least 15 per cent of animal protein requirement for more than 100 million people and up to 50 per cent for some communities.

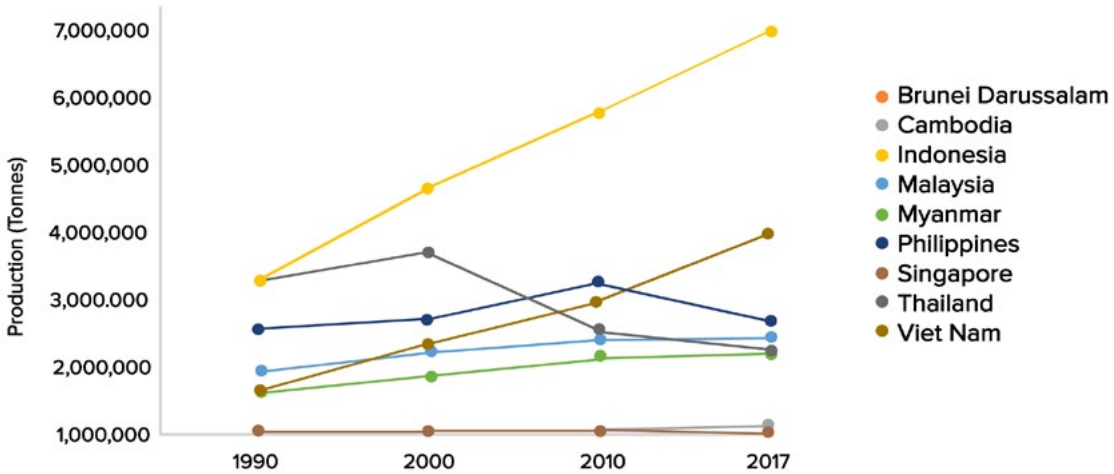
Fisheries, including inland aquaculture, contribute to livelihood provision at both the local and regional levels. Aquatic products are one of the most widely traded and exported food products for many AMS. The sector employs an estimated 80 million people in AMS. The processing, marketing, distribution, and supply industries associated with fishing and aquaculture employ up to another 10 million people.[2]

Marine fisheries contribute 40 per cent, by quantity, and 50 per cent, by value, to the region's total fisheries production.

Figure 5 illustrates the production trends in marine capture fisheries of AMS. Large quantities of marine capture fisheries are derived from pelagic fishery resources, like tuna, round scads, mackerels, anchovies, and sardines, among others. Most pelagic fish species are migratory and transboundary in nature, thus, are shared by many AMS.

FAO provides a framework that explains the essential elements and pathway to attain Aichi Target 6 as indicated in Table 6. The framework lays out a plan with clear policy, programmes, and coordinated implementation with expected outcomes as benchmarks of progress.

Figure 5. Trends in marine capture fisheries production of AMS, 1990–2017[3]



Source: FAO. (2019). Fishery Statistical Collections accessed at http://www.fao.org/fishery/statistics/global-capture-production/query/en

Table 6. Elements of Target 6, including examples of intermediate and final outcomes[4]

Target 6 elements	Types of Actions (intermediate outcomes)			Expected final states and outcomes
	Laws	Policies	Plans	
A. All target stocks; Fish, invertebrates, plants	Fishery Act; Adoption of international agreements (UNFSA, PSMA); Rebuilding and conservation laws	Rebuilding and protection goals and strategies; capacity-building; participation incentives	Approach; Measure; Roles; MCS, Rebuilding plans and deadlines; Benchmarks; Evaluation	Sustainably harvested; Legally harvested; Overfishing is avoided
B. Depleted target and non-target species				Rebuilding plans and measures in place for depleted stocks; Non-target species not being depleted or else have recovery plans
C. Threatened species; Vulnerable ecosystems				No significant adverse impacts (SAIs)
D. Ecosystem structure and function				Within safe ecological limits (SEL)

Source: Garcia, S.M. and Rice, J. 2020. Assessing Progress towards Aichi Biodiversity Target 6 on Sustainable Marine Fisheries. Technical Series No. 87. Secretariat of the Convention on Biological Diversity, Montreal.

Regional initiatives towards sustainable fishery management

The *34th ASEAN Summit* held in Lao PDR in 2016 recognised the *Joint ASEAN-Southeast Asian Fisheries Development Center (SEAFDEC) Declaration on Regional Cooperation for Combating IUU Fishing and Enhancing the Competitiveness of ASEAN Fish and Fishery Products*.[5]

The overarching efforts of the AMS have so far focused on addressing overfishing over the various Aichi Target 6 elements that revolve around IUU fishing. How the ASEAN may proceed in addressing IUU fishing is proposed through a framework that incorporates the economics, social, and institutional drivers. The framework covers registration of fishing vessels, preventing entry of illegal fish products, and most importantly, developing co-management of fisheries and improving monitoring at landing sites. In addition, governments of the AMS are presented this opportunity to work together with relevant stakeholders such as fishers, fisher agencies, or associations to exchange information for reducing IUU fishing.[6]

An earlier initiative to improve the regulatory and institutional system in fishery management was the institution of the *Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing in the Region* (RPOA-IUU)[7] which promotes regional cooperation in preventing IUU fishing particularly through the implementation of port state measures. Most AMS—Brunei Darussalam, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam—are active players in this programme.

The programme enhances and strengthens the fisheries management to ensure the sustainability of resources and optimise the benefits of adopting responsible fishing practices. It covers the areas of the South China Sea, Sulu-Sulawesi Sea (Celebes Sea), and the Arafura-Timor Sea.

In addition to addressing IUU fishing regionally, there are sub-regional efforts to respond to important issues besetting the fishery sector. *The SEAFDEC-Sweden Project (2013–2019)*, which covered Andaman Sea, the Gulf of Thailand, and the Mekong River Basin, strengthened the management system for transboundary stocks of identified species. The project allowed knowledge exchange and sharing of experiences on the current fisheries status and existing legal frameworks in order to come up with action plans on fisheries and habitat management, particularly for critical habitats, transboundary stocks, economically important species and protected areas around transboundary waters.[8]

In their formal statement, the chair of the *35th ASEAN Summit* held in 2019 welcomed the commencement of a feasibility study on the Development of an ASEAN General Fisheries Policy. The study, which was finished in 2020, provided information on the state and prevailing problems of fishery in the region, and presented an analysis of the

economic, social, and biological dimensions of the industry. It said that the fisheries sector in AMS and its constituent parts (inland, marine, aquaculture, processing) have both varied and shared characteristics, and even problems. As such, regional policy may be helpful in addressing these shared issues.

AMS initiatives toward sustainable fishery management

FAO reported in 2018 that Cambodia was one of the 34 countries that contributes to the growth of global inland fisheries catch over the past decade.[9] The country's estimated total annual inland fish production in 2017 was 528,500 metric tons while the marine fishery production was 121,000 metric tons.[10] The Tonle Sap freshwater fishery resource ranks first in productivity in the world and fourth in total catch.

Indonesia implemented Aichi Target 6 as National Target 6 (NT6) which pertains to the implementation of policies for sustainable management and harvest. NT6 of the *Indonesian Biodiversity Strategy and Action Plan* (IBSAP 2015–2020) articulates the "maintenance and preservation of biodiversity" through working groups with a theme of surveillance efforts on marine water and marine biodiversity species that are protected and managed."

On water area surveillance efforts, the Government of Indonesia has undertaken steps to eradicate illegal fishing in 11 Fisheries Management Areas (FMAs). As a result, illegal fishing was deterred, thus, dramatically boosting the national marine capture fisheries production in 2017. During this period, marine catches reached 3.35 million tonnes, an increase of 11.3 per cent compared to 3.01 million tons during the same period in 2016. As fish production increased, the welfare of fishermen improved.

Malaysia is implementing National Plan of Actions (NPOAs) for IUU Fishing to enhance fishing capacity to protect endangered species including turtles, sharks, and dugong. In addressing IUU fishing, Malaysia upheld the principles of *FAO International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing* (FAO-IPOA-IUU) in establishing the inter-agency National IUU Committee.

Malaysia also supported the establishment of the Regional Fishing Vessels Record (RFVR) for Vessels 24 Metres 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.

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. The directive aims to increase safety at sea and reduce conflict between commercial and small-scale fisheries as well as to prevent local fishing vessels from fishing illegally outside national 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 in coastal waters.

Box 21. Cambodia and its fishery reforms

To support the thriving fishery industry of Cambodia, the government has been supporting small-scale fishery management through the establishment of Community Fisheries (CFi).

As of 2017, 516 CFi (475 inland and 41 marine) have been formed with total membership of 332,168, 35 per cent of which are women, from 475 households. Between 2016 and 2017, 644 fishery conservation areas have been instituted.

To gauge the progress in implementing the fishery plans, a mid-term assessment identified the challenges that beset the fishery industry: (1) use of illegal fishing gear; (2) construction of hydro-dam in the Mekong and its tributaries; (3) lack of technical capacity and fund support to CFi; (4) poorly regulated importation and expensive inputs for aquaculture; (5) loose sanitary and phytosanitary (SPS) measures; and (6) limited equipment and funds for research.


Photo by Kyaw Kyaw Winn

The adoption of EAFM by the Department of Fisheries Malaysia has incorporated community-based resources management at the national level. The EAFM approach has also 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 instil the importance of protecting and conserving the aquatic natural resources in Malaysian waters especially in freshwater protected areas (FPAs) and marine protected areas (MPAs). Similarly, there are a number of EAFM demonstration sites established in the states of Sabah, Sarawak, Perak, Kedah, Selangor, and Terengganu.

Myanmar's National Target 6.1 states: "By 2020, states/regions have approved laws allowing for community and/ or co-managed fisheries." The project *MyCoast:Ecosystem-Based Conservation of Myanmar's Southern Coastal Zone* was an initiative to achieve this target. The Department of Fisheries partnered with FAO in 2018 to establish LMMAs in Thayawthadangyu Island and the Langan Island group. The project was a vital measure to protect the coral reefs and the breeding ground of important fish and crab species while providing local livelihoods. New LMMAs are planned to be established in Tanithayi Region.

Lessons from the Philippines show that when fishing communities are given more responsibility and authority to manage their local fisheries, either alone (community-based management) or in cooperation with government (co-management), compliance with rules and regulations increases, leading to more sustainable fishing practices. Regional experience also shows that when communities are given more control over their resources and to exclude outsiders and reap the benefits of sustainable management, they invest their own time and effort in protecting the resources and enforcing regulations on their use. Improved laws could help address pressures on freshwater fisheries and marine areas, where harvesting

is unsustainable, using destructive gear and illegal fishing practices. Rakhine State now has a law enabling community fisheries.

A further refinement of Aichi Target 6 is through National Target 6.2 thus stating that "By 2020, total commercial marine catch will be reduced to more sustainable levels." The rationale for this is that the greatest threat to marine fisheries is unsustainable harvesting, both legal and illegal. The major factors behind the decline in coastal fisheries include intensive fishing practices, the use of intensive and destructive fishing gear, little respect for seasonal closures, local and foreign trawlers illegally entering near-shore areas, and loss of mangroves, seagrass, coral reefs, and other ecosystems essential for the survival of fish at different stages in their life cycle.

To overcome illegal fishing in Myanmar, locally managed marine areas (LMMAs) have been installed in three (3) areas covering more than 10,000 hectares in the Myeik area, and with plans to establish more, especially in Rakhine State.

The Philippines continues to make progress in deterring IUUF through its pursuit of legal, administrative, and budgetary reform. In 2013, it adopted the NPOA through Executive Order No. 154 which created the Inter-agency Philippine Committee against IUUF, which is mandated to ensure the implementation of the NPOA-IUU, provide policy guidance, and develop capacity-building programmes. Other reforms include the acquisition of a fully functional vessel monitoring system and patrol crafts to aid in fisheries monitoring control and surveillance.

The Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR) also uses the Visible Infrared Imaging Radiometer Suite (VIIRS) Night Light Boat Detection as a tool for combatting illegal fishing and protecting marine biodiversity. VIIRS of the National Oceanic and Atmospheric Administration (NOAA) is a satellite sensor that can detect fishing boats that employ lights to attract catch. Data collected by VIIRS is essential for fisheries management, enforcement, monitoring, and surveillance. This data has been used to examine the effectiveness of seasonal fishery closures in the Philippines. In 2015, Republic Act (RA) 10654 or an Act to Prevent, Deter and Eliminate IUUF was passed, amending the Philippine Fisheries Code of 1998 or RA 8550. The amended Fisheries Code added IUU fishing as an offence and increased the sanctions and penalties for violations.

In Thailand, its Department of Fisheries, the Southeast Asian Fisheries Development Center (SEAFDEC), World Wildlife Fund (WWF), and Thai Tuna Industry Association (TTIA) collaborated to improve the sustainability of the Long-tail Tuna fishing in the Gulf of Thailand. The department releases 400–600 million aquatic species annually in 800 freshwater fish sources around Thailand


Photo by Alfred John Michael C. Yap


Photo by Mar Lar Winn

to promote and incentivise conservation and sustainable use of fishery resources especially among local communities.

The Ministry of Agriculture and Rural Development (MARD) of Viet Nam reported initial results in combatting IUU. International regulations on IUU fishing have been codified in the Fisheries Law of 2017 and its guiding documents have been enacted. Fisheries management agencies at the central to local levels, fishing communities, and businesses have enhanced their knowledge on IUU fishing. The situation of fishing vessels violating the waters of Pacific Island countries has also almost ended. The inspection and control of fishing vessels operating on the sea has improved and international cooperation and participation in agreements and international conventions on fisheries have fostered numerous positive efforts.

As of 2017, Viet Nam has established 10 MPAs covering a total area of 1,878 square kilometres or 0.19 per cent of the country's total sea area. Research projects under the *Programme on protection and development of aquatic resources to 2020* has achieved some level of success in reproducing and commercial breeding of rare species like *Semilabeo obscurus* (dusky labiate-barbel), *Catlocarpio siamensis* (giant barb), *Hemibagrus guttatus* (catfish locally known as *cá lăng chấm*), and *Bagarius rutilus* (sisorid catfish) which are listed in Viet Nam's Red List and in the Red Data Book. A similar research initiative seeks to artificially reproduce and commercially raise *Austriella corrugata* - a bivalve species of high economic value in Quang Ninh's mangrove area.

Lao PDR, meanwhile, is challenging to determine due to the lack of a clear monitoring programme. Nevertheless, data gathered by the Mekong River Commission (MRC) indicates a decline in overall fish stocks. Large fish species in the Red List threat status, particularly the Critically Endangered (CE) *Pangasius sanitwongsei* (dog-eating catfish), are being caught less frequently over time.

Fisheries experts from Cambodia and Lao PDR have been regularly monitoring fish stocks in transboundary waters. A recent assessment study projects a 10 per cent increase in fish stocks by 2021 in the transboundary conservation pool if illegal

fishing activities and the use of traditional but illegal fishing gears will be reduced by 50 and 80 per cent, respectively.

Under *The Agrobiodiversity Initiative* (TABI), 885 of fish conservation zones have been established in Lao PDR including 252 zones that were developed by the local communities.

Several AMS have reported an increase in demand for fisheries products in the ASEAN region. FAO reported in 2018 that this continuous growth in fish consumption is driven by a combination of the growing population, dramatic expansion of fish production, particularly from aquaculture, rising incomes, and increase in international fish trade.

Myanmar reported that its shrimp sector has been particularly hard hit. In northern Rakhine State, the area of shrimp farming increased from 340 square kilometres in 2001 to 630 square kilometres in 2005 and down to 450 square kilometres in 2010. However, productivity declined from 200 kg/hectare/year to less than 20 kg/hectare/year. This was the inevitable result of the massive loss of mangroves that provide a natural nursery habitat for shrimp larvae.

Fish stock assessment efforts in the Philippines showed that 10 out of its 13 major fishing grounds have experienced overfishing and high extraction patterns. The status of fish stocks vis-à-vis fishing pressure was assessed in terms of exploitation rates of selected species using 2015 data as baseline. The results suggested that most of the traditional fishing grounds in the country continue to suffer from over extraction brought about by increasing fishing activities and more efficient fishing gears.

In Indonesia, a 2018 study found that reliable data on stock status for capture fisheries are relatively scarce. Research suggested that the majority of targeted fish stocks in Indonesia are fully- or over-exploited. Nearly half of Indonesia's wild capture fish stocks were overexploited, and at least seven (7) out of Indonesia's 11 WPPs (*Wilayah Pengelolaan Perikanan* or fishery management units) showed no opportunities for immediate expansion of production. The total allowable catch (TAC) for all WPPs combined in 2017 was approximately 12.5 million tons, which


Photo by Edward Laurence Opena


Photo by Dicky Simorangkir

the government used to inform annual production targets. The government has set a fisheries production target for Marine Spatial Management (MMAF) of 17.6 metric tons in 2018 and 22.32 metric tons in 2019. Additional increases of these levels will have significant and adverse impacts on the future fisheries potential of the country.[11]

Exacerbating this problem of overfishing is the ever-increasing threat of climate change to the fisheries sector of AMS. The effects of climate change on fishery production include seawater warming, ocean acidification, increased frequency of debris flows, rainfall regime change, typhoon intensity, and sea level rise. The impacts on coastal and offshore fishery production include the disappearance of part of the sedentary and migratory species, change in seasonal swimming habits which leads to decreased fishery production, change in the composition of caught species, an imbalance in the ecosystem, and increased difficulty in fishing operations.

In terms of aquaculture inland fishery, the impacts produced by climate and natural disasters include the occurrence of debris flows, changes in water quality, drought, alterations in the source of fish food, and deteriorated quality of fish oil. Finally, the impact of disasters and climate change will influence food security and the supply and demand market through domestic production and imports.[12]

Photo by Adel D. Samson

Challenges

Notwithstanding its dominant status as a major producer, the state of fisheries in the ASEAN region remains in a precarious situation. The 5NRs and 6NRs of AMS indicate that IUU fishing remains prevalent in the region. The Fifth ASEAN State of Environment Report raised concerns on the increase in IUU fishing in the region brought about by loose enforcement of domestic and international laws on fisheries management and conservation by coastal states and the international community.

IUU fishing accounts for some USD 6 billion of fish catch per year, thus, bringing significant losses to the economies of the ASEAN fishing nations.

The capture fisheries, particularly marine, had been on a downhill trend from almost 70 per cent of the region's total fisheries production in 2000 to only 40 per cent in 2014 due to overfishing and unsustainable fishing practices. The coastal and marine ecosystems are suffering the same fate. Other threats that face fisheries in the ASEAN region are high fishing pressure, pollution, and reef damage. While aquaculture appears to pick up the slack in marine capture fisheries, it comes with significant environmental trade-offs.

Ways Forward

- The ASEAN Biodiversity Outlook 2 recommended an inclusive and integrated approach in the management of the coastal and marine environment in the region including the improvement of fisheries-related policies and their implementation.[13] Given the framework for implementing Aichi Target 6 as suggested by the CBD Secretariat, this integrated approach should enable a holistic consideration of the other Aichi Targets: Target 4 (sustainable production and consumption as well as governance systems able to keep the impacts of use of natural resources well within safe ecological limits), Target 7 (sustainable management of agriculture, of which fisheries is a sub-sector, and aquaculture), Target 10 (minimising the multiple anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification), Target 11 (area-based conservation), Target 12 (protection of threatened species), and Target 14 (restoration and safeguarding of ecosystems and their services).[14]

- In order to contribute to the measure of progress towards global sustainability and to relate to the SDGs, the indicators of fisheries sustainability should address its ecological, economic and social dimensions or the so-called "triple bottom line." Although CBD is focused on the biodiversity aspects of the triple bottom line, the commitment to both its conservation and sustainable use makes all three dimensions relevant to the CBD goals. Even if Aichi Target 6 does not have elements that directly address the economic or social outcomes of fishing, patterns and levels of fishing that deliver all the elements of Aichi Target 6 must be sustainable in terms of their social and economic dimensions for fishers and governments to support fisheries in those conditions.[15]

- All AMS strive to take on the direction towards sustainability of their fishery. But given that there is no uniform approach on how this can be achieved, the long-term prospect for sustainability would have to come about at the regional level. During the *35th ASEAN Summit* in 2019, the ASEAN agreed to carry out a feasibility study on ASEAN General Fisheries Policy which should lead to a common framework for sustainable fisheries.[16]

- More needs to be done to enable effective monitoring, control and surveillance systems including proper catch documentation and labelling, up-to-date registry of commercial fishing vessels, training of enforcement officers and agencies, and a monitoring and policing infrastructure that fits the purpose. Documentation and reporting of marine fishery production in the region needs to be improved as SEAFDEC data shows that unidentified marine species account for more than half of marine fish catch in 2014.[17]


Photo by Saiyadeth Sitthilath


Photo by Irman Andriana

- The FAO 2018 report presented the achievements of the ecosystem approach to fisheries (EAF) and the ecosystem approach to aquaculture (EAA). These strategies developed and promoted by FAO recognises the need for wider frameworks for the planning, development, and management of sustainable fisheries and aquaculture, taking into consideration the effects of other sectors on fisheries and aquaculture, and the effects of fisheries and aquaculture on the ecosystem. As the number of projects on EAF/EAA increases and is also becoming evident in the region, so does the opportunity to draw lessons from their development and implementation.

Box 22. Common lessons across countries with EAF/EAA project:

1. Stakeholder participation is essential and key to effective management. It allows diverse interests to agree on a common approach, but it must be perceived by all stakeholders as fair and effective. Participation must be ensured both at the planning stage and as part of the regular management cycle, including data collection and research activities.

2. EAF/EAA implementation requires institutional processes that ensure regular monitoring and decision-making in relation to the agreed objectives in the management plans. Mechanisms for mid-term review of management plans should also be built into the institutional processes.

3. Despite the awareness-raising efforts, EAF/EAA may be misconstrued as an approach mainly concerned with conservation. In reality, it is an enhanced sectoral or multisectoral management approach for achieving sustainability by considering the dynamic ecosystem that underpins any fishery and the social and economic goals of those involved in the sector. Amidst the growing global pressures, these strategies require important changes in attitude and mentality of recognising the benefits of sustainable fisheries and aquaculture for its full implementation.

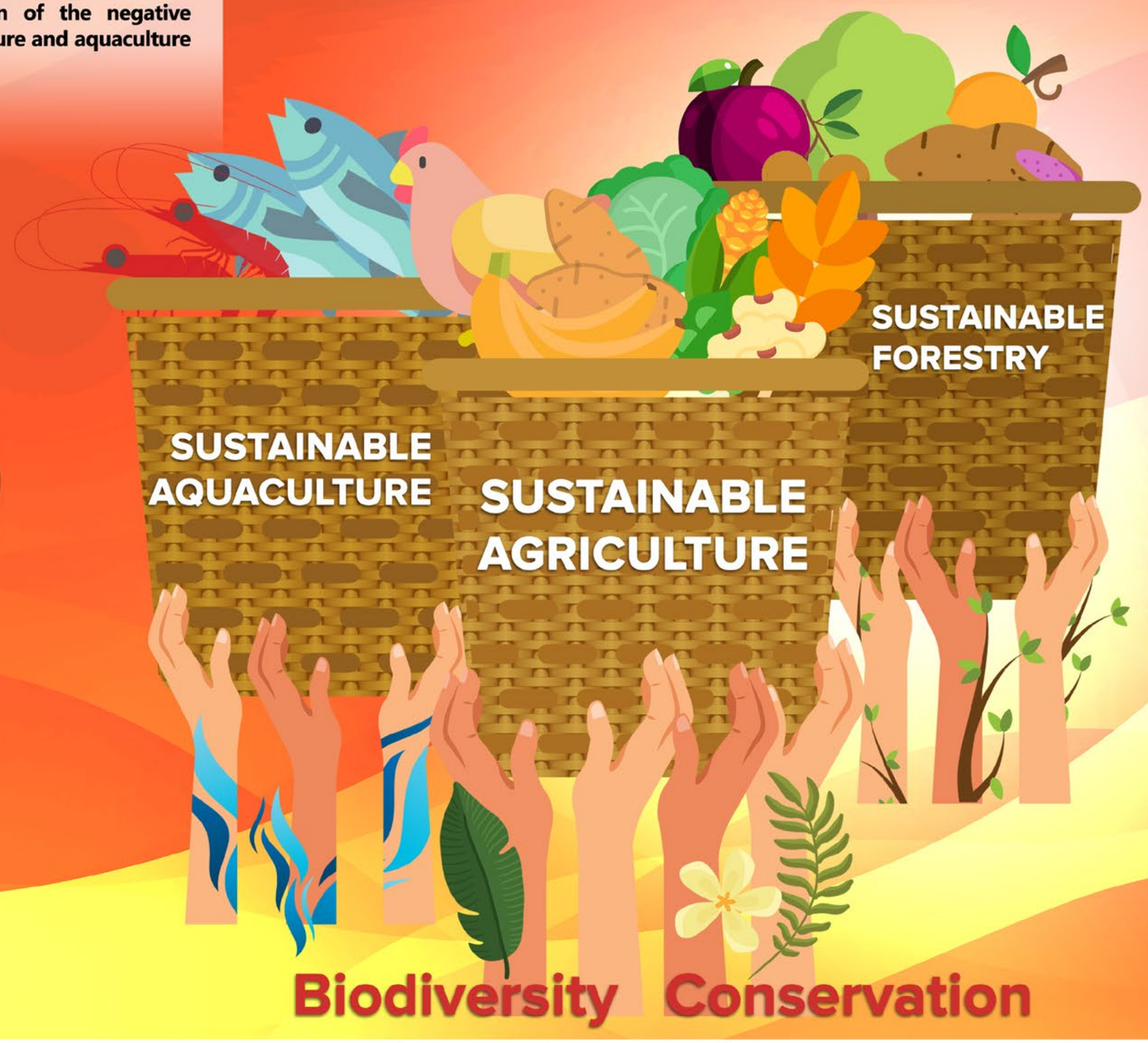
TARGET 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

As the region is primarily agricultural and one of the most productive in the world, there is a need to support and promote agro-ecological and regenerative farming practices and initiatives to strike a balance between increasing food production, increasing population, and conserving agricultural biodiversity.

There is a growing recognition of the negative impacts of unsustainable agriculture and aquaculture to biodiversity in the region.

Challenges

- Forest encroachment
- Heavy reliance on chemical production inputs
- Conversion of agricultural lands to residential and commercial areas



Ways Forward

- Develop, implement, and promote an ASEAN branding and labelling system of sustainable agricultural practices and products
- Regional standards should reflect, complement, and enhance national efforts
- Improve agricultural certification standards and processes
- Improve farming techniques and use nature-based and climate-smart solutions

Photo by Kim Chong Keat

Aichi Biodiversity Target 7: Sustainable agriculture, aquaculture, and forestry
By 2020, areas under agriculture, aquaculture, and forestry are managed sustainably, ensuring conservation of biodiversity.

Sustainable management of agriculture, aquaculture, and forestry is gaining traction in the ASEAN region to an extent that is contributing to biodiversity conservation. Policies and mechanisms are being implemented to scale up biodiversity-friendly agriculture and aquaculture technologies to address the negative impacts of unsustainable agriculture and aquaculture practices in the region.

The *Strategic Plan of ASEAN Cooperation in Food, Agriculture, and Forestry 2016–2025* is the overarching framework that defines the vision and goals for food, agriculture, and forestry sector in the ASEAN region. The vision is to create "A competitive, inclusive, resilient, and sustainable Food, Agriculture, and Forestry (FAF)." Upon this framework anchors several other regional strategic plans that underscored sectoral thrusts and roadmaps for implementation such as the *Strategic Plan of Action for ASEAN Cooperation on Fisheries 2021–2025* and the *Strategic Plan of Action for ASEAN Cooperation on Forestry*.

AMS operationalises these strategic plans through national plans, policies, and programmes. In 2019, Cambodia, Lao PDR, and Viet Nam concluded a four-year project on the sustainable use of biodiversity-based products. In Lao PDR, several programmes and activities directed towards supporting local communities were being implemented to promote sustainable agriculture. For instance, the coverage of integrated land-use planning through *The Agrobiodiversity Initiative* (TABI) has increased and now covers over 10,000 square kilometres of agriculture and forest land. Malaysia contextualises agricultural sustainability through certification schemes in the palm oil industry and various crop production practices under the myGap programme. These efforts contribute to Malaysia's target of 50 per cent sustainability of all agricultural areas by 2025.

Similarly, Myanmar is moving towards sustainable forestry through a certification system. Fisherfolks have accelerated the use of sustainable techniques at all aquaculture sites. These efforts are complemented with mangroves reclamation, provision of extension services, and capacity building. Thailand continues to implement its 10-point agriculture agenda for sustainable agriculture. In the Philippines, agriculture areas under biodiversity-agriculture will be increased by 10 per cent. Meanwhile, Viet Nam has been capitalising on the increasing demand for organic commodities, thus, the effort to increase the production of organic agricultural produce.

Scaling-up sustainable management of agriculture, forestry, and aquaculture in the ASEAN region

The CBD technical rationale states the milestones for this target include: (1) By 2012, all Parties have identified or developed and promoted sustainability criteria and/or good practices for agriculture, aquaculture and forestry; and (2) By 2015, the area of agriculture, aquaculture, and forestry managed according to sustainability criteria has doubled.

In the ASEAN Region, the S*trategic Plan of ASEAN Cooperation in Food, Agriculture and Forestry 2016–2025* is the overarching framework that defines the vision and goals for food, agriculture, and forestry sectors. The vision is to create "A competitive, inclusive, resilient, and sustainable Food, Agriculture, and Forestry (FAF)."

This central framework anchors the *Strategic Plan of Action for ASEAN Cooperation on Fisheries 2021–2025* and the *Strategic Plan of Action for ASEAN Cooperation on Forestry* which serve as the region's roadmap in planning and implementing sectoral initiatives and interventions towards a more sustainable agriculture, aquaculture, and forestry.

During the *42nd AMAF Meeting* in 2020, the ASEAN adopted several instruments that harmonise standards and provide guidelines to support trade facilitation of agricultural products in the region.

- *ASEAN Strategic Plan of Action for Cooperation in Livestock*, 2021–2025
- *ASEAN Strategic Plan of Action for Cooperation in Crops*, 2021–2025
- *ASEAN Strategic Plan of Action for Cooperation in Fisheries*, 2021–2025
- *ASEAN Plan of Action for Fall Army Worm Control*, 2020–2025
- *ASEAN Regional Guideline for the Implementation of International Standards related to Sanitary and Phytosanitary (SPS) Measures*

ASEAN developed the Good Agricultural Practice (GAP) standards that harmonises the various national GAP standards to enhance the competitiveness of ASEAN agricultural products in the export market. Adopted in 2006, the ASEAN GAP aimed to prevent the risks associated with production, harvesting, and post-harvest handling of fresh fruits and vegetables, and to facilitate their trade within and beyond the region.

Aquaculture in the ASEAN region is a flourishing industry in terms of production


Photo by Ye Win Nyunt


Photo by Rodolfo Vicente

and importance, both at the regional and global levels. In fact, the region contributes 18.3 per cent (2014) of the global fish supply and this trend is projected to increase to at least a quarter of the global output in 2030 and up to two decades hence.[1] The remarkable four-fold increase in aquaculture production in Southeast Asia from 2000 to 2014 has contributed to the steady increase of fish production in the region. Correspondingly, the gains from the fish industry has positively impacted related concerns in the region like food security, livelihoods, and poverty.

Anchoring on the ASEAN Economic Community (AEC) Blueprint, the ASEAN Good Aquaculture Practices (ASEAN GAqP) for Food Fish provides the overarching policy framework that harmonises the production and trade policy in fisheries and aquaculture in the region.

The *39th AMAF* adopted in 2017 the *ASEAN Criteria and Indicators for Sustainable Management of Tropical Forests* to provide countries with a framework for defining sustainable forest management and assessing progress towards this goal. The established criteria and indicators help identify trends in the forest sector and the effects of forest management interventions over time, and facilitate decision-making in national forest policy processes. The ultimate aim of these tools is to promote improved forest management practices and further the development of a healthier and more productive forest resource base.

However, criteria and indicator frameworks alone cannot drive the attainment of Sustainable Forest Management (SFM). It requires concrete actions in the form of regulations, incentives, and voluntary compliance with SFM guidelines. Knowledge of the state and trends in management and forest conditions, as well as system interactions, is essential for informing these actions and the policies that support them.[2]

While independent national assessments of progress to Aichi Biodiversity Targets are lacking, the 6NRs indicate that AMS

implement their own set of sustainability criteria in the three major economic sectors which are applied depending on the requirements of their export markets.

Sustainable Management of Agriculture

In the framework of its National Voluntary Land Degradation Neutrality (LDN) Targets and Measures, Cambodia aimed to maintain and enhance ecosystems and their services by *inter alia* restoring at least eight (8) per cent of degraded and depressed protected areas, conservation areas, agroecosystems, and forest ecosystems including mangroves. These targets are operationalised in three provinces (Kampong Thom, Preah Vihear and Siem Reap) where Forest Landscape Restoration (FLR) and Restoration Opportunities Assessment Methodology (ROAM) approach are being implemented.

Lao PDR implements this target through the provision of agricultural support services to farming communities that apply sustainable production measures, protection, and sustainable use of biodiversity rich agricultural landscapes in at least one site per province, and reduced use of hazardous agro-chemicals in the agriculture and forestry sector. The country implemented pilot programmes which are focused on sustainable agriculture and agrobiodiversity particularly among local communities. Among these include *The Agro-Biodiversity Initiative* (TABI) which has carried out integrated land-use planning in 315 villages in 12 provinces, covering more than 10,000 square kilometres of agriculture and forest land.

Indonesia implemented Aichi Target 7 as National Target 7 which seeks to improve sustainably managed land for agricultural, plantation, and animal husbandry towards achieving set targets and success indicators.

- The aim of developing organic farming villages for rice was the impetus in setting up 897 Organic Fertiliser Processing Units in 2015 which increased to 1,499 in 2017. This move aimed to improve the fertility and productivity of agricultural land and preserve these resources and the environment.
- Supervision of the production process (on farm) through prime certification 1, 2, and 3 by the Competent Authority for Food Safety at the regional or the national level to farmers/farmer groups/ business actors. One of the assessments was on security and food and social aspects as well as environmental quality. Between 2015 and 2017, the cumulative number of certified fresh food products has reached 90.47 per cent exceeding the target of 80 per cent.
- To attain food sufficiency, diversified food consumption is being promoted to the public. Toward this goal, 140,500 square kilometres of Planting Intensification Areas were established in 2014. These


Photo by Arjanmar Rebeta


Photo by Froilan C. Robas

are areas where staples such as rice, corn, and soybean are grown without having to clear new paddy fields and are located in areas with limited paddy fields. In 2017, the figure reached 163,900 square kilometres.

Malaysia aimed that by 2025, production forests, agriculture production, and fisheries are managed and harvested sustainably. It reported progress towards this target but at an insufficient rate. Target 4 is carried out through Action 4.2: Strengthen Agricultural Planning and Improve Practices. The agriculture sector is one of the major sectors in Malaysia, contributing 8.2 per cent or RM 96 billion to the Gross Domestic Product (GDP) in 2017. The agriculture sector is divided into two main subsectors: commodity and agro-food.

For the commodity subsector, the National Commodity Policy (2011–2020) provided 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 per cent of production while larger companies produced the remaining 60 per cent.

The drive for sustainable agricultural certification has focused on oil palm—a major commercial commodity. The Malaysian Sustainable Palm Oil (MSPO) was launched in 2015 as part of efforts towards increased sustainability in palm oil production. As of 2019, 54.6 per cent of the 58,500 square kilometres oil palm planted areas are certified as sustainable under the MSPO. Incentives have been provided to improve the certification rate of independent smallholders.

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

Various integrated pest management (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.

Malaysia has set 2025 as the target where 50 per cent of all agricultural areas are sustainably managed under certification schemes like MSPO, RSPO, and myGAP. Malaysia reported being on track to achieve this target.

Myanmar's Target 7.1 is an iteration of Aichi Target 7. It sets 2020 as the target for implementing the System of Rice Intensification (SRI) and other forms of environment-friendly rice production in 10 per cent of rice paddy areas. Myanmar reported that implementing Target 7.1 requires considerable training of farmers to improve crop techniques and research at the genetic level to improve varieties. The Ministry of Agriculture has trained several thousand people so far on sustainable rice production, and rice production has increased. It is uncertain, however, if the training and production are correlated.

There has also been an extensive programme to work with floating vegetation farmers to reduce chemical use and improve farm techniques. A national programme for biological control of pests on vegetable crops exists. To protect the genetic base of its crops, Myanmar has stored more than 12,000 crop species accessions in cold storage and over 2,400 accessions at the long-term international cold storage systems.

The Philippines set this as National Target 11 where by 2028, there will be a 10 per cent increase in agricultural areas devoted to all types of biodiversity-friendly agriculture. It reported that it is on track to achieve this target through the institutionalisation of biodiversity-friendly agricultural practices (BDFAPs) within the context of protected areas and key biodiversity areas (KBAs). Several farms have been assessed for BDFAPs in eight pilot sites of the BPP with an aggregate area of almost 8,000 square kilometres.

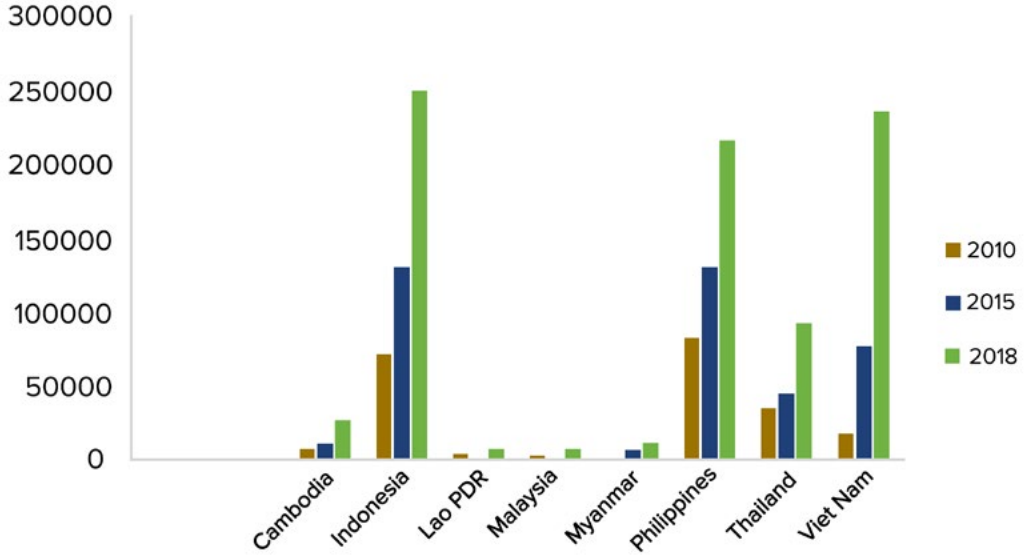
Singapore reported its current practices in agriculture where allowable farming activities in agriculture land are tagged to licenses and licensing conditions. The Singapore Food Agency (SFA) ensures that farmers comply with licensing conditions through a routine surveillance programme. These policies and practices help ensure that farmlands are put to proper use.

During the planning phase, SFA consulted agencies such as National Parks Board of Singapore to ensure that the farming activities do not result in negative externalities and are sustainable (i.e., do not encroach into nature reserves, minimise the impact on natural ecosystems). Where necessary, impact assessment may be required.

Thailand recasts Aichi Target 7 as NT 13: By 2020, tools/mechanisms/guidelines on the sustainable use of biodiversity are applied in all relevant sectors. It reports progress towards the target but at an insufficient rate. The Department of Agriculture's


Photo from Inlay Lake Wildlife Sanctuary

Figure 6. Trend in the growth of organic agriculture in the ASEAN region.



Source: IFOAM-FIBL World of Organic Agriculture 2019 from 2017 data (Willer and Lernoud, 2019)

"Agroforestry" and "Sustainable Agricultural System," especially in the buffer zone around the protected area advance the sustainable use of biodiversity in the agricultural sector. The sector follows a 10-point guideline for sustainable agriculture with the sixth guideline emphasising that biodiversity should use and blend a variety of activities to maximise the benefits, apply natural pest control, and adopt chemical-free activities.

Viet Nam reported that it had 33 provinces and cities employing organic agriculture. Several of its organic crops (such as rice) and livestock products (such as ducks, pigs, dairy, cows, shrimp, etc.) have reached the international market, specifically Australia, Japan, Korea, and the United States.

The Vietnamese Academy of Agricultural Sciences has developed hundreds of accredited technology practices, including GAP, value chain enhancement, safe agricultural production, and protection of appellations of origin. Some of these technologies include the control of brown plant hopper, yellow dwarf virus, and black streaked-dwarf virus on rice. Other technologies are IPM process for greening on citrus, propagation of Cayen pineapple by cuttings, and production of vegetables under Viet GAP.

Organic agriculture is a relatively recent but promising sustainability approach to agriculture in the region. Sectoral groups like the International Federation of Organic Agriculture Movement (IFOAM) and the Research Institute of Organic Agriculture (FIBL) regularly monitor the poduction trend of organic crops. Figure 6 shows an increasing trajectory of organic agriculture in terms of area, organic share, and number of producers.

Sustainable Aquaculture

Fisheries and aquaculture contribute significantly to addressing food security, nutrition, and livelihood in the ASEAN region. For the past five years, the region saw an increasing trend in fishery production from 44.0 metric tons in 2014 to 46.8 metric tons in 2019. The region contributed 21.9 per cent of the total fishery production in 2018. Indonesia had the highest production in 2019 in terms of volume at 48.4 per cent, followed by Viet Nam (17.7%), and Myanmar (12.7%). This progress in the fishery sector has a lot to do with the fortified efforts of AMS towards sustainable fishing management.[4]

Aquaculture production in Cambodia is increasing steadily. This, in part, can be attributed to the effort of the Fisheries Administration (FiA) in conducting capacity-building activities on sustainable fish aquaculture. In 2017, aquaculture yielded 207,433 tons of fish which was 34,943 tons higher compared to the 2016 figures. In the same year, fishery breeders increased by 11 million. With the continuing effort of FiA to provide technical guidance, 309 fish breeding places and 864 community fish ponds were developed across the country. Rice field fisheries are likewise increasing in number.

Indonesia reports on implementing fisheries standardisation for the entire supply chain, through the Indonesian National Standard (SNI). As of 2018, there were at least 11 SNIs for aquaculture, 69 SNI for fisheries testing methods, and 265 SNI for fishery products. It also included quality assurance system certification such as the Hazard Analysis Critical Control Point (HACCP) certification and traceability in the Fish Processing Unit, and on aquaculture products. From 2014 to 2017, over 7,400 such certificates were issued. The number of rejection cases on fishery product exports per partner country in the last four years was below four cases per year.

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

The aquaculture industry contributes 20 per cent to Myanmar's total fishery by weight. This portion is expected to increase with the institution of new laws and programmes. The sustainable aquaculture national target states that by 2020, 5 per cent of fish and shrimp aquaculture by volume should follow


Photo by Konyi Calisto

Box 23. The benefits of utilising local feed sources

Indonesia started the Independent Fish Movement (GERPARI) to reduce the carbon footprint from the importation of feed ingredients. It also supports the production of fish feed using locally available raw materials. Through GERPARI, the local raw material feed production has increased by 300 per cent from 2015 to 2016, thus, helping the local economy. It has also cut down the importation of fish feed ingredients by up to 27 per cent for the same period.


Photo by the BBP Project

international best practices for sustainable management. The country's aquaculture industry, which primarily covers freshwater fish ponds and shrimp farms, has been growing in terms of area and correspondingly, production. From 1991 to 2013, the aquaculture area increased from 123 square kilometres to 1,816 square kilometres, and production of 6,400 tons to 944,800 tons. These trends are expected to continue with the policy and investment structure that the government has been implementing in support of the aquaculture industry.

However, the expansion of shrimp areas, which based on the 6NR, is around 924 square kilometres, has been detrimental to mangroves particularly in Rakhine State and Ayeyarwady Delta. Considerable areas of mangrove have been cleared to construct ponds since 2000, severely affecting nursery areas for juvenile shrimps and causing the provision of other ecosystem services to be disrupted.

In partnership with the European Union (EU), Myanmar has recently instituted the *Myanmar Sustainable Aquaculture Programme* (MYSAP) to improve the sustainability of shrimp farming practices. Owing to its recency, the progress of the project towards the target is still unknown. On the other hand, the JICA/ Department of Fisheries (DoF) programme, which started in 2009, has trained a large number of fish and shrimp farmers.

The *Myfish2* programme, which began in 2017 in partnership with WorldFish and the DoF, aims to improve fishery management in Ayeyarwady Delta. The DOF has conducted trainings on best practices and sustainable shrimp farming techniques in 17 shrimp farms but there is limited data on the number of farms that follow best practices. What is known is that larger farms use less labour than small farms (per unit of production) owing to economies of scale. Some indicators do suggest considerable improvements: 13 per cent of farms use pelletised foods versus 7 per cent in 2011 and yield increased to about 3.5 tons/ha vs. 3 tons/ha in 2011.

Singapore's current practices in aquaculture as reported in the Addendum to its NBSAP indicate that a study to determine the carrying capacity of the country's aquaculture sites in the Straits of Johor has been completed. SFA will also be initiating studies to assess the suitability of aquaculture in southern waters. The results of these studies would assist SFA in developing policy measures to optimise and manage the industry in a more sustainable manner.

The aquaculture industry of Viet Nam accounted for 53 per cent of the country's total fishery production in 2017, and it continuously grew at an average rate of 12.77 per cent each year. The Directorate of Fisheries reported an estimated production of 3,858 thousand tons in 2017, or 5.5 per cent which is higher than the 2016 production. Viet Nam's seafood industry has likewise been making progress over the last 17 years at an average rate of 9.07 per cent per year based on the report of the Viet Nam Association of Seafood Exporters and Producers (VASEP).

Box 24. The Agrobiodiversity Initiative in Lao PDR

The Agrobiodiversity Initiative or TABI Project in Lao PDR integrates forest and agriculture land use planning, allocation, and management. It has carried this out in 315 villages in 12 provinces covering 10,000 square kilometres of agriculture and forestland. TABI has collected detailed evidence of forest regeneration, reduction in shifting cultivation, and strengthened local capacity to actively manage their land. The process is emerging as an effective mechanism for supporting better-managed landscapes with multiple functions. It provides an opportunity for local people to demarcate, protect their resource claims and further know the various use zones.

As Viet Nam's aquaculture industry grows, the government recognises further the value of responsible and sustainable farm management. Thus, it applied in 2013 for sustainable seafood certification from the Aquaculture Stewardship Council (ASC). The ASC is an independent, international organisation that manages the world's leading certification and labelling programme for responsible aquaculture.[5]

In 2013, Viet Nam had five pangasius enterprises certified sustainable by the ASC. This holds significance as Viet Nam contributes more than 90 per cent of pangasius in the international market. In 2014, the World Wide Fund for Nature (WWF) supported Quoc Viet Company in Ca Mau province in becoming an enterprise with a shrimp production area certified by ASC.

Sustainable Forestry

Brunei Darussalam is one of the countries in Southeast Asia with rich forest cover. The Forest Act of 1934 set a robust policy framework in forestry and biodiversity management in Brunei Darussalam. It was amended in 2007 to emphasise biological diversity conservation, biological prospecting, access and benefit sharing, and enforcement of forest protection.

An indication of the government's serious effort to protect its forestry resources is shown by its decision to pledge 58 per cent of its total land area for the Heart of Borneo (HoB) initiative.

Cambodia has one of the largest forest covers in the ASEAN region with about 80,680 square kilometres of forest in 2020, which represents 48.14 per cent of the country's total land area. In 2015, FAO reported 3,200 square kilometres of primary forests; 74,640 square kilometres of other naturally regenerated forests; 690 square kilometres of planted forests; and 500 square kilometres of mangroves. In addition to rubber plantations considered in the FAO assessment, Viet Nam has other plantations consisting of oil palm and unspecified tree.

Cambodia's forests face many threats, including logging, fragmentation, and conversion to agriculture. The main drivers underlying these threats are increasing population (and with it, the increasing demand for natural resources and space). The country's forests also face threats caused by the diverse activities needed for economic development (e.g., expansion and establishment of garment factories, rubber plantations, tourism).

The coverage of primary forests declined and stabilised from 2005 while other naturally-regenerated forests and mangroves declined steadily. This can be attributed to government reforms on forest management and involvement of local communities and authorities in preventing deforestation.

Indonesia has been implementing its Sustainable Production Forest Management Programme in a total of 688,310 square kilometres of forest area through the development of forest certification system and chain of custody in ensuring legality of timber. It does this through the Timber Legality Verification System, the Forest Product Administration Information System, and establishing production forest management units.

Box 25. The Heart of Borneo Initiative

The HoB Initiative is a voluntary transboundary cooperation initiative between the Government of Brunei Darussalam,Indonesia (Kalimantan) and Malaysia (Sabah and Sarawak), to conserve the biodiversity that lies within the HoB for the benefit of the people who rely upon it through the effective management of forest resources and the conservation of a network of protected forest areas, productive forests and other sustainable land uses.

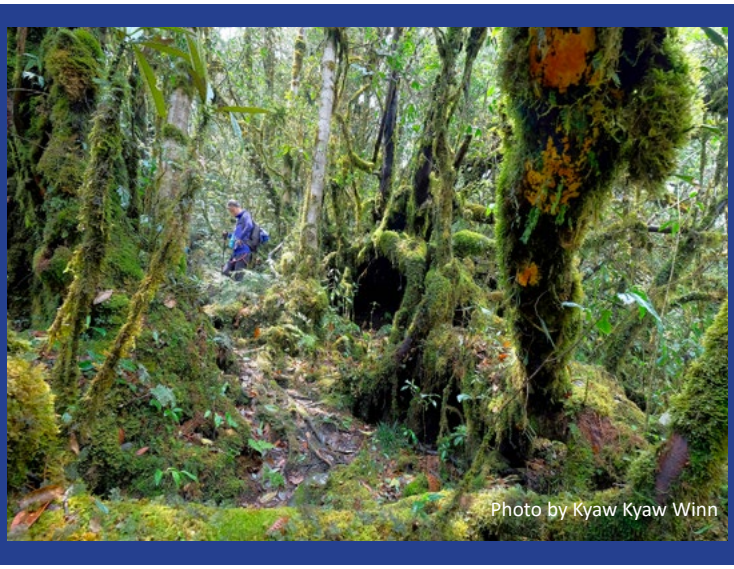


Photo by Kyaw Kyaw Winn

To overcome the rate of deforestation and sustainably manage its forests, Indonesia extended the moratorium on permits for the utilisation of primary natural forests for a third and fourth time in 2015 and 2017, respectively. In relation to this, the newest revision (13th) of the *Indicative Map on Postponement of New Permits Grant for Forest Utilisation, Use of Forest Areas and Allocation Changes* (or moratorium map) covered a total forest area of 664,000 square kilometres on which no rights for production forest area and another use area is going to be granted.

Malaysia implemented the Malaysian Timber Certification Scheme or MTCS and the Malaysian Standard for Sustainable Palm Oil (MSPO) Production. These certify that their forest management and oil palm production practices, respectively, meet the requirements of the best practices in sustainable management.

About a third of the Permanent Reserved Forest (PRF) in Malaysia is certified under MTCS while 54.6 per cent of oil palm planted area was certified by MSPO by September 2019. Malaysia is also implementing its new forestry policies, the *Sabah Forest Policy 2018* and the *Sarawak Forest Ordinance 2015* that put a stronger emphasis on biodiversity and finalised the *National Roadmap for Social Forestry*. The country set a target to sustainably manage 100 per cent of its timber and timber products under schemes such as MTCS, FSC, etc.), and reported that it is on track to achieve the target.

Myanmar implemented national target 5.1 aiming to put at least 10 per cent of its 'dry mixed deciduous forest' (DMDF) and mangrove forest under some form of protection, including sustainable use and management. Myanmar's Target 5 primarily aimed to reduce habitat and ecosystem loss.

However, like several other countries in Central and Southeast Asia, it had a high rate of deforestation (at 1.4 per cent in 2016 and almost 2 per cent on average from 2005 to 2015). Myanmar lost almost 4,000 square kilometres per year of forest between 2005 and 2015, and its intact forest landscapes declined by 31 per cent from 2001 to 2013. Myanmar's losses have continued with a further decline by 1,120 square kilometres per year of intact forest.

The area of DMDF added under protection has also been small and there are only a few community forests that have been certified as sustainably managed. On the positive side, the area under community forests has considerably increased, and as these areas become certified, there will be incremental movement towards the target. However, it seems unlikely that the target can be met within two years. Community forestry is largely dealt with under Target 15, but there are now several community forests in

mangrove areas and a mangrove action plan is currently being implemented. Myanmar has its own forest certification system as part of its move towards a more sustainable forestry sector.

Thailand reported that it will incentivise the conservation and sustainable use of its forest. This will include initiatives to restore the natural environment in the conserved forest and promote conservation tourism and activities that encourage community participation in forest conservation and restoration. The guidelines for promoting the sustainable use of biodiversity of forestry is in Component 1 of its work programme (conservation, sustainable use, and share benefits), Target 4 (promotion of the sustainable use of forestry resources) and in Objective no.1 (promotion of the sustainable use of forestry resources to support the conservation of biodiversity).

By virtue of Resolution No. 134/2016/ QH13 approved in 2016, Viet Nam's land-use plan to 2020 was adjusted indicating that by 2020, the total natural area for forestry would be expanded to 162,245 square kilometres constituting protected forest (46,184 square kilometres), special use forest land (23,589 square kilometres), and production forest land (92,679 square kilometres). In 2017, the forest area in Viet Nam was around 160,336 square kilometres of which protected forest covered 58,485 square kilometres, special-use forest was at 22,888 square kilometres, and production forest at 79,562 square kilometres.

As of August 2018, the total area of forest certified under the Forest Stewardship Council (FSC) system was 2,293 square kilometres (1,477 square kilometres of planted forest and 816 square kilometres of natural forest) in 17 provinces with 36 certificates granted including four households and 32 forestry companies. Timber production is certified at 2 million cubic metres FSC-certified wood while products fetch 10–15 per cent higher than non-FSC-certified products.

Photo by Paolo Antonio Saministrado

Photo by Dedi Suwidiantoro

Challenges

Forest encroachment, agricultural land conversion, and heavy reliance on chemical production inputs threaten ecosystem services essential to sustainable agriculture in the ASEAN region. Being the major producer of oil palm globally and supplier of about 90 per cent of natural rubber to the world market, the areas being allocated to these plantation crops continuously increase as forest areas decrease. At the same time, lowland agricultural areas are being threatened by urbanisation, including the conversion of agricultural lands to residential and commercial areas. The proportion of agricultural land to total land area declines as the urban population of the region increases.

Ways Forward

ABO 2 recommended the development, implementation and promotion of an ASEAN branding and labeling system for forest and agricultural products derived from sustainably managed forests and plantations.

What the 6NRs have shown is that the AMS take their own respective efforts towards various sustainability criteria and standards for agriculture, aquaculture, and forestry. These national efforts should be taken into account in the regional standards that are being disseminated by the ASEAN Economic Community.

Given the mainstreaming thrusts of the Convention on Biological Diversity going into the post-2020 global biodiversity framework, the integration of all these efforts towards a uniform standard for the sustainable management of agriculture, aquaculture, and forestry in the ASEAN is something that will enhance the implementation of the successor target to Aichi Target 7.

This effort at the regional level should be mindful of this caveat by Tayleur et al.[7]: whether certification will make a meaningful contribution to biodiversity conservation at regional and global scales will depend both on efficacy and geographic coverage. While certified products are rapidly moving from niche to mainstream markets, there has been inadequate systematic assessment of the geographic coverage patterns of agricultural certification, and thus of its likely contribution to conservation goals at scale.

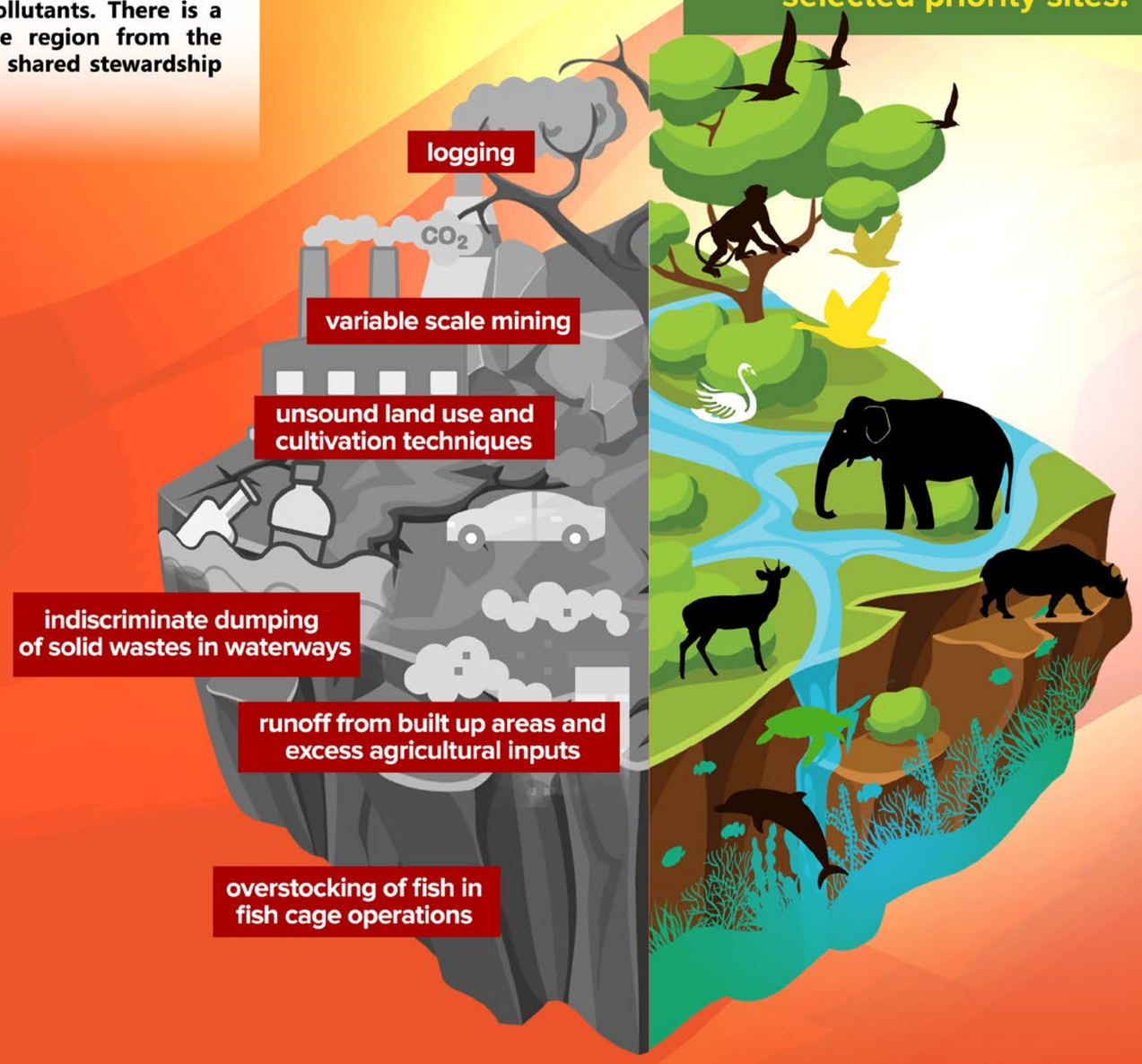
In the future, there needs to be an agreement to adopt uniform criteria and standards for sustainable agriculture, aquaculture, and forestry at the global and regional level. Additionally, all CBD Parties should agree to uniformly adopt a monitoring framework for easier assessment of progress towards Aichi Targets and its successor post-2020.


Photo by Ismail Amin

TARGET 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

With support from development partners, some AMS have improved waste management systems to reduce emissions of persistent organic pollutants. There is a need to address pollution in the region from the position of individual concern and shared stewardship among all stakeholders.

AMS have incorporated planned remediation measures in their NBSAPs, conducted communication campaigns, monitored compliance of industry, and mobilised action in selected priority sites.



Challenges

- Pollution remains to be a problem among AMS despite legislation, policies, and actions.
- Biodiversity in inland aquatic, coastal, and marine ecosystems are highly vulnerable to sedimentation.
- There is a need for better understanding of nitrogen in the environment, impacts of pollution on the ecology and economy of the AMS, and the lag time between legislation, action, and clear results.

Ways Forward

- Focus CEPA activities in reshaping paradigm and values that target minimum waste and proper waste management
- Develop robust policies on waste disposal and management
- Strengthen regional cooperation on sustainable forest management in the context of forest fire prevention and control
- Call for adherence to the ASEAN Agreement on Transboundary Haze Pollution
- Promote cooperation for the protection, restoration and sustainable use of coastal and marine environment
- Respond and address the risk of pollution and threats to marine ecosystem and coastal environment, particularly in ecologically sensitive areas
- Promote approaches and schemes that could result to effective solid waste management
- Utilise existing regional and international institutions and agreements on transboundary environmental issues
- Heighten collection action in combatting marine debris

Photo by Alexis Principe

Aichi Biodiversity Target 8: Pollution reduced
By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Pollution of all types is a crucial issue in the region; thus, all concerned sectors are called to implement effective mitigation measures and actions to address it and ultimately, its detrimental effects on biodiversity.

AMS have incorporated remediation measures in their NBSAPs, refined existing policies and formulated new ones, monitored pollution status using standard quality indices, and executed countermeasures to mitigate pollution that impact on biodiversity. At the regional level, plans and guidance on pollution regulation in the agricultural sector were formulated like the *ASEAN Guidelines on Soil and Nutrient Management and the ASEAN Strategic Plan of Action for Cooperation on Livestock*. AMS have national policies and strategies that align with these regional initiatives. Indonesia has been using bio-organic fertiliser more broadly, Lao PDR and Malaysia have laws that seek to reduce the use of agrochemicals, and Myanmar has a new Pesticide Law which directs labelling claims and their bio-efficacy on rice. Organic agriculture has gained traction in the region with Indonesia, the Philippines, Thailand, and Viet Nam expanding their programmes and areas devoted to it. Organic produce from some AMS have penetrated the international market.

When it comes to managing solid waste, Singapore applied the waste-to-energy (WTE) strategy through incineration. It has reached a recycling rate of 61 per cent in 2020, which was a mere 4 per cent of its national target. Through various programmes, Indonesia had significantly reduced its waste, exceeding its reduction target for 2019 by at least 170 per cent. In 2018, *Malaysia's Roadmap Towards Zero Single-use Plastics* 2018–2030 was launched. The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) has engaged four AMS in its *Close the Loop* project which applied cutting-edge technologies to map the path of plastic wastes from urban centres to marine environments. Policy formulation and investment strategies are key components of this programme. Cambodia's *Industrial Development Policy 2015–2025* calls for environmental protection and resource management, to lessen environmental pollution caused by industrial and chemical wastes, and to ensure the sustainability of ecosystems.

Transboundary waste has been a contentious issue in the region. In 2019, the move to amend the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (Basel Convention), a legal prohibition on the exportation of hazardous wastes, came into fruition with its elevation into an international law. To address an equally important issue on marine debris, the *Bangkok Declaration on Combatting Marine Debris* in the ASEAN

Region and the *ASEAN Framework of Action on Marine Debris* (FAMAD) took effect in 2019, thus, fortifying AMS' commitment in dealing with pollution risks and threats to the marine and coastal environment.

Pollution defined and the importance of the target

The CBD defines pollution as "chemical contaminants that are introduced to the environment resulting in instability or harm." Nutrients exist naturally in the environment but they should be maintained at a level that does not harm ecosystems and species, and impede the provision of ecosystem services like clean water, uncontaminated air, and productive lands.

Aichi Target 8 underscores the dangers of nutrient pollution, particularly of an overabundance of nitrogen and phosphorus that emanate from agricultural runoff, wastewaters, fossil fuels, and even residential areas. The presence of nutrients and chemical compounds beyond the acceptable levels can subsequently cause environmental damages like rapid growth of aquatic plants and algal blooms, bacterial growth in water bodies, eutrophication, and creation of "dead zones" in aquatic environments, among many others.[1]

Milestones to achieve Aichi Target 8 include identifying priority pollution issues and addressing the sources of pollution. Water quality guidelines need to be established to address pollution and avert nutrient loading in freshwater and marine ecosystems. Sub-indicators include AMS' efforts toward more efficient use of fertiliser and management of wastes. This target contributes to the realisation of SDGs 3, 6, 9, 10, 11, 12, and 14.

Aichi Target 8 aligns with the Rotterdam and Stockholm Conventions, the Johannesburg Plan of Implementation by 2020, and the Basel Convention which all aim to reduce the production and use of chemicals. As such, national targets adopted in support of Aichi Target 8 have the potential to create synergies between the CBD and other international processes.

Regional status and initiatives

The Global Biodiversity Outlook (GBO) 5 reports that pollution, including excess nutrients, pesticides, plastics, and other waste, continues to be a major driver of biodiversity loss. Nutrient levels remain at a point that deters ecosystem function and inhibits biodiversity to thrive. Many forms of solid wastes, especially plastics, continue to suffocate marine ecosystems to the detriment of various living species. These indicate that this target has not been achieved at the global level.[2]

Country assessment of progress toward this target indicated that three AMS are on track to bringing down pollution at a level that is not harmful to biodiversity, four AMS are going towards that direction but are less likely to meet this target, while two AMS have not shown significant progress.

Box 26. Talk about pollution

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reports that since 1980:

- Fertilisers entering coastal ecosystems have produced more than 400 ocean 'dead zones' or areas with critically low oxygen level due to nutrient pollution.
- Industrial facilities have been dumping 300–400 million tonnes of heavy metals, solvents, toxic sludge, and other wastes annually into the world's waters.
- Plastic pollution has increased tenfold.

Photo by Jonas Mantua Juntilla

Covering more grounds: Managing land-based pollution

Regulating agricultural inputs towards a healthy environment and food

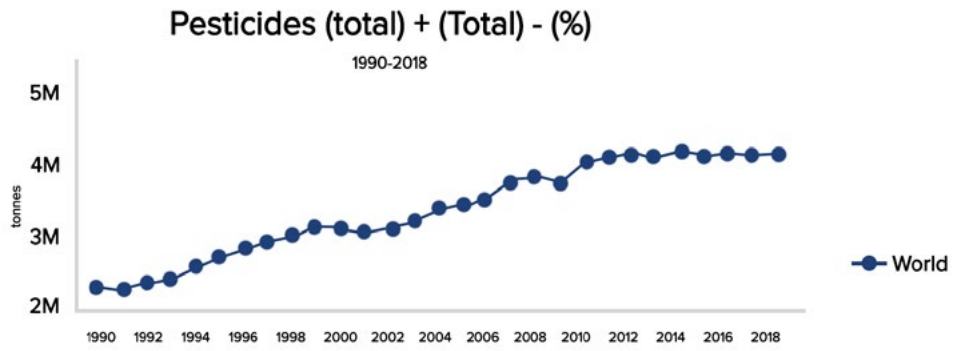
The ASEAN region currently has a total population of over 661.8 million and the numbers continue to grow.[3] This puts pressure for agricultural production to outpace demand. Increasing production yield would likely increase the use of farm inputs, including agrochemicals like fertilisers, herbicides, and pesticides that are hazardous and harmful to humans and the environment.

Figure 7 presents an increasing trend in global pesticide use from 1990 to 2018 with the highest consumption in 2014 at over 4 million tonnes, an increase of 79 per cent.[4] On the other hand, in the ASEAN region, pesticide use was variable with erratic increases and downward trends for the past three decades. The highest fertiliser use was registered in 2010 with over 176,000 tonnes, and the lowest in 1992 at over 91,000 tonnes (Figure 8).[5] While the variable trend may indicate changing agricultural priorities and practices in specific periods, it also shows a huge potential to effectively scale down chemical use, hence, agricultural pollution.

Recognising the importance of regulating the use of agrochemical inputs, the *ASEAN Guidelines on Soil and Nutrient Management* was released in 2017 to present science-based policy recommendations for climate-resilient soil and nutrient management towards sustainable agricultural production and enhanced food security. The guidelines provide key recommendations under the Strategic Plan of Action for the ASEAN Integrated Food Security (AIFS) *Framework*.

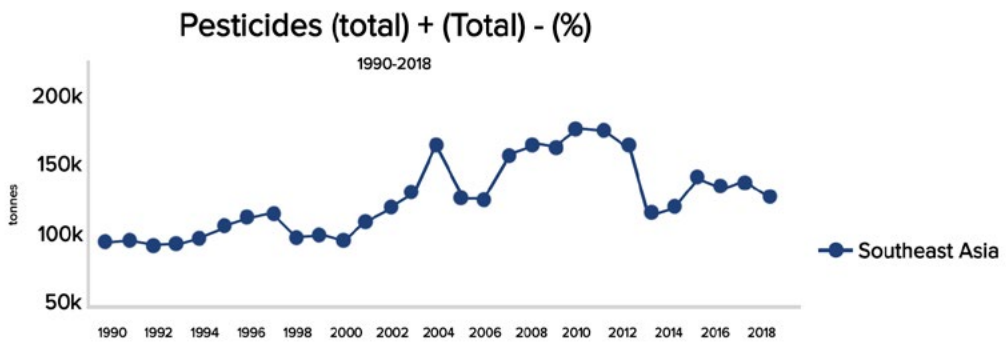
At the country level, the AMS have put in place policies and measures to curb agricultural pollutants. In Cambodia, soil fertility is generally low; hence, the reported

Figure 7. Global trend in pesticide use, 1990–2018, in tonnes.



Source: FAO, 2016. FAOSTAT Inputs/Pesticides Use. http://www.fao.org/faostat/en/#data/RP

Figure 8. Trend on pesticide use in the ASEAN, 1990–2018, in tonnes.



Source: FAO, 2016. FAOSTAT Inputs/Pesticides Use. http://www.fao.org/faostat/en/#data/RP

cases of pesticide residues exceeding the maximum residue limits (MRLs). As a countermeasure, the Integrated Pest Management (IPM) approach, which has been demonstrating high efficacy, is being advocated. However, Cambodia faces challenges in the dissemination and adoption of these programmes among farmers.

Indonesia benefits from the use of bio-organic fertilisers and organic ingredients to improve soil fertility and increase farm productivity. The *Pesticide Management Decree* of Lao PDR, on the other hand, highlights the reduction in the use of hazardous agrochemicals in the agriculture and forestry sectors.

The amended *Pesticide Act* of 1974 of Malaysia imposes stiffer penalties and stricter control on pesticide use. Malaysia has programmes which apply the IPM approach like the pesticide risk reduction programme, certification of farms with myGAP (Good Agricultural Practice), and zero burning policy. The new *Pesticide Law* (2016) of Myanmar institutionalised the Registration Board under the guidance of the Myanmar Department of Agriculture, which takes charge of testing pesticide labelling claims, as well as their bio-efficacy on crops.

The Philippines has developed the *Balance Fertilization Strategy* which emphasises the management of crop residues, farm water recycling, and an optimum combination of organic and inorganic fertilisers. Its Fertilizer and Pesticide Authority, under the Department of Agriculture, oversees issues and concerns relative to fertiliser and pesticide manufacturing, trade, use, risk management among other responsibilities.

Thailand came up with its *Twenty-Year Agriculture and Cooperative Strategy (2017-2036)* which outlines the *12th National Economic and Social Development Plan (2017-2021, NESDP)*. Strategy 4 of the Agricultural Development Strategy of NESDP sets out to promote environment-friendly agriculture through on-farm waste management system, production techniques that do not pollute or damage the environment, and capacity building of farmers in green agriculture, good agricultural practices (GAP), and low-carbon farming, among others.[6] The 13th NESDP has been drafted and its first strategic outcome focuses on inclusive, green, resilient and low-carbon, sustainable economy.[7]

Viet Nam has plans of restructuring its agricultural sector towards improving value-added and sustainable development. The restructuring would include environmental assessment, monitoring, and control of the use of pesticide and fertilisers, development of databases in green agriculture and green technologies, and training and awareness-


Photo by Dennis Tingle


Photo from Hoang Lien National Park

raising, among others. The country has been serious about producing organic agricultural products. At least 33 provinces and cities are producing organic crops and livestock, and these are officially being traded in the international market (e.g., Australia, Japan Korea, and the United States).

Aichi Target 3 articulates the importance of assessing the impact of subsidies and incentives in managing agrochemicals which is embodied in Aichi Target 8.

A study conducted by the Institute of Democracy and Economic Affairs (IDEAS) based in Malaysia established that agricultural subsidies in the form of fertilisers and pesticides have led to the continued dependence on chemical-based inputs in rice production.

The study indicated that there is no correlation between input and yield in rice productivity as there was an observed decline in yield despite the increasing cost of subsidy. In fact, the quality of soil has even deteriorated. These results prodded the government to revisit the incentive structure and effect necessary reforms, regulations and institutional structures, programmes and projects, and trade and tariffs. Additionally, 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.

Vegetables are important crops in addressing domestic food security and human nutrition. But similar to major crops, increasing use of chemical inputs has been observed in vegetable production. For instance, Thailand and Viet Nam saw a build-up of pesticide use by 7–10 per cent annually for the last 10 years. Cambodia and Lao PDR had a much lower consumption level but would most likely tend to intensify.[8]

The World Vegetable Center conducted an extensive study in 2020 on pesticide use[9] on yard-long bean and leafy brassicas among 1,000 farmers in Cambodia, Lao PDR, and Viet Nam. The study showed the proportion of farmers who use pesticides beyond what is economically optimal as follows: 100 per cent in Viet Nam; 73 per cent in Cambodia; and 59 per cent in Lao PDR. On the average, 77 per cent of the farmers' pesticide expenditure was unnecessary. Additionally, when a woman does the pesticide management, expenditure was 42 per cent less.

The study also revealed that farmers with adequate knowledge of the distinction between beneficial insects and insect pests tend to use more biopesticides or nature-based pest control products (including beneficial insects) over inorganic pesticides. This illustrates the importance of providing

farmers with adequate knowledge in nature-based farming practices that are less expensive, more sustainable, and environmentally sound like organic farming.

The Research Institute of Organic Agriculture reported that at least 61,000 square kilometres of land area in the ASEAN region is devoted to organic agriculture and the prospect for expansion is promising.[10]

The shift from inorganic, synthetic fertilisers to biological organic fertilisers has been Indonesia's strategy in agricultural management. Through this method, they can improve the chemical and biological properties of the soil, suppress disease, fertilise plant roots, and increase crop yields.

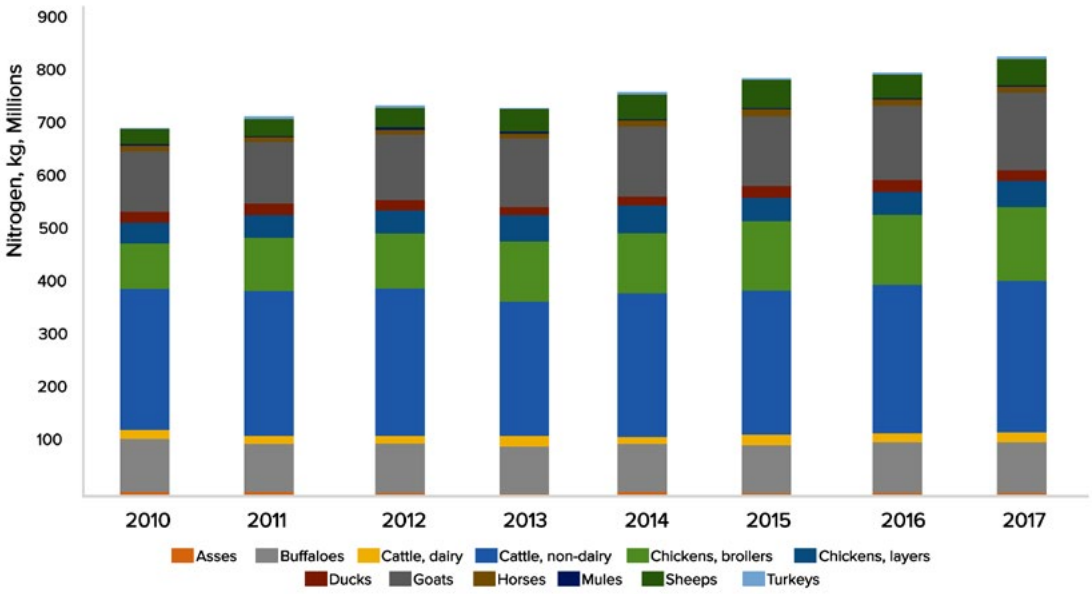
The Philippines is the fifth country in the world to have the most number of organic producers at 16,958 based on data from the IFOAM. Organic farming is operationalised through the Organic Act of 2010 which promotes the practice of organic agriculture in the country. Thailand is set to have 2,080 square kilometres under organic agriculture by 2021 under the National Plan for Organic Farming.

Industrial animal agriculture

The livestock sector is another critical source of agricultural pollution. Animal wastes, antibiotics and hormones, fertilisers, and pesticides used for feed crops are usually transported from land to streams, rivers, and other tributaries, and ultimately the ocean. Based on FAO statistics, animal manure particularly of non-dairy cattle, buffaloes, and goats is the primary source of nitrogen in the ASEAN region. Animal manure leaches to the soil and causes serious eutrophication of water bodies (Figure 9).[11]

Another FAO report stated that "14.5 per cent of all human-caused greenhouse gas (GHG) emissions come from livestock supply chains, contributing 7.1 gigatonnes (GT) of carbon dioxide equivalent (CO_2-eq) per year."This stems in large part from feed production and processing (46.7%) and enteric fermentation (39.1%) or the digestive process among ruminants.[12] Thus, policies, programmes, and local actions that could successfully bring down pollutants from livestock need to be emphasised and seriously considered in development and economic planning.

Figure 9. Trend in the amount of nitrogen in livestock manure (left on pasture) that leaches, by type of livestock, AMS, 2010–2017



Source: FAOSTAT. (2019). http://www.fao.org/faostat/en/#data

The *ASEAN Strategic Plan of Action for Cooperation on Livestock* (2016–2020)[13] provides the roadmap for sustainable livestock production and trade, which supports the broader ASEAN Vision on Food, Agriculture, and Forestry. At the country level, the AMS can draw lessons from helpful initiatives and programmes within the region and beyond.

Some favourable achievements of the AMS include the certification of 480 livestock farms in Malaysia under the myGAP and myOrganic schemes, Viet Nam's direction towards increased production of organic livestock, and Cambodia's National Biodigester Programme. A biodigester converts animal wastes into fuel for domestic use and processed as organic fertiliser for crops. It enables households to save from this energy-efficient and cost-effective technology.

There are myriad innovative agricultural practices and technologies that align with the sustainable agriculture framework. It is vital to consolidate and promote the application of GAP as a means to effectively control pollution and manage agricultural wastes.

Managing solid wastes

Solid wastes are another pressing concern in the ASEAN region against the backdrop of exceptional productivity growth, burgeoning industries, progressive infrastructures, and an improved labour force. Generally speaking, as countries continue to progress, consumption patterns increase along with waste generation (e.g., agricultural, food waste, e-waste, industrial, and household). Consequently, the health of the environment and biodiversity are considerably compromised.

A UNEP report stated that waste generation in ASEAN is increasing, in volume and composition. The per capita municipal solid waste (MSW) generation in ASEAN is 1.14 kg/capita/day. In terms of total annual MSW generation in 2017, the top three countries were Indonesia, Thailand, and Viet Nam. The waste these countries produce were comprised mostly by organic materials and some plastic, paper, and metals. Of late, there had been a surge of medical waste, electronic waste (e.g., TV, computer, phones, etc.), industrial waste, and construction waste.[14]

The common waste management practices in majority of AMS are open dumping and open burning, composting, and recovery of valuable recyclables like plastic, metals, and paper. Singapore applies the more sophisticated management strategy of WTE through incineration.[15]

Box 27. Wastes as organic fertiliser and alternative energy source

Cambodia's *National Biodigester Programme* illustrates the country's strategy to address pollution while contributing to sustainable development. Set up in 2006 by the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the SNV Netherlands Development Organization, the Programme developed biodigesters. Biodigesters convert animal manure and human excrement into combustible methane gas, which provides reliable, cheap, and sustainable energy source for households. They replace stoves that burn wood or biomass, hence, there is indoor smoke. Another by-product is organic fertiliser for improved crop production.

At least 20,000 biodigesters were marketed through microenterprise in 15 provinces during Phase 1 of the programme. Initial benefits from the project include: increase in rural incomes, improved sanitation, enhanced, optimised energy consumption, and improved quality of both rural life and agricultural products. The biodigesters likewise help reduce greenhouse gas emissions (GHG).

As of 2019, concrete gains from the NBP include: 28,110 biodigesters constructed with 64.4 per cent still operational; biogas kitchen air pollution reduced to 88 per cent (Particulate Matter 2.5); USD 143 saving in cooking fuel per household per year; 3.52 tCO_2 reduced per digester and a total of 821,440 tCO_2 reduced (2009–2019); and 276,300 tonnes of wood saved.

Table 7. Total annual municipal solid waste (MSW) generation, 2017

Country	Solid waste generation ('000 tonnes/year)
Brunei Darussalam	210
Cambodia	1,089
Indonesia	64,000
Lao PDR	77
Malaysia	12,840
Myanmar	841
Philippines	14,660
Singapore	7,514
Thailand	26,770
Viet Nam	22,020

Source: UNEP. (2017). Waste management in ASEAN countries.https://environment.asean.org/wp-content/uploads/2020/03/Summary-Report-Waste-Management-in-ASEAN-Countries- UNEP.pdf

Some AMS—Indonesia, Malaysia, the Philippines, and Thailand—have enacted and refined laws on waste management and implemented national plans and strategies. But progress along this line has been varied across AMS, and to some, significant outcomes have yet to manifest. Several underlying factors that hamper improvement in waste management systems include lack of appropriate legislation, insufficient government funding, lack of appropriate infrastructure, lack of technical capacity,[16] and inadequate stakeholder engagement.

Indonesia managed 14.9 million tonnes of solid waste in 2017 or 54.8 per cent of the targeted volume for 2019. They were able to reduce waste by 14.44 million tonnes, exceeding their 2019 target by 170 per cent.

With support from the Asian Development Bank (ADB), the Pollution Control Department of Lao PDR's Ministry of Natural Resources and Environment (MoNRE) developed the *National Pollution Control Strategy and Action Plan 2018–2025, with Vision to 2030 under the Greater Mekong Subregion (GMS) Core Environment Programme*. The plan covers law and policy development and programmes that all direct to limit pollution at the source. The programme has turned out a centralised environmental pollution database, awareness-


Photo by Marc Joshua A. Esquerra

raising activities towards behaviour change (e.g. source separation and storage, waste reduction through 3Rs—Reduce, Reuse, and Recycle), and the conduct of training in urban and industrial waste pollution prevention measures in provincial capitals and towns in 18 provinces. Thus far, the initiatives to curb waste volume in the municipal areas are showing good results.

The Philippines has the *Ecological Solid Waste Management Act of 2000* (RA 9003) which provides the legal framework for the solid waste management programme that shall ensure the protection of public health and the environment.

Singapore promotes waste reduction, sustainable production and consumption and waste management through initiatives such as Closing the Waste Loop and the 3R Fund. These schemes are vital for Singapore because the country has only one landfill—the Semakau Landfill. About 7.7 million tonnes of waste generated is disposed of in this offshore landfill. At the current rate of waste generation, the landfill is projected to be filled by 2035. Thus, Singapore aims to achieve a recycling rate of 65 per cent by 2020 in the short-term and 70 per cent by 2030. As of 2018, Singapore has reached a recycling rate of 61 per cent (4,726,000 tonnes) which is only 4 per cent less its 2020 target.

Viet Nam is implementing the *National Strategy for Integrated Management of Domestic Solid Wastes to 2025, a vision to 2050*. The strategy aims that by 2020, 90

per cent of urban domestic solid wastes are collected and treated, and 100 per cent by 2025. The total collected waste was at 32,415 tons per day in 2015. As of 2015, 35 domestic solid waste facilities have been operating across the country with an average capacity of 100–200 tonnes per day. Some larger solid waste facilities can process 3,000–5,000 tonnes per day.

In dealing with the complex issue of waste management, a shift in paradigm wherein waste should be considered a resource and not merely useless materials may be a crucial consideration.[17] While improving the waste value chain and adopting viable technologies are core solutions to the waste problem, sustainable production and consumption towards waste reduction and prevention should be at the very core of the equation. Stakeholder engagement can be a game-changer in this sense, especially the participation of the private sector as they have the needed capability, technology, and resources.

These objectives are being operationalised through the application of cutting-edge technologies like remote sensing, satellite, and data applications to map the path of plastic wastes from source to waterways in pilot cities: Surabaya (Indonesia); Kuala Lumpur (Malaysia); Nakhon Si Thammarat (Thailand); and Da Nang (Viet Nam). State officials are trained to use smart technologies to monitor, assess, report on, and sustainably manage plastic wastes and strengthen solid waste management systems. A vital component of the programme is the development of policies and investment strategies, using the *circular economy approach*.[18]

The circular economy approach lessens the inputs and impacts of waste plastic on the terrestrial and marine ecosystems. It covers sustainable management of water and sanitation; sustainable consumption and production; inclusive, safe, resilient; and sustainable use of terrestrial and marine ecosystems while ensuring their protection, restoration, and conservation.

Dealing with industrial waste

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reported that globally, industrial facilities have been dumping 300-400 million tonnes of heavy metals, solvents, toxic sludge, and other wastes annually into the world's waters.[19]

In recent decades, Cambodia, Lao PDR, Myanmar, and Viet Nam have been substantially investing in the garment and footwear industries. Viet Nam ranked 4th in the apparel export market in 2019 with a 6.2 per cent market share, and Indonesia and Cambodia ranked 8th with 1.7 per cent market share.[20] Viet Nam's export revenue in the same year was USD 39 billion.


Photo by Dedi Suwidiantoro

While this favours the economy, the high volume of textile dyeing and finishing mills contribute substantially to water pollution and greenhouse gas (GHG) emissions. In the case of footwear industries in Cambodia, the unregulated processing of animal skin (tanneries) like that of the Siamese crocodile (*Crocodylus siamensis*) increases the level of chemical pollution. Additionally, the high demand for the said crocodile skin has now placed the species in the 'Critically Endangered' category by the International Union for the Conservation of Nature (IUCN). It has now been banned for trade by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The *Cambodia Industrial Development Policy* 2015–2025 calls for the proper management of environmental resources in ways that ensure the sustainability of ecosystems. The *Waste Management Strategy Plan for Phnom Penh 2018–2035* is a complementary initiative that was formulated through decades of multi-stakeholder dialogues on the management of all types of wastes. A 3R (Reduce, Re-use, Recycle) programme was also initiated in the context of the Industrial Development Policy, which aligns with key strategies and plans like the *Green Growth Roadmap* and the *National Environment Strategy and Action Plan, 2016–2023*.

To entice companies in Indonesia to practice proper environmental management, the government provides reputation incentives that recognise companies that adopt cleaner production systems.

In Myanmar, a study showed that in the agricultural area in the central dry zone, a reduction of about 40 per cent in rice yield was attributed to wastewater pollution from the textile industry. The Environment Conservation Department enacted in 2018 the *Environmental Management Plan*—the first of such regulation in the country—for polluting industries in 2018. The plan requires nine major industries, including the textile business, to adopt wastewater and solid waste management systems.

Box 28. Closing the Loop in Thailand

Under the Closing the Loop Programme, the contributions of and links between formal actors (Bangkok Municipal Administration) and informal actors (waste pickers and waste dealers) in plastic waste management in Bangkok was studied.

The study substantiates the importance of informal actors in the waste management system in Bangkok with the following significant findings:

- Informal actors help ensure that large quantities of plastic waste are recycled rather than incinerated or stuffed into landfills which contribute significantly in reducing GHG emissions.
- Informal actors fill a big role in alleviating the financial burden of plastic waste recycling and management on government.
- By recycling plastic waste, the BMA estimates to have saved THB 10 million (~USD 320,000) per year in avoided disposal fees in Sai Mai District alone. This excludes the savings from avoided labour costs.
- Informal actors have the opportunity to earn a living through this work, although they lack social recognition and protection.

Photo by Angie Metin


Photo by Antonio Rojas Jr.

The pollution index in Viet Nam is projected to accelerate as a result of industrial activities and urbanisation. As a remedial measure, the *Cleaner Production Strategy* has been deployed in 63 provinces and cities with 9,000 enterprises from varying industries participating. Models of sustainable production in industries have been developed but outscaling remains limited.

In the region, the ASEAN Working Group on Chemicals and Waste (AWGCW),[21] serves as a consultative platform among AMS to further strengthen regional coordination and cooperation in addressing chemicals-related issues under relevant multilateral environmental agreements such as the *Basel Convention*, *Rotterdam Convention on the Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention)*, *Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention)*, and *Minamata Convention on Mercury (Minamata Convention)*.

The AWGCW guides collaboration in the areas of policy and strategy formulation and implementation, knowledge and experience sharing, research, and institutional and human capacity building especially on the management of the transboundary movement of hazardous chemical substances. Reiterating the concern and commitment to address hazardous chemicals and waste management issues in the region, the ASEAN issued the *ASEAN Joint Declaration on Hazardous Chemicals and Waste Management*.

Inroads to addressing the problem of transboundary waste

In recent decades, Asia has been at the receiving end of various types of wastes from rich countries for recycling, and later disposal. This has initially been an economically practical set up for the importing countries especially as the global trash industry is valued at hundreds of billions of dollars.

This led to the massive inflow of plastic waste imports to countries in the ASEAN region by as much as 171 per cent or 2,231,127 tonnes in 2018 from 836,529 tonnes in 2016.[22] Waste-exporting countries have since been redirecting their wastes to unsuspecting countries in the region in the guise of legitimate trade commodities. AMS could follow what China implemented: banning the importation of vast types of solid waste in 2018 and allowing only the entry of plastic wastes with a contamination rate of 0.5 per cent or less.[23]

A study by the University of Georgia envisages the displacement of 111 million metric tonnes of plastic waste by 2030 as a result of this new Chinese policy,[24] thus, further compounding the already complex waste problem.

These scenarios were met with strong resistance and serious countermeasures particularly from Malaysia, the Philippines, Thailand, and Viet Nam. In 2019, Malaysia sent back 4,120 tonnes of plastic waste to 13 countries and closed down 200 illegal recycling centres. The Philippine government called on the Government of Canada to take back transported wastes. Thailand has put a stop to the importation of electronic wastes, especially the toxic kind, and declared to end doing so totally by 2021. Pressure from the Thai citizens has weighed in on the government's decision to ban the importation of contaminated trash. Viet Nam has imposed a cutback on waste import quotas by 90 per cent and a halt on the issuance of licences to waste importation. The country also vowed to ban the importation of plastic scrap by 2025.[25]

The transboundary movement of waste has been a highly contentious issue. While some AMS have taken proactive steps and a firm stand on this issue on the domestic front, the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* has somehow helped level the field. Adopted in 1989 and entered into force in 1992, the overarching goal of this international treaty is to protect human health and the environment from the adverse effects of wastes, in particular taking into account the vulnerabilities of developing countries.

Parties to the Convention are obligated to: 1) reduce and minimise waste at source; 2) manage wastes within the country in which they are generated; 3) reduce transboundary movement of wastes to a minimum; 4) manage wastes in an environmentally sound manner; 5) strictly control waste trade via a notification and consent mechanism known as "prior informed consent".[26]

As of 2020, all AMS have ratified the *Basel Convention*.[27]

However, the original treaty did not ban hazardous waste, hence, the adoption of the Ban Amendment in 1994 and as a proposed amendment in 1995. The Ban Amendment prohibits the member states of the Organization for Economic Cooperation and Development (OECD), the European Union (EU), and Liechtenstein from exporting hazardous wastes as defined by the Convention to other countries–primarily developing countries or countries with economies in transition. In 2019, a breakthrough was achieved via the elevation of the proposed amendment into an international law upon meeting the minimum required number of Parties ratifying the amendment.[28]

Wading into the issue of water pollution

Water pollution is rapidly increasing in both urban and rural areas. Pollution and eutrophication (excessive nutrients in water) are caused by runoff from the land, industrial effluents, and municipal and domestic sewage, which cause the death of various species and the deterioration of ecosystems. Globally, 80 per cent of all pollution in


Photo by Rozaldo C. Dimanalata Jr.

seas and oceans comes from land-based activities,[29] thus, the importance of proper water management.

At the regional level, the ASEAN Working Group on Water Resources Management (AWGWRM) is the consultative platform for promoting the sustainability of water resources and ensuring the accessibility of quality and sufficient water for the people of ASEAN. Under the AWGWRM, the ASEAN Strategic Plan of Action on Water Resources Management (ASPA-WRM) was developed to serve as the roadmap in focusing programmes and activities around four key issues on water management: (1) supply, demand, and allocation; (2) water quality and sanitation; (3) climate change and extreme events; and (4) governance and capacity building.

In terms of subregional initiatives, the Mekong River Commission's Water Quality Monitoring Network (MRC-WQMN) oversees the regular monthly testing and monitoring of the river's water quality. Water quality monitoring using appropriate indicators like the Water Quality Index (WQI) is vital to determine the state of health of water bodies, identify existing problems, and anticipate issues that may emerge. All these shall feed into the formulation of policy recommendations and water management strategies.

Monitoring the Mekong River is particularly important as it is a transboundary river that traverses China, Myanmar, Thailand, Lao PDR, Cambodia, and Viet Nam and spans over 4,900 kilometres.[30] It contains the world's largest inland fishery yielding about 2 million tonnes of fish annually, and some 500,000 tonnes of other aquatic animals like frogs, snakes, snails, etc. Around 52 million people depend on the river system for food and livelihoods, and over 20,000 plant species and 850 fish species thrive in it.[31] Several factors have caused important freshwater ecosystem to deteroriate including agriculture and fishery, hydropower development, and climate change.

The MRC-WQMN has 48 monitoring stations in Cambodia (19), Lao PDR (11), Thailand (8), and Viet Nam (10). The MRC Secretariat provides technical support, ensures the integrity of data, and acts as the central hub for regional water quality data. It provides a platform for data exchange following the Procedures for Data and Information Exchange and Sharing (PDIES).[32]

The adequacy of data on water quality and other indicators has facilitated the preparation of national Environmental Impact Assessment (EIA) reports for the development of infrastructure projects on the Mekong mainstream, development of mitigation measures to reduce impacts on water quality resulting from water infrastructure projects, implementation of the MRC's Procedures on Water Quality, and development of the Basin Development Strategy 2021–2030 and MRC Strategic Plan 2021–2025.

In the 6NRs, most AMS have reported conducting water quality testing and monitoring. In Indonesia, there was an observed decline in water quality for 2016–2017 from 60.38 to 58.68. As a continuing


Photo by Jamir Lyndon Lumbao

effort to address water pollution, the country established an online water monitoring system (ONLIMO) in seven priority watersheds in 2017. The Minister of Environment and Forestry established a decree on the Pollution Load Capacity and Pollution Load and provided the needed financial support in 2018 for four rivers.

For the past 15 years, Lao PDR's water quality has generally been good. However, with the pressure of rapid demographic growth, economic development, and urbanisation, water quality is increasingly likely to deteriorate. Malaysia and Myanmar have established an extensive network of monitoring stations for rivers and marine areas across the country.

The Philippines' *Clean Water Act of 2004* (RA 9275) is the legal framework that protects the country's water bodies from land-based pollution sources. It provides a comprehensive and integrated strategy to prevent and minimise water pollution through a multi-sectoral and participatory approach involving all the stakeholders.

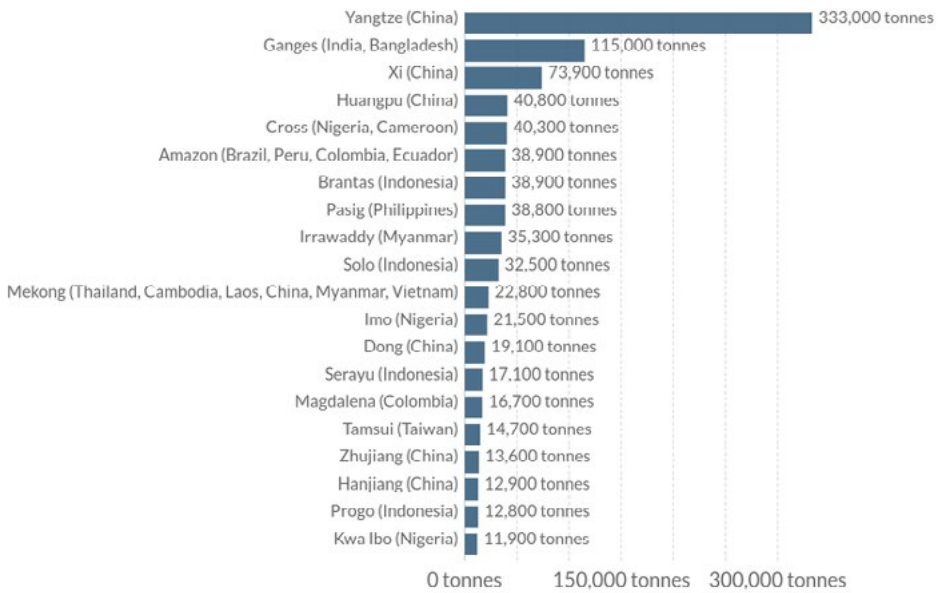
The *Clean Water Programme* anchors on the Clean Water Act and is being implemented by the Department of Environment and Natural Resources. The programme prioritises compliance monitoring of firms/industries, conducts classification of water bodies, and designates Water Quality Management Areas (WQMAS). Continuous clean-up drive of Priority Rivers and other critical water bodies is a priority activity under the programme.

Water quality in freshwater reservoirs in Thailand was observed to have deteriorated in 2017 compared to the previous year. No reservoir was found to have severely deteriorated though. The water quality of the marine environment in 2017 was in a state of deterioration to severe deterioration.

The surface waters in rivers, lakes, canals, and ditches in Viet Nam's cities have been mostly polluted, despite rehabilitation efforts, due to continuous dumping of industrial wastes and development activities. Coastal waters have been negatively affected by tourism and seaport activities, and wastes from industries and residences.

In recent years, Da Nang, a famous tourist spot, has become a hotspot of marine pollution. In recent years though, there has been a positive change in wastewater treatment in urban and residential areas albeit the volume of domestic wastewater that is treated is still low. Data from 2015 indicate that 42 out of 787 (5.3%) urban areas nationwide have wastewater treatment facilities that meet prescribed standards. Most hospitals in Hanoi and Ho Chi Minh City have built and operated medical wastewater treatment systems.

Figure 10. Estimated annual plastic inputs from rivers into the ocean, given as data for the top rivers, and by continental region



Source: Lebreton, L. C., Van der Zwet, J., Damsteeg, J. W., Slat, B., Andrady, A., & Reisser, J. (2017). River plastic emissions to the world's oceans. Nature Communications, 8, 15611

Turning the tide: Addressing the problem of marine debris

Every minute, a truckload of plastic wastes is being dumped into the oceans—80 million tonnes of plastic waste each year. At the rate by which people dump single-use plastics that end up in the oceans, it is projected that the oceans will have more plastic than fish by 2050, and 99 per cent of seabirds would have ingested plastics.[33]

The IPBES reported that plastic pollution in the ASEAN region has increased tenfold since 1980. Of the top ten rivers that pollute the oceans in 2015, four are in the region (Figure 10).[34] The region accounts for about 20 per cent of the global plastic production.[35] GBO 5 reports that plastic pollution has been causing severe impacts on marine ecosystems, and in other ecosystems with still largely unknown implications. Actions taken in many countries to minimise plastic waste have not been sufficient to reduce this source of pollution, thus, it concludes that the Aichi Target 8 has not been achieved.

The IPBES reported that since 1980, fertilisers entering coastal ecosystems have produced more than 400 ocean 'dead zones' or areas with critically low oxygen level due to nutrient pollution.

The *Bangkok Declaration on Combating Marine Debris in the ASEAN Region* and the *ASEAN Framework of Action on Marine Debris* (FAMAD), which took effect in 2019, address the escalating problem of coastal and marine pollution in AMS and the region as a whole. All AMS are signatories to these Agreements and have reaffirmed their commitment to promote regional cooperation for the protection, restoration, and sustainable use of the coastal and marine environment, and respond and deal with the risk of pollution and threats to the marine ecosystem and coastal environment. The Framework has four priority areas: (1) policy support and planning; (2) research, innovation, and capacity building; (3) public awareness, education, and outreach; and (4) private sector engagement.[36]

The region has several initiatives that focus on marine debris. The *Closing the Loop* project which was discussed under land-based pollution was initiated in support of the ASEAN FAMAD and the G20 Osaka Blue Vision. A vital component of the project is the development of policies and investment

strategies, using the circular economy approach, in the effective management of plastic wastes.

A counterpart initiative to the ASEAN FAMAD is the *Marine Plastics Debris Cooperative Action Initiative* (AMPDCEI) under the ASEAN+3. It is all about improving the management of plastic waste through environmentally sound waste management and the 3R (reduce, reuse and recycle), promoting awareness, research, and education on marine plastic debris, and strengthening regional and international cooperation.

Cognisant of the importance of aggregating information on marine debris, and of sharing this knowledge and building the capacity of relevant stakeholders, the Regional Knowledge Centre for Marine Plastic Debris (RKC-MPD) was established by the Economic Research Institute for ASEAN and East Asia (ERIA) under the AMPDCEI.[37]

The RKC-MPD serves as the information clearinghouse on marine plastic debris in ASEAN +3 countries. It has been providing information on good practices and innovative actions in each country in tackling marine debris, scientific knowledge, state, and voluntary initiatives, and private sector involvement.

The World Bank has recently approved the project *Southeast Asia Regional Program on Combating Marine Plastics* (SEA-MaP) which aims to support long-term solutions to reduce marine plastics through strengthening institutions, harmonising policies, and catalysing actions at the regional and national level in ASEAN. These objectives will be concretised in terms of a number of policies, guidelines, or standards harmonised among ASEAN countries, the number and volume of plastic circularity solutions piloted and tested for application, and percent of AMS satisfied with knowledge exchanges facilitated by ASEAN.[38]

The air we breathe: Managing air pollution

The World Health Organisation (WHO) recommends that air quality be at or less than a mean annual PM2.5 reading of 10 micrograms per cubic metre to be considered safe. But less than eight (8) per cent of the world's population has such clean air.[39] In the ASEAN region, the particulate matter in polluted air comes from various sources like smoke from fires and emissions from power plants, industries, and cars. These pollution sources contain PM2.5 which is small enough to penetrate the lungs and even the bloodstream and cause the development of various diseases.

Globally, 9 out of 10 people are exposed to unsafe air or air quality that does not meet WHO Air Quality Guidelines. This is a serious concern especially in the ASEAN region where the pollution level is one of the highest in the world.

The air quality matrix (Table 8)[40] made use of the US Air Quality Index (AQI) to show the PM2.5 level that exceeds the WHO target. There were six categories of pollutant concentration: blue-meets WHO PM2.5 guideline; yellow-exceeds WHO PM2.5 guideline by 2–3 times; orange-exceeds WHO PM2.5 guideline by 3–5 times; red-exceeds WHO PM2.5 guideline by 5–7 times;

Table 8. Air quality of AMS, 2019–2020 (based on annual average PM2.5 concentration (μg/m³)

AMS	2019	2020	2021
Singapore	19.00	11.80	13.8
Philippines	17.60	12.80	15.6
Malaysia	19.40	15.60	19.4
Cambodia	21.10	21.10	19.8
Thailand	24.30	21.40	20.2
Lao PDR	23.10	22.40	21.5
Viet Nam	34.10	28.00	24.7
Myanmar	31.00	29.40	25.9
Indonesia	51.70	40.70	34.3

Source: World Air Quality Report. https://www.iqair.com/world-most-polluted-countries; https://www.airnow.gov/aqi/aqi-basics

purple-exceeds WHO PM2.5 guideline by 7–10 times; and maroon-exceeds WHO PM2.5 guideline by over 10 times. The orange colour code means that the air quality is already "unhealthy for sensitive groups", yellow is moderate, green and blue is good. The sensitive groups refer to elderly, children, and people with lung disease and are at risk from particulate matter, hence, should avoid outdoor activity for potential respiratory symptoms.

Meanwhile, the air quality in Brunei Darussalam is considered safe with an annual mean concentration PM2.5 reading of 6 μg/m^3. The highest levels of pollution occur during the dry season (February to April) due to transboundary haze from neighbouring countries.[41]

The IQAir report states that air pollution remains a challenge in the ASEAN region due to myriad causes: increase in energy demand (6 per cent per year) and reliance on fossil fuels (i.e. oil and coal) for energy; construction, industry, and transportation in urban areas; and rural areas, open burning either for land clearing or preparation. All these stems from the broader issues of rapid population growth and economic development.[42] While the COVID-19 pandemic has greatly affected many countries the world over, it has provided a "breathing space" to the environment. In 2020, the air quality in 70 per cent of cities in the ASEAN region has improved.

In terms of pollution from the transportation sector, Singapore has implemented numerous measures to lessen emissions from vehicles. These include increasing the efficiency of energy consumption and diverting human traffic to less polluting modes of transport such as shared electric vehicles and public transportation. Frequent monitoring of various air pollution indicators across the country also assists with documentation of long-term trends, facilitating strategic planning on measures Singapore can take to combat air pollution.

Transboundary haze pollution resulting from land and forest fires is another critical issue in the ASEAN region. Some of these incidents were severe like in mid-2013 and 2015 for parts of Indonesia, Malaysia, Singapore, and Thailand as well as in early 2015 for parts of Lao PDR, Myanmar, and Thailand. It was estimated that the 2015 haze caused around 100,000 premature deaths in Indonesia, Malaysia, and Singapore. The World Bank assessed the economic damage to Indonesia alone at over USD 16 billion.[43]

Based on LANDSAT 8 HS Terra Aqua satellite image data, the area of forest and land fires has decreased dramatically: 26,114 square kilometres in 2015, 4,384 square kilometres in 2016, and 1,247 square kilometres in 2017. Contributory to this significant drop is the issuance of Ministerial Regulation which presents guidelines for planning, organising, implementing, monitoring, and evaluating


Photo by Gwee Kai Yan

forest and land fire control. The persistent rainfall in 2017 may have also helped in reducing the incidence of forest fires.

The *ASEAN Agreement on Transboundary Haze Pollution* (AATHP) is the first regional arrangement in the world that binds a group of contiguous states to tackle transboundary haze pollution resulting from land, forest, and peatland fires. It has also been considered as a global role model for tackling transboundary issues.

The Agreement aims to prevent and monitor transboundary haze pollution as a result of land and/or forest fires which should be mitigated, through concerted national efforts and intensified regional and international cooperation. This should be pursued in the overall context of sustainable development and under the provisions of this Agreement.

Complementing the AATHP is the ASEAN Peatland Management Strategy (APMS), the regional policy framework for sustainable peatland management in the period 2006–2020. It is operationalised through collective action and enhanced cooperation to support and sustain local livelihoods, reduce risks of fire and its associated haze, and contribute to global environmental management.[44]

The ASEAN and IFAD jointly launched the *Measurable Action for Haze-Free Sustainable Land Management in Southeast Asia (MAHFSA) Programme* in 2019. The MAHFSA serves as the regional coordination platform that would facilitate a more harmonised response to tackling the transboundary haze pollution problem and for promoting sustainable forest management and peatland conservation.

The initiative will systematise data and information management and operationalise a flexible regional coordination platform for building capacity, harmonising programmes and projects, coordinating activities of stakeholders engaged in combatting haze, and channelling multiple sources of finance to address the haze challenge.[45]

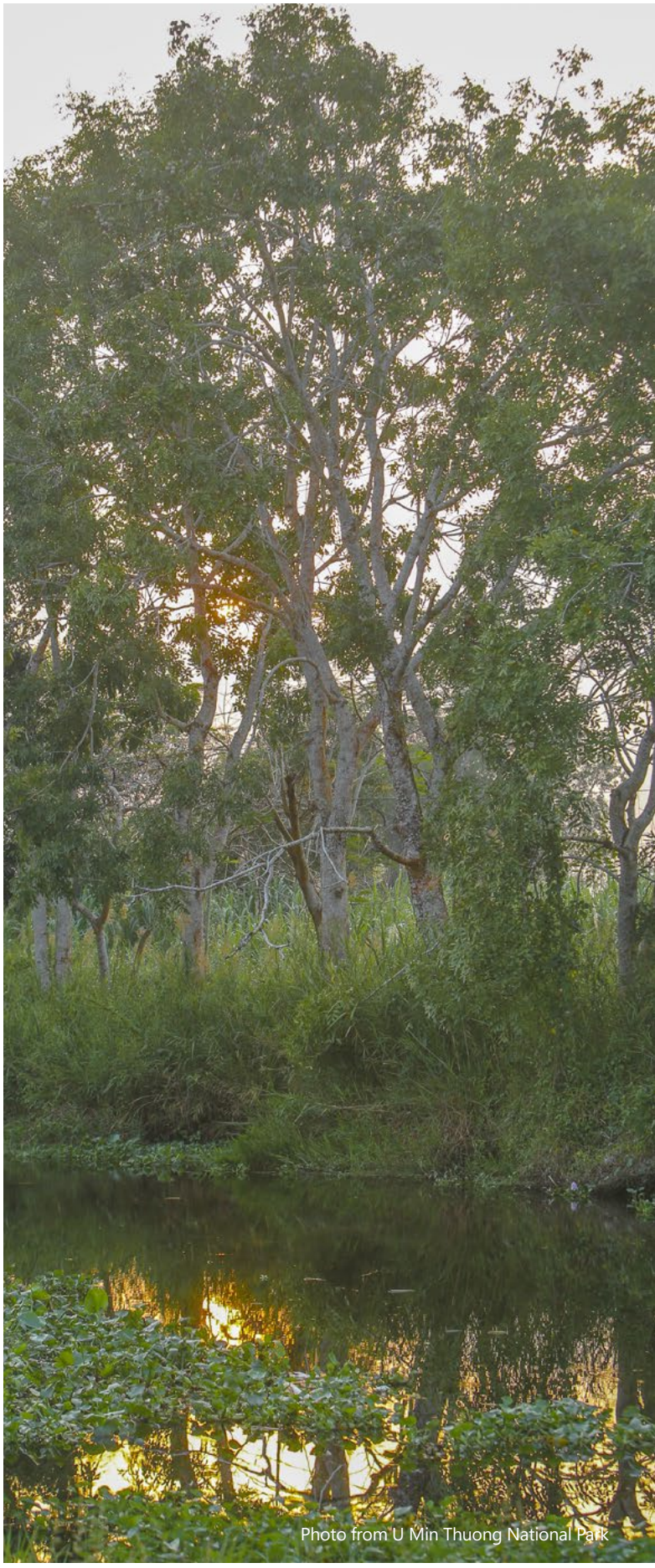


Photo from U Min Thuong National Park

Challenges

The national reports of the AMS and the various global assessments mirror the complex issues and challenges that encompass pollution. Aichi Target 8 primarily aims to address the presence of nutrients like nitrogen and phosphorous in the natural environment in excessive and harmful amounts as this condition damages the ecosystems. However, in the analysis of CBD, it appears that 28 per cent of the NBSAPs do not have components related to Aichi Target 8. Instead, policy frameworks and strategies are more focused on the issue of waste management.


Photo by Antonio Rojas Jr.

But even with national legislation, policies, and actions, widespread pollution and waste generation continue to negate the economic gains that the region has been achieving. All forms of ecosystems—terrestrial, inland aquatic, coastal, and marine—remain severely threatened primarily due to human activities. This is compounded by the wide-scale impacts of the climate crisis. Unsustainable land-use, agriculture production, and consumption patterns have been causing excessive nutrient runoff from built-up areas to the land, seas, and atmosphere which are harmful to species diversity, the peoples, and the environment. The indiscriminate dumping of all types of waste, domestically and globally, has damaged ecosystems that support development activities and all living species.

It is therefore imperative to have a full and holistic grasp of the different nutrient processes and the broad dynamics that come into play in the natural environments and how they impact the economy, ecology, and biodiversity of AMS. Transboundary issues like solid waste management, marine debris, and haze evidently have serious regional and global ramifications. As such, the ASEAN's call for international cooperation needs to be concretised and operationalised, across all levels of leadership, industries, sectors, and down to the individual citizens.

The COVID-19 pandemic has presented a clear correlation between biodiversity and public health. The pandemic has likewise highlighted the negative impacts of pollution and waste management to the environment. There has been observed increase in medical wastes (e.g., disinfectants, masks, gloves, etc.) and their disposal has been, to a large extent, imprudent; lockdowns restricted waste processing facilities from fully operating; and municipal wastes have increased in volume from plastics used in products and food deliveries. These underscore the importance of positioning the issue of pollution and waste management in the priority agenda of economic and development plans across all levels of governance.

Ways Forward

- Revisit and evaluate agricultural production systems to ascertain the appropriate and sustainable production approaches with the least harm to the environment.

- Focus communication, education, and public awareness (CEPA) activities in reshaping paradigm and values and consumption patterns that target minimum pollution and proper waste management (e.g. recycling, segregating at source, use of compostable materials, etc.) across the region.

- Promote approaches and schemes (e.g. circular economy, polluter pays principle, Extended Producer Responsibility) that could bring about more effective solid waste management at source, across the production process, and up to the level of the consuming public.

- Strengthen stakeholder involvement in pollution control and waste management systems especially the private sectors as they have the necessary capability, technology, and resources.

- Operationalise existing regional and international institutions and agreements on transboundary environmental issues such as marine debris, illegal movement, disposal of hazardous substances and wastes, and haze.

- Intensify national and regional cooperation, heighten collective action, and encourage resource sharing in dealing with transboundary pollution and waste issues (e.g., AMPDCEI and the EAS Summit Countries).

- Address the multiple risks of pollution and threats to the marine ecosystem and coastal environment particularly in ecologically-sensitive areas.

- Adopt good management practices and strengthen policies to address the impacts of development projects on coastal and international waters.

- Promote regional and national cooperation for the protection, restoration, and sustainable use of the coastal and marine environment.

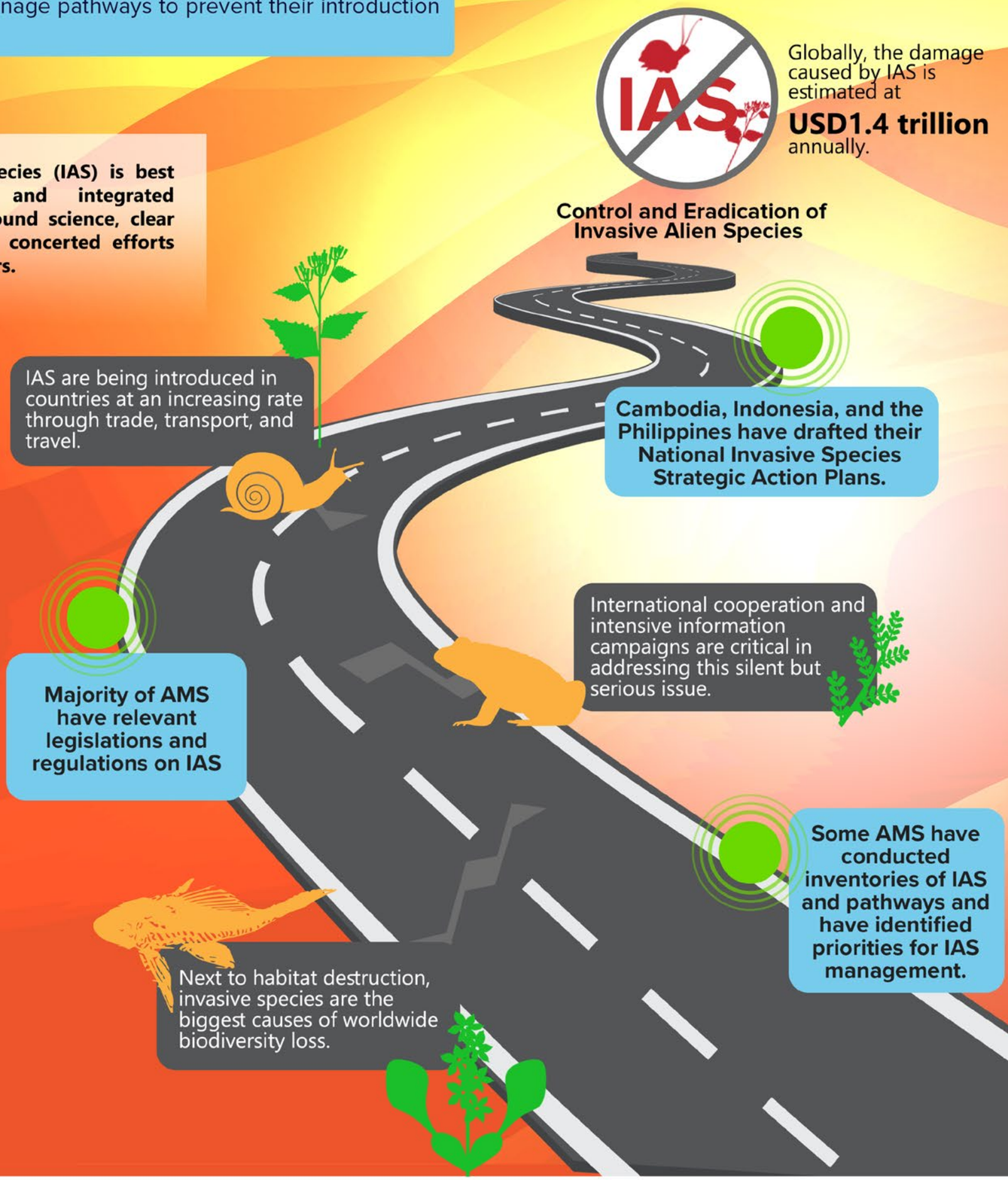

Photo by Achier Chung

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.

The problem of invasive alien species (IAS) is best tackled through harmonised and integrated approaches that are backed by sound science, clear policy and legal frameworks, and concerted efforts from concerned agencies and sectors.

Challenges

- Inadequate effort to tackle the problem of IAS in the region
- Lack of policy and awareness and limited capacity on IAS management
- Climate change promotes species migration
- Conversion of ecosystems
- Invasive species outcompete native species for space and food
- Insufficient information on aquatic IAS pathways and impacts
- Low accession to IAS-related international agreements
- More efforts are needed for the inventory of IAS



Globally, the damage caused by IAS is estimated at **USD1.4 trillion** annually.

Ways Forward

- Establish a regional programme to collectively address priority IAS issues
- Regularly and consistently update information on IAS, their pathways of introduction, and impacts
- Conduct IAS taxonomic work through a network of experts and enhanced platform for information exchange
- Enforce and implement strategies, action plans, legislations, and regulations related to IAS management, eradication, or control that are already in place in the AMS
- Strengthen cross sector and transboundary collaboration on enforcement

Photo by Arvin C. Diesmos

Aichi Biodiversity Target 9: Invasive alien species prevented and controlled
By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

AMS have made good progress in the inventory of invasive alien species (IAS) and their pathways and in selecting priorities for managing IAS, albeit more focused on terrestrial species.

Effective management of IAS and their pathways depends heavily on relevant national strategies that are reinforced by laws. Most AMS have laws and regulations to prevent the introduction of and to manage IAS. The NBSAPs of AMS articulate targets aimed at preventing, eradicating, and controlling IAS, and have aligned these targets to Aichi Target 9.

In addition to local laws, international agreements that support the prevention and control of IAS provide guidance to AMS. Two such agreements are the International Convention for the Control and Management of Ships' Ballast Water and Sediments through the International Maritime Organisation (IMO) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Some AMS maintain a national list or database, while others utilise other databases such as the Global Invasive Species Database. To manage risks from IAS, Thailand revised its database of alien species with the help of Mahidol University and Rama 9 Public Park. The Philippines endorsed for approval a draft list of IAS in the country while Singapore aimed to compile a list of potential IAS in 2020.

Several AMS, namely: Malaysia, Indonesia, Cambodia, and Thailand, produced information materials on IAS such as books and booklets. Through its College of Fisheries, Indonesia created *AIS Indonesia*, an app used to identify alien and invasive fish species. Indonesia and Cambodia mapped the occurrence of IAS in their respective territories.

Importance of the target and its relation to development goals

An analysis of the CBD Strategic Plan 2011–2020 and discussions of resulting recommendations for a post-2020 CBD framework conducted by Marques, et al. explored the interactions of the Aichi Targets. The assessment pointed to a strong interaction between Aichi Target 9 and Aichi Targets 10, 12, and 14 to highlight how gains towards accomplishing these targets impact the others.[1]

GBO 5 noted that SDG 15, which covers the sustainable use of terrestrial ecosystems, is a related target to Aichi Target 9. In an analysis of the CBD Strategic Plan 2011–2020 and the first discussions of resulting recommendations for a post-2020 CBD framework, it was pointed out that since IAS also occur in marine habitats, their control or eradication would also foster the implementation of SDG 14.[2]

IAS impact is far more costly than the food sufficiency and sustainability impact that have seemingly been giving impetus to efforts to control IAS. According to the *Global Invasive Species Programme*, aside from being a threat to biodiversity and ecosystem services, IAS cause costly land degradation, block transport routes, contribute to the spread of disease, and reduce the effectiveness of development investments, i.e., cause the choking of irrigation canals.[3]

Similarly, the IUCN pointed out that IAS impacts go beyond biodiversity losses and seriously affect economic activities, livelihoods, food security, and human health and well-being. It also risks undermining the progress towards achieving 10 of the 17 UN SDGs.

The Millennium Ecosystem Assessment report *Ecosystem and Human Well-being Biodiversity Synthesis* (2005) identified IAS, among others, as one of the most direct drivers of biodiversity loss and change in ecosystem services. IAS have been a significant cause of extinction, especially on islands and in freshwater habitats.[4]

The IPBES began a comprehensive thematic assessment of IAS in 2019, covering the extent of the threat they pose, major pathways and drivers, and the global status and trends in their impacts. It looked into people's awareness of the extent of IAS and their impacts and the effectiveness of control measures and associated policy options. The assessment results are to be reviewed in 2022.[5]

IPBES had earlier said that annual economic losses attributed to IAS are not well studied but are likely substantial. In Southeast Asia, it was estimated to be at USD 33.5 billion. There is evidence that IAS are increasing in number due to the increasing volume of international trade, transportation improvement, and cross-border migration.[6]


Photo by Leonardo E. Eduvije Jr.

Table 9 shows the IAS that were reported by AMS to have been causing ecological and economic damage and losses in their respective countries. Some of these IAS are common across AMS.

Table 9. Common IAS that occur across AMS

IAS	AMS	Impacts
Eichhornia crassipes Common water hyacinth	Brunei Darussalam, Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam	The common water hyacinth has beautiful, large purple and violet flowers. This makes it a popular ornamental plant for ponds. It is now found in more than 50 countries on five continents. It is a fast-growing plant, with populations known to double in as little as 12 days. Infestations of this weed block waterways, limiting boat traffic, swimming, and fishing. It also prevents sunlight and oxygen from reaching the water column and submerged plants. Its shading and crowding of native aquatic plants dramatically reduce biological diversity in aquatic ecosystems.
Pomacea insularum Apple snail	Cambodia, Malaysia, and the Philippines	Apple snails have rounded whorls at the top, with deeply indented sutures. Originally from South American countries, they are now widespread in Southeast Asia, where they live in swamps, ditches, ponds, lakes, and rivers. They are now a major pest hindering the promotion and adoption of direct-seeded rice. This snail is blamed for displacing the native edible snail, *Pila conica*, in Luzon. Chemical control using imported molluscicides was estimated to be valued at USD 23 million in 1998. It is a vector of rat lungworm parasite that affects humans.[7]
Acacia nilotica	Indonesia	Commonly called prickly acacia, this is a woody plant that grows up to 12–15 metres. It has one main trunk with a broad round-shaped canopy, dark brown bark with a rough surface, and 10-cm long silver thorns that stick out in pairs. It is native to the Indian subcontinent, the Middle East, and Myanmar. The tree has invaded Indonesia, especially the Baluran National Park. It stands in the way of grass, decreases forage production for herbivores, and stimulates broadleaf bush vegetation. It has caused mortality in native Indonesian plants and animals such as bulls and wild water buffalo in Baluran National Park.[8]
Brontispa longissima Coconut leaf beetle	Cambodia, Lao PDR, Myanmar, Philippines, Singapore, Thailand, and Viet Nam	The coconut leaf beetle is native to Aru Island, Maluku, Indonesia, and Papua New Guinea. Coconut is its most favoured host. It is a leaf beetle that feeds on young leaves and damages seedlings and mature coconut palms. It has inflicted damages that are significantly affected farmers in Cambodia and the Philippines. Phytosanitary measures, pest outbreak intervention using insecticides, and other measures to control and reduce the pest's spread have proven to be inefficient and uneconomic.[9]
Mimosa pigra Giant sensitive tree	Brunei Darussalam, Cambodia, and Viet Nam	*Mimosa pigra* is a thorny shrub originally from the Amazon. It can survive fire, flood, and droughts, conditions that became particularly prevalent between 2011 and 2015. It is now widespread in Asia, America, and Oceania. *Mimosa pigra* has the ability to dominate a site forming impenetrable, monospecific shrub stands of up to 6-metre tall. It can have negative implications in plantations and orchards competing with the cultivation of young palm trees, thus reducing the production of palm oil. In Thailand, *Mimosa pigra* also negatively affects rice cultivation by blocking irrigation inlets and threatening the sustainability of water supply by colonising the edges of the water bodies.
Salvinia molesta Kariba weed	Indonesia, the Philippines	*Salvinia molesta* is a floating aquatic fern that thrives in slow-moving, nutrient-rich, warm freshwater. It is native to Brazil. It has been spread throughout the world in the past 50 years and it can be found in Africa, the Indian subcontinent, Southeast Asia, Australia, New Zealand, the southern USA, and some Pacific islands. The invasion of *Salvinia molesta* can change wetland ecosystems and cause loss of wetland habitat. It also poses a serious threat to socio-economic activities that depend on open, flowing and/or high-quality water bodies, including hydroelectric power, fishermen transportation, and ships. In implementing IAS control, eradication process is best carried out in a participatory manner involving the community. For example, the Bromo Tengger Semeru National Park (TNBTS) Management and the people of Ranupani Village cleared a lake from *Salvinia molesta* and were able to restore about 65 per cent of the lake surface.[10]

IAS	AMS	Impacts
Lantana camara Lantana	Cambodia, Indonesia, and the Philippines,	*Lantana camara* is an aromatic evergreen shrub that contains toxic triterpenes which cause hepatic degeneration in cattle. Its leaves are ovate and opposite along the square stem. Its stems and leaves emit an unpleasant "spicy" smell when crushed. It is native to Central and South America but is now a major weed in the Palaeotropics where it invades natural and agricultural ecosystems. It can grow individually in clumps or as dense thickets, crowding out more desirable species. In disturbed native forests, it can become the dominant understorey species, disrupting succession and decreasing biodiversity. In Indonesia, some of the biological invasion effects on the ecosystem were observed at Pangandaran Nature Reserve, where the invasive *Lantana camara* appears to replace the native grassland, alter fire regimes and greatly reduce the productivity of economically important plants such as oil palm, coconut, and coffee. Similar to other invasive species with allelopathic qualities, lantana can invade plantations and reduce the vigour of the crops nearby.[11]
Rhinella marina Cane toad, *baki*, *kamprag*, or bullfrog	Philippines	Cane toads are native to South America, Central America, Mexico, and extreme southern Texas. They have grey olive-brown dorsal skin with many warts ending in dark brown caps. They were originally introduced as biological control of dengue mosquito (*Aedes aegypti*). Overall, the major impacts are on predatory species that attempt to eat toads and then die; in particular, species that preferentially feed on amphibians. And while touted as natural mosquito predators, they really do not consume significantly enough to control mosquito populations. In rice fields, they consume significantly more beneficial insects than pests andtheir tadpoles largely eat plant material and rarely prey on insect larvae.[12]

Assessment of Progress in Achieving Target 9

Information on AMS accomplishments were consolidated according to the four elements used in GBO 4, namely, invasive alien species identified and prioritised; pathways identified and prioritised; priority species controlled or eradicated; and introduction and establishment of IAS prevented.

Invasive alien species identified and prioritised

Most of the AMS have made considerable accomplishments in identifying IAS that have entered their territory. Viet Nam issued a circular regulating the criteria for determining and promulgating the list of IAS. It updated its list of IAS and potential IAS in 2018. Moreover, it trained quarantine officers to manage 47 quarantine stations and customs officers posted at 18 international border gates. It also approved a programme for awareness-raising on the prevention and control of IAS to guide localities in developing and implementing communication activities.

The National Parks Board of Singapore keeps an updated list of the IAS found in

Box 29. When an IAS becomes a source of livelihood[13]

Tons of common water hyacinth (*Eichhornia crassipes*) are used as raw materials for baskets. For example, on August 2013, about 250 dump trucks of water lilies that had been clogging a river in Pangasinan, Philippines were pulled using heavy equipment. The water hyacinth were used as raw materials for a basket-making livelihood project of the local government.

Photo by Ruben Mojares

the island-state. A multi-agency body with representatives from agencies responsible for customs, food safety, biodiversity conservation, water, and animal and veterinary services work together to licence and monitor the entry and exit of live animals to prevent the movement of IAS.

There is high accession to IAS-related international agreements. Most of the AMS acceded to the BWM under the International Maritime Organisation (IMO). This is important for a unified position in the region, with AMS acceding to IAS-related agreements.

Indonesia noted alien species potentially becoming invasive in new habitats such as those that are recorded to be in its national parks. However, it took note of alien plant species that are important plantation crops such as rubber, palm oil, coffee, and cacao; agriculture such as rice, corn, and vegetables; and decorative plants such as those that belong to the *Compositae* and *Acanthaceae* families.

Publications and databases documented the IAS with Indonesia having two books; Myanmar and Thailand, a booklet and handbook, respectively; Malaysia a book and posters; and Lao PDR and Thailand, databases on IAS.

Cambodia, Indonesia, and the Philippines released IAS strategy and action plans in 2016 to serve as roadmaps in preventing the introduction and spread of invasive species and in reducing their impacts on biodiversity. In the Philippines, it covers policy and institutional support, leadership and coordination, research and information management, education and public awareness, training and capacity building, and international cooperation.

Box 30. Native species and IAS

A study conducted in the rice fields of Laguna, Philippines found that invasive alien species such as the cane toad (*Rhinella marina*) indirectly damage rice crops by preying on beneficial arthropod predators while native species like the smaller-bodied Luzon wart frog (*Fejevarya vittigera*) consumes insect pests of rice. These results suggest an added benefit of native biodiversity and the detrimental effect of IAS on agriculture.

Box 31. Participation of stakeholders and local communities in controlling and eradicating IAS

Many of the AMS have enlisted or are planning to enlist local communities and other entities in helping control and eradicate IAS.

Thailand aims to disseminate knowledge on IAS and build the capacity of related government agencies, local governments and people to participate actively and efficiently, being an active "surveillance" agent in controlling and eliminating IAS.

Management of IAS in Thailand also has the support of the education sector on information gathering and inventory and the private sector in promoting the use of native species (instead of introduced species) for habitat rehabilitation.

Malaysia conducts continuous public engagement including information dissemination activities, as well as collaborates with local communities (Koperasi Pelacongan Mukim Batu Puteh Kinabatangan) to eradicate *Salvinia molesta*, a weed which has infested oxbow lakes in the Kinabatangan region.

Operation No Release in Singapore is a government- led outreach campaign against the release of animals into the wild as these animals will not be able to survive and in the case of some species, become invasive. The campaign has enlisted the support of numerous volunteer groups who conduct the outreach.

The Department of Plant Science of the Faculty of Science, Mahidol University in Thailand, with Rama 9 Public Park, revised the 3,500 list of plants imported into Thailand in order to manage risks from invasive alien species. The Marine Department of Malaysia is undertaking a national baseline survey and risk assessment of ships coming into Malaysian ports, and to establish ballast water exchange in cooperation with local scientists from the university.

Cambodia's *Environment and Natural Resources Code* (2017 Draft 9.1) calls for (i) the creation and maintenance of a *National List of Invasive Species* that would be regularly reviewed by the Biodiversity Technical Working Group of the ministry or institution responsible for sustainable development; and (ii) the development of *Invasive Species Management Plan* that shall seek to eradicate and/or minimise the impacts of invasive species on the environment, economy, and human health.

Malaysia, on the other hand, issued a National Policy on Biological Diversity 2016–2025 that aims for IAS and pathways to be identified, priority species controlled, and measures put in place to prevent their introduction and establishment.

Some AMS do not have databases and use international data such as are available in the Global Invasive Species Database for information on IAS in their respective territory. Thailand is ahead in terms of a database for IAS with Mahidol University and Rama 9 Public Park revising the 3,500 lists of plants imported into the country with the aim of managing risks from invasive alien species. Thailand also maps the location of IAS across the country and has approved measures in 2018 to include more specific information on alien species in its register.

Box 32. Quarantine and Risk Assessment

Malaysia is on track to develop a risk assessment framework for IAS. Response on IAS predominantly follows the prevention, detection and monitoring, containment, and eradication hierarchy. Risk assessments used to be carried out with the focus on IAS which cause disease to agricultural crops and humans, leaving out the biodiversity aspect. 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 IRA evaluation.

Myanmar research on identification of invasive species and the quantification of the impacts of invasive species is scarce. Department of Agriculture, Plant Biotechnology Center (Yangon) regularly examines crop seeds from companies (both exports and imports) for presence/ absence of GMOs and issues certificates of safety. In accordance with seed law, imported crops to be registered in Myanmar for cultivation require GMO testing and a non-GMO certificate issued as of 2014–2015.

Photo by Jeremy Angeles Sandel

Identification and Prioritisation of Pathways

There is a lack of information on the identification and prioritisation of pathways according to the framework recommended by the CBD to assess and prioritise the risk posed by pathways of IAS introduction.

Some species that were identified as causing severe potential impacts if released into the wild in Viet Nam were recorded to have been imported by seafood import-export companies for raising in a breeding centre.

Cambodia points to trade, transport, and travel routes as the means of entry of IAS in the country. Studies are yet to be carried out to assess the extent of these species' spread and impact.

The National Parks Board of Singapore in its website identified ballast releases from ships as possible IAS pathway.

Other possible pathways for introduction include aquaculture development, horticulture, aquarium, and ornamental fish trades, mariculture, and agriculture.

The 6NR reports on pathways are anecdotal and not supported by empirical evidence. There is insufficient information on aquatic IAS pathways and impacts. A prioritisation would be difficult to draw up from this dearth of information on how IAS enter territories.

AMS would benefit from undertaking a systematic approach to identify and prioritise IAS pathways.

Control and eradication of IAS

At least half of all AMS have acknowledged the urgency to address threats brought about by IAS in the ASEAN region. Among the initiatives reported in the 6NRs are organising awareness and outreach programmes, developing information sources and platforms, preparing guidelines and policies, and implementing some local actions directed at eradication.

Legal framework and action plans provide the basis for steps to control and eradicate IAS especially since implementation in some AMS is done with the community participating in it.

Beyond the approval of an awareness programme on the prevention and control of IAS in Viet Nam, the government issued a decree, imposing administrative sanctions for violations of the control of IAS.

Box 33. Boon or Bane?

Alien plant species become invasive in their new habitat. Examples of these in the Indonesian experience are *Barlettina sordida* in Gede Pangrango National Park, *Ruellia tuberosa* in Bali Barat NP, *Acacia nilotica* in Baluran NP, and *Maesopsis eminnii* in Bodogol, Gunung Halimun NP.

However, several alien plant species are used as important commodity for plantation (rubber, oil palm, coffee, cacao), agricullture (rice, corn, and vegetables), and decorative plants (*Compositae, Acanthaceae*).

In the Philippines invasive alien species such as the Nile tilapia (*Oreochromis niloticus*) is believed to have displaced the native species mullet/banak (*Liza froscheli*) in Naujan Lake National Park. The inland wetland areas of Mt. Isarog have also been invaded by tilapia and hito, displacing endemic species such as talusog and kauli, causing a decline in their annual catch.

Photo by Evarina

Thailand also recognises the need to impose stringent rules at the points of entry of IAS by implementing new guidelines for species that are brought in, especially those that are backed up by claims for economic purposes.

With its national target to compile a list of potentially invasive species, Singapore will be able to direct resources to manage these species. Singapore manages non-native species through weeding. It is also conducting outreach campaigns such as Operation No Release.

In the Philippines, the experimental control of *P. aduncum* was piloted in a watershed forest reserve with results showing that low concentration chemicals were more effective in eradicating the invasive plant species.

Six protected areas in the Philippines were identified as pilot sites for the prevention, control, and management of IAS. A survey conducted for IAS yielded 39 invasive species inside and around these protected areas. These invasive species outcompete native species for space and food.

A major challenge in implementing the project was that members of local communities continued to plant and culture IAS such as mahogany and tilapia because of their economic importance.

During a regional consultation, it was found that individuals working in the environment sector are aware of their impacts, but members of the local communities are not.

The AMS have involved people on the ground to help in the control and eradication of IAS through increased awareness of the harm that alien species could bring.

Indonesia and Viet Nam are mapping the distribution of IAS for better guidance in their control and eradication.

Clearly, participation, a whole-of-government, and also, a global cooperation approach are needed to control and eradicate IAS. There needs to be policy and institutional support, leadership and coordination, research and information management, education and public awareness, and training and capacity building in AMS. Beyond its borders, individual AMS need to strengthen international cooperation in controlling the spread of IAS.

Climate change is going to magnify and be a driver of the IAS problem. Its greatest impacts on invasive species may arise from the disturbance in ecosystems that cause them to be vulnerable to invasions. It will create exceptional opportunities for IAS to be dispersed and to grow.[14]


Photo by Arvin C. Diesmos

Photo by Ramarie Ann Rama

Challenges

Data on the number, pathways, and impacts of IAS in the region have to be augmented and made available to provide references for analyses and for developing strategies against further incidents of introduction. A few AMS reported examples of successful measures of management of IAS in their 6NRs. Some have measures in place to control and eradicate IAS such as a combination of chemical and mechanical means.

Membership in IAS-related international agreements would translate to each AMS's increased level of national commitment to relevant international policies in controlling the spread of IAS.

It is important to note that only one AMS is a signatory to the Convention on Migratory Species, and only 4 out of 10 have signed up to the International Convention for the Control and Management of Ships' Ballast Water and Sediments to date. It is also important to highlight that more efforts are needed for the inventory of aquatic IAS. Insufficient information on aquatic IAS pathways and impacts would make controlling them even more difficult.

Based on the national reports, one of the foremost challenges encountered by the AMS is enhancing appreciation of indicators, benchmarks, and trends that may be used in setting annual targets and determining milestones.

- By 2014, potential pathways for invasive alien species are identified using a risk assessment framework, and lists of the most harmful invasive species are developed
- By 2014, action plans are developed and relevant legislation is reviewed;
- By 2016, actions have been taken to address the most important introduction pathways and the most serious invasions;
- By 2020, the measures which have been put in place have been assessed to determine their impact.

This reflects inadequate effort to tackle the problem of IAS in the region. As an offshoot, policy and awareness, as well as capacity in IAS management, is severely hampered.

Using the definition in the technical rationale as well as sample milestones will provide directions in attaining the Target. The technical rationale also provides suggestions on how prioritisation of IAS and pathways, as well as control and eradication, may be done. It suggests references from organisations that have been working on IAS.

Ways Forward

The impacts of IAS go beyond the loss of biodiversity. IAS also seriously affect economic activities, livelihoods, food security, and human health and well-being. IAS are known to disrupt ecosystems, cause land degradation, and sickness and disease, among others.

Knowing how much IAS have affected ecology and biodiversity requires an all-of-government approach that is based on a solid foundation of science. AMS will benefit from enlisting the help of their public universities to establish baseline information and conduct scientific research in IAS. This should include regular and consistently updated information on IAS, taxonomy, and how IAS are affecting the other species, their pathways of introduction, and inputs.

The strategic management of IAS will need a network of experts on taxonomy and ecology and an enhanced platform for information exchange. The sector that can provide this is academe. The government bureaucracy that takes responsibility for work in this area and academe should collaborate in the work to manage invasive alien species.[11]

The strategies, action plans, and legislation and regulations related to IAS management, eradication, or control that are already in place in AMS need to be enforced and pragmatically implemented. But managing the entry of IAS goes beyond government-level intervention. It requires cooperation among AMS to prevent trafficking of animal and plant species. A regional programme to collectively address priority IAS issues should be established will bode well for the protection, especially of resources that are common to them. AMS should strengthen cross sector and transboundary collaboration on enforcement.


Photo by Joshua Calang Paredes

Establishing a regional programme to collectively address priority IAS issues is going to be advantageous to AMS. Cross sector and transboundary collaboration on enforcement should strengthen and boost collective action. As one of the drivers of biodiversity loss in the ASEAN Region, the proliferation of IAS certainly alters biodiversity distribution, especially in an increasingly fragmented landscape, thus the need to monitor and regulate their entry into the respective territories.

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.

Recent assessments indicate that only 4% of the ASEAN region's coastal and marine area has been put under some form of conservation. This progress is miniscule considering that 88% of the region's coral reefs are at risk, with half at "high" or "very high" level of threat.

Challenges

- Lack of data and information
- Overfishing and IUU fishing
- Destructive fishing practices
- Coral harvesting and exporting
- Increasing human settlement in coastal areas
- Pollution and solid waste and sewage pollution
- Excessive agricultural inputs, sedimentation and agricultural runoff
- Unsustainable coastal interventions
- Dredging, land-filling, mining of sand and coral
- Poaching
- Overexploitation of threatened species

Ways Forward

- Improve fisheries-related policies and their implementation
- Integrate costs of maintaining coastal and marine ecosystems in resource management
- Establish proper incentives and penalty systems
- Reduce land-based sources of pollution and sedimentation
- Implement more engaging awareness-raising campaigns
- Adopt good management practices and strengthen them to address the impacts of development projects on coastal and international waters
- Scale up the conservation and protection of the remaining coral reefs, seagrasses, and mangroves
- Increase the coverage and effectiveness of MPAs and MPA networks
- Promote cooperation for the conservation, restoration, and sustainable use of coastal and marine environment

Photo by Achier Chung

Aichi Biodiversity Target 10: Ecosystems vulnerable to climate change
By 2015, the multiple anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised so as to maintain their integrity and functioning.

Southeast Asia is endowed with a very rich marine biodiversity. The region contains nearly 100,000 square kilometres of coral reefs, or almost 34 per cent of the world's total. It is the global centre of biodiversity for coral reef fish, mollusks, and crustaceans and is home to 51 of the world's 70 mangrove species and 23 of the 50 seagrass species.[1] Mangroves in the region occupy over 61,000 square kilometres, 62 per cent of which are found in Indonesia.

However, this biodiversity-rich region is under threat. According to a coral ecologist from Curtin University in Australia, over the past 40 years, nearly all of Southeast Asia's marine coastal ecosystems have experienced intense pressures due to large-scale economic development, urbanisation, and deforestation.[2]

Pollutants, toxic substances, microplastics, and pathogens from sewage and garbage that go untreated into the ocean aggravate the situation, but the lack of data and information on this threat makes it difficult for AMS to address.

Recent assessments indicate that only four (4) per cent of the ASEAN region's coastal and marine area has been put under some form of conservation. More work must be done considering that 88 per cent of the region's coral reefs is at risk. To date, only 22 per cent of the 82 marine key biodiversity areas (KBAs) identified in the region has been placed under marine protected area (MPA) status.

AMS have pursued collective land- and marine-based initiatives to reduce anthropogenic pressure on the environment. Collectively and individually, most of these initiatives are considered process indicators—the number of plans, programmes, and strategies related to the protection and management of marine and coastal ecosystems—as described in the technical rationale of Aichi Target 10 by COP/CBD.[3]

The Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI), a collective action involving Indonesia, Malaysia, the Philippines, and three other countries outside the ASEAN, covers a region with the highest coral diversity and the highest coral reef fish diversity in the world. CTI, the first multilateral cooperation of its kind, focuses on food security through sustainable management and climate change impacts.

Land-based initiatives such as the Reducing Emissions from Deforestation of Forest Degradation (REDD+) programme that aims to reduce greenhouse gas (GHG) emissions are also relevant to Aichi Target 10, as global warming impacts marine ecosystems.

Indonesia recognises marine debris as a threat to marine biodiversity, in addition to coral reef mining, sedimentation and agricultural runoff, destructive fishing practices, and infrastructure development in coastal areas.

In 2017, the Oceanographic Research Center assessed a 2016 coral bleaching event in Indonesia and found that only 6.39 per cent of the total coral reef was in very good condition. The rest were in good condition (23.4 per cent), sufficient (35.06 per cent), and in very bad condition (35.15 per cent).

Understanding the economic value of coral reefs or any ecological resource promotes habitat conservation. AMS must have a comprehensive and science-backed valuation of marine and other resources to communicate their actual worth and to guide their decisions.

The role that marine protected areas (MPAs) play in promoting the health of oceans has been recognised at the highest levels of government and non-government entities. As it has not established new marine parks since 2014 to protect its 1,870 square kilometres of coral reef system, Myanmar granted three local fishing communities long-term management rights of marine areas to protect diverse coral reefs and important fish and crab nursery grounds.

Coral reefs in the Philippines cover a 22,500 square kilometre area, the third largest in the world. This represents nine (9) per cent of the global reef area and is well known for its species-rich coral reefs. Efforts are now underway to update the national assessments of coral reefs that were last conducted in the 1970s. It initiated the Sustainable Coral Reef Visualization and Assessment and the National Assessment of Coral Reef Ecosystems Projects in 2014.

To promote marine biodiversity conservation and fill conservation gaps in the region, AMS need to recognise and support the establishment of places where other effective area-based conservation measures (OECM) are carried out.

This is consistent with the Decision 14/8 of the parties to the CBD welcoming in 2018 the integration of and adoption of "other effective area-based conservation measure" or OECM into the wider land- and seascapes and mainstreaming these into sectors.

OECM refers to geographically defined areas other than a protected area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity, with associated ecosystem functions and services; and where applicable, cultural, spiritual, socio-economic, and other locally relevant values. Decision 14/8 of the parties to the CBD integrated and adopted OECM into the wider land and seascapes and mainstreamed these into sectors in 2018.

Aichi Target 10 is achieved largely through the interaction of the achievement of the various Aichi Targets that work in tandem to attain five overarching goals.[4] This target corresponds to UN SDG 14 or Life Below Water, or the management and protection of marine and coastal ecosystems and addressing the impacts of ocean acidification. The ocean drives global systems that make earth habitable for humankind. Marine biodiversity is critical to the health of people and the planet.


Photo by Danielle Mark M Fukuda


Photo by Alvin Simon

Among the threats to coastal and marine ecosystems are unsustainable aquaculture practices, overfishing, illegal, unreported, and unregulated fishing, and destructive coral harvesting practices. IPBES has projected that if unsustainable fishing practices continue, there would be no exploitable fish stocks by 2048.

Activities on land also impact on marine ecosystems such as pollution and solid waste and sewage pollution, excessive use of agricultural inputs, sedimentation and agricultural runoff dredging, land-filling, mining of sand and coral poaching, and overexploitation of threatened species.

Global marine fishing has become industrial in scale to respond to rising levels of demand. As a result, fish, shellfish, and other marine resources are extracted at unsustainable levels; in some cases causing permanent damage to the marine ecosystems. Exacerbating this is the continuing degradation of the environment brought about by global warming.

Climate change, extreme climatic events, ocean warming, and ocean acidification will cause further destruction of marine ecosystems and failure of ecosystem functions. Thus, if global warming is kept at 1.5°C as recommended by the IPCC in the Report on Global Warming, this can be averted.[5]

The IPBES report highlights the importance of protected areas in biodiversity conservation in threatened areas. Although protected area coverage in the Asia-Pacific region has increased substantially, they still do not effectively target areas of important biodiversity, and progress in terms of better overall management effectiveness remains to be seen. Between 2014 and 2017, the region registered a growth in protected area coverage of 0.3 per cent in terrestrial protected areas and 13.8 per cent in MPAs.

Not only should their numbers and area increase, MPAs need to be effectively managed and well-resourced with regulations in place to reduce overfishing, marine pollution, and ocean acidification.[6]

Collective action is necessary especially where AMS share a common resource such as the sea. An example is the Coral Triangle, which houses biodiversity-rich but threatened terrestrial, marine, and wetland ecosystems. The Coral Triangle is a transnational resource shared by Indonesia, Malaysia, and the Philippines, as well as three non-AMS countries: Timor-Leste, Papua New Guinea, and Solomon Islands. As IPBES pointed out, action or inaction in any of these countries can generate positive or negative effects in neighbouring countries.

Assessment of progress by AMS in achieving the target

The progress of AMS in meeting their Aichi Target 10 commitments is evaluated based on the following: marine trophic index, incidence of human-induced ecosystem failure, health and well-being of communities that depend on local ecosystem goods and services,

trends in coral bleaching, and ecological footprints and related concepts.

Marine trophic index

AMS have recorded observations of decline in marine biodiversity. For instance, Myanmar documented the absence of large pelagic species including sharks and rays, which certain areas in the country were known for until quite recently. This could be reflective of the preference of fisheries for large predatory fish for consumption, which results in the depletion of fishes at the top of the food chain.[8]

The fishery is then left with the lesser preferred and smaller fishes and invertebrates. Continuous fishing that targets fishes at decreasing trophic levels is referred to as fishing down the foodweb. The mean trophic level of fisheries catch, renamed in 2000 as "Marine Trophic Index" (MTI) is an indicator of ecosystem health that reflects fishing down.[9]

Incidence of human-induced ecosystem failure

AMS can curb the loss of marine biodiversity by acting quickly to eliminate unsustainable fishing practices, protect a greater portion of the seas under their jurisdiction, and adopt a new treaty to protect the high seas.[9] Recovery from damage caused by climate change and overfishing presupposes that other countries will scale down on their carbon emissions and fishing effort. While the AMS have committed to this, they are not the sources of significant GHG emission, and in fact, could suffer bigger losses than most regions in the world.

Coral reefs will be among those habitats that will undergo more extreme warming events with less recovery time in between events, causing bleaching episodes with high levels of mortality.[10]

Marine debris is reported to impact on the health of marine waters, and in varying ways on coral reefs in Indonesia, ultimately resulting in coral bleaching and over-growth. For biota other than coral, this will directly affect digestive tracts, hormone stability, fertility, and nerve disorders in the brain. Other main causes of damage are coral reef mining, sedimentation, and inappropriate fishing methods, that is, use of dynamite, toxic cyanide, *muro-ami* fishing techniques, and use of destructive fishing nets.

Conversion into settlements, roads, ports and other infrastructure development also damage mangrove forests.

Health and well-being of communities that depend on local ecosystem goods and services

Cambodia estimates the value of its coral reefs around the Koh Rong and Koh Rong Samloen area to be between USD 117–500 million per year given that the reefs are intact, have a well-maintained structure, functioning; and overall, are in good health. A hectare of such a coral reef, according to the Economics of Ecosystems and Biodiversity estimate, is between USD 130,000 and USD 1.2 million. Further, a first comprehensive baseline assessment of seagrasses in Koh Rong in 2014 found an estimated 0.18 square kilometres habitat of four species of seagrass.

A depleted and damaged coral reef system will be catastrophic to the over 120 million people who live in the Coral Triangle and rely on the coral reefs for food, income, and protection from storms.[11]

Documentation of such ecosystem services will establish the value of the resource at all levels of a supply chain, and how its losses would impact the industries and businesses that depend on it.

Box 34. Understanding the marine trophic index

MTI is the mean trophic level of fisheries catches. Countries with higher MTI have fish catches consisting of taxa from higher trophic level, while lower scores consist of taxa further down the food web. If MTI decreases over time, this may be due to a country's depleting stocks of higher level fish and resorting to lower level taxa. (FishingDown.org)


Photo by Lene and Topp Claus

Coral bleaching in Southeast Asia

AMS noted increased incidence and widespread coral bleaching in their respective areas in the past years.

Mass-bleaching events were reported in Thailand and Viet Nam in 2010. In the Gulf of Thailand, there was high prevalence of bleached coral colonies in May and October 2010 affecting 90–100 per cent coral colonies in all species.

Viet Nam observed that coral reef ecosystems in its coastal waters are most vulnerable to climate change. It traced its 2010 coral bleaching events to rising sea temperatures. At sea temperatures above 29°C for an extended period of time, corals lose symbionts, leading to bleaching and death.

In 2017, the Oceanographic Research Center studied the coral reefs in 1,064 observation stations at 108 locations in Indonesia. The study found that only 6.39 per cent of the total coral reef was in very good condition. The rest were in good (23.4 per cent), sufficient (35.06 per cent) and in very bad condition (35 per cent).

In the Philippines, the Coral Reefs Project assessed live hard coral cover from 2015 to 2017 in six biogeographic regions in 166 stations in Luzon (108), Visayas (31), and Mindanao (27). None of the 166 showed live coral covers that were excellent. More than 90 per cent were in the poor (0–25 per cent) and fair (25–50 per cent) categories.

Key coral reef areas in Myanmar reported a decline by over 56 per cent in recent decades due to mass coral bleaching, among other reasons.

Annual surveys have been done of the coral reefs in Malaysia since 2007. Its average live coral cover of 40.63 per cent across 180 sites as of 2019 is still considered high. However, researchers have observed a continuous declining trend in the coral cover and observed low numbers of high-value fish and shellfish species. Malaysia drew up *A Coral Bleaching Response Plan* to guide response to this mass coral bleaching event.

Marine Conservation Cambodia conducted the KohRong Samloen and Koh Kon Marine Environmental Assessment for the Fisheries Administration (FiA): Department of Conservation in May 2011. It found that most of the damage in their coral reefs was caused by abandoned fish nets and trash (46 and 25 per cent, respectively). Coral damage was also caused by anchors and dynamite (13 per cent and 11 per cent, respectively). The general degree of bleached parts within coral colonies was on average nine (9) per cent.

Ecological footprint and related concepts

Ecological footprint gauges human dependence on natural resources. It calculates how much of the environment is needed to sustain a particular lifestyle.

Ecological footprint is measured in global hectares (gha) or the amount of biologically productive land with productivity equal to the world average.[12] An area is considered unsustainable if a land's ecological footprint is greater than its biocapacity or if its demand of nature is greater than its supply.

A report by the Asian Development Bank (ADB) showed that six (6) AMS are biocapacity debtors, meaning their ecological


Photo by Achier Chung

footprint is greater than their biocapacity.[13] The biocapacity data in this report covers terrestrial and marine resources.

Country Programmes

Data gathered by academe, government, and non-government agencies on the reef's ecosystems, status, trends, and projections and involving multi-sectoral stakeholders allowed decision-makers to design Koh Rong Marine National Park using spatial prioritisation and the ridge-to-reef approach.

Cambodia established the Koh Rong Marine National Park with the different zones provided for in the Protected Area Law, and implemented the Strategic Planning Framework for Fisheries 2010–2019. It had among its objectives for 8.4 square kilometres of coral reef to be under an appropriate form of sustainable management and 10 square kilometres of flooded forest and mangrove to be replanted.

Cambodia is gathering data that will determine the rate of loss of coral reefs and of efforts needed to halve the loss. Moreover, it enforced laws (e.g., the 2008 Protected Area Law) and the Environment and Natural Resources Code to ensure that anthropogenic pressures impacting coral reefs are controlled and their impacts reduced.

It also established the multiple-use MPA, Marine Fisheries Management Area. Cambodia used the zoning method that not only took into account the multiple uses of coral reef products but also their value and full advantage of biodiversity around the islands.

Its Climate Change Strategic Plan (2014–2023) aims to ensure climate resilience of critical ecosystems such as Tonle Sap Lake, Mekong River, coastal ecosystems, highlands, biodiversity, protected areas, and cultural heritage sites.

Indonesia carried out efforts to control pollution in the marine and fisheries sector. It implemented rules and regulations that require feasibility certificates for fish processing units to ensure proper waste handling and monitoring of water pollution. It implemented programmes and drew up plans on awareness and support for community coastal waste management, mapping and monitoring biotoxin and heavy metal pollution, and prepared the national action plan for marine debris as well as the *Indonesian Coral Bleaching Response Plan*.

Studies in Indonesia on climate change adaptation and mitigation have doubled in number compared to that in 2015–2018. These are on topics such as habitat rehabilitation, adaptive capacity, impact on reef ecosystems and seaweed growing seasons, as well as reviewing losses and damage to the coastal and marine ecosystems. It also implemented climate change mitigation efforts, drew up policies and tools including those related to First Nationally Determined Contributions on transition to a low carbon and climate- resilient future, REDD+, National Registry System for Climate Change Control, Reporting of National GHG Inventories, Implementation Strategy Book, and the book *Roadmap for Adaptation and Mitigation of Climate Change and Sustainable Development in Maluku Province*.

Reef Check Indonesia has been carried out with EcoDiver instructors in all its large islands totalling 100 in 2006 and more than 1,000 volunteers in 20 years. WWF Indonesia carried out the Coral Triangle Programme and conducted capacity building activities for 10,676 fishermen and fisheries players from 2010 to 2017.

In Malaysia, majority of tourism impact mitigation programmes are in coral reef areas which are major tourist attractions. Green Fins is among the programmes it has implemented to regulate and monitor marine recreational activities to minimise coral damage. Tourism operators, snorkeling guides, and local boatmen were trained to properly take care of coral reefs.

Malaysia established coral reef rehabilitation nurseries adjacent to marine parks in six island locations (Payar, Perhentian, Redang, Tioman, Tinggi, and Rusukan Besar) in 2017. Decommissioned vessels have also been deployed to create alternative dive sites in order to reduce the pressure on the natural reefs.

Marine parks employed the carrying capacity principle by increasing user fees and issuing a permit quota system to control the number of visitors. Areas of higher demand assessed higher user fees and visitor quotas. In Pulau Sipadan Marine Park, a permit quota system put a limit to the number of divers per day to 120 to control the impact of tourism on the coral reef ecosystem. They also collected a levy from visitors to the 12 island resorts adjacent to Sipadan.

Malaysia assessed marine park management effectiveness using the Management Effectiveness Assessment Tool (MEAT) developed by the MPA Technical Working Group of CTI. All marine parks in Peninsular Malaysia achieved the highest ranking of four (4) 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 is yet to be assessed. The assessment has enabled the department to analyse gaps and use the information to make improvements in marine park management.

Malaysia is a party to the CTI, located as it is at the global centre of marine biodiversity. Formed in 2007, CTI aims to sustainably manage fisheries, provide climate change adaptation measures, improve the status of threatened species, and establish and effectively manage priority seascapes and MPAs. The CTI member-countries adopted the 10-year Regional Plan of Action (RPOA) for CTI-CFF 2010–2020, which prioritises MPAs and is focused on initiating a region-wide Coral Triangle MPA System (CTMPAS). In 2013, the CTMPAS Framework and Action Plan was 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.

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


Photo by Danny Ocampo

Plan Action focuses on the development and implementation of innovative management approaches to overcome climate change risks and overexploitation of marine resources.

Of the 1,870 square kilometres of reefs of Myanmar, about 510 square kilometres are protected in Lampi Marine National Park and Thamihla Wildlife Sanctuary. Myanmar has a long coast and a large offshore area and the ocean in the Andaman Sea and Bay of Bengal are highly impacted by human actions. MPAs are needed as a key means to conserve biodiversity in these areas, however, no new marine parks were created in Myanmar after 2014.

Reduction of multiple anthropogenic stresses and building reef resilience is of top priority for Myanmar to ensure the sustainability of marine and coastal resources. Seeing the substantial gap in the representation of MPAs in marine ecosystems, especially coral reefs, it granted three local fishing communities in Myeik archipelago long-term management of marine areas. The designation of these three Locally Managed Marine Areas (LMMA) on Thayawthdangyi Island and the Langan Island group is meant to protect diverse coral reefs and important fish and crab nursery grounds, while supporting the local livelihoods in the area.

Government agencies and academe are now working together to establish a new LMMA in Pulaw Township, Taninthayi Region. Myanmar is conducting the MyCoast Project which is intended to bring improved conservation of hundreds of thousands of hectares of mangroves, seagrass, and other coastal zone natural resources. The total current reef coverage is about 33 per cent of Myanmar's reefs, but the target of +15 per cent under the NBSAP has not yet been met.

The Philippines is one of 18 mega-biodiverse countries of the world, housing two-thirds of the earth's biodiversity and between 70–80 per cent of the world's plant and animal species. All over the world, it ranks high in terms of the number of plant species, species endemism, and bird endemism.

This unique biodiversity is supported by a large variety of ecosystems, landscapes, and habitats, most of which are greatly threatened by human activities.[14]

In the Philippines, mangrove forest cover and mangrove cover within forest lands increased by a total of 1,852.5 square kilometres from 2010 to 2015. This may have stemmed from interventions that were introduced to address mangrove rehabilitation in 2014 when the government included the Mangrove and Beach Forest Development Project as a component programme under the National Greening Programme.

This was in recognition of the important role of mangrove and beach forests as natural defences against storm surges and protection of coastal communities. The initiative was pursued after the devastating Super Typhoon Haiyan struck the central Philippines in 2013.

In 2014, the Philippines submitted its position on non-carbon benefits (NCB) based on the PNRPS, a strategy that defines the policy direction of the country in REDD+ implementation to nationally define NCBs and for methodologies, modalities, and procedures to be identified at the country level. It also emphasised the need to view REDD+ in a holistic manner and value forests not only for their capacity to store and sequester carbon dioxide, but also for the myriad other uses and services within the context of climate change adaptation and sustainable development.

Singapore has benefited from reef enhancement units that were installed to enhance local habitats in the 1990s. These were designed with steep sloping surfaces to minimise sediment accumulation. In 2007, the country launched a two-year coral nursery project that made use of "corals of opportunity" or coral fragments found


Photo by Achier Chung

naturally on reefs and used to help grow new colonies and enhance existing reefs across Singapore.

The *Grow-a-Reef Garden* project implemented through a collaborative effort between the National Parks Board of Singapore and the JTC Corporation in 2018 is Singapore's largest artificial reef installation project to date. The eight reef structures or "terrace houses," were installed on bare seabeds to facilitate the growth of new coral reefs at the Sisters' Islands Marine Park. They are especially designed to maximise coral settlement, promote the growth of encrusting species, and provide shelter to fishes and other mobile organisms.

Singapore has also undertaken mangrove restoration projects after it observed many of its important mangrove sites to be undergoing severe erosion. One such site is on Pulau Tekong, which is home to one of its largest remaining patches of mangrove habitat, stretching about three kilometres along the offshore island's coast, with a size of approximately 0.92 square kilometres.

After experimenting with different mangrove restoration methods in 2009, Singapore chose a unique design to optimise mangrove restoration for the site. This design had defensive rock revetments planted with mangrove species adapted to harder substrate, and a layer of tougher pioneer mangrove species planted farther out to sea. Singapore reported that this unique design promotes mangrove seedling recruitment and accelerates habitat recovery and growth as cited in a study by Yang et.al.[15] Similar methodologies have subsequently been implemented in other mangrove sites such as the Sungei Buloh Wetland Reserve and plans are underway for a mangrove enhancement project in Chek Jawa Wetlands on Pulau Ubin.

Thailand launched campaigns to encourage tourists to carry out activities with local communities that aim to conserve, protect, and restore coral reefs. Selected activities called for participation from the education and private sector, as well as from the general public, namely: Project Coral Reef Cleaning (Fish Homes), Project Boat Buoy Installation; and Project Restoring Coral Reefs.

Activities related to conservation aimed to raise the youth and children's awareness about the ecosystem and related concerns such as Children's Day and World Seas Day.

In 2015, with better detecting equipment and technology that enabled better reach, coral reefs that were surveyed in 2015 in the Gulf of Thailand and at the Andaman Coast were found to be more extensive than was thought in 2012.

The survey indicated 280 species from 18 families and 71 genus spread into 16 coastal provinces. However, only 5.7 per cent were in good-excellent condition. Up to 5 per cent


Photo by Dicky Simorangkir


Photo by Dicky Simorangkir

were in the Gulf of Thailand and 6.4 per cent in the Andaman coast.

Thailand achieved some progress in reducing the loss of natural habitats, forest, and coastal ecosystems but still aims to meet the indicative national target of 50 per cent of the total area of the country.

Threats to coral reefs in Viet Nam include human impacts as cited in its 6NR, namely: over-exploitation and destructive exploitation of coral reefs and reef animals; uncontrolled development of tourism; environmental pollution leading to blooms of algae; and mainland floods causing sedimentation. Also observed were an outbreak of various invasive species such as sea-buckthorn, porifera, and sea urchins, natural disasters (e.g. high temperatures and low salinity for a short period of time), and bleaching in the waters of Phu Quoc in 2010.

A number of studies on coral reef restoration techniques in Viet Nam have been applied in some marine conservation zones, including Cu Lao Cham, Nha Trang Bay and Phu Quoc. According to the Management Board of Cu Lao Cham Marine conservation zone, the Board has cooperated with the Institute of Oceanography of Nha Trang and the Academy of Science and Technology of Viet Nam to plant more than 6,000 coral reefs in Bai Loi, Hon Lao, Bai Tra, Bai Nen, and the North Beach from 2013 onwards.

In Phu Quoc marine conservation zone, the managers also work with Nha Trang Oceanographic Institute to create two coral reef nurseries and replace dead coral reefs.

Despite these, Viet Nam's progress is considered to be at an insufficient rate because there are not enough local institutions, technical capacity and inter-agency collaboration for managing and protecting coral reef grounds.

Some of Viet Nam's protected areas have conducted monitoring of threatened species, however, this has not progressed beyond the pilot phases. These pilots were conducted in Cat Ba National Park and Na Hang protected areas to monitor primate species and in Phu Quoc National Park and Con Dao MPA.

In 2010, the Prime Minister approved the planning of Viet Nam's MPA system for implementation until 2020 to include 16 MPA areas. By 2017, 10 of 16 MPAs had been established. Pilot models of coral reef plantation and rehabilitation are currently being undertaken with the participation of communities and enterprises in some islands and protected areas, including Co To, Cu Lao Cham, and Nha Trang Bay.

Viet Nam embarked on a model for tourism enterprises to participate in the management and reasonable use of coral reef resources developed and tested in various coral reefs in central Viet Nam.

Photo by Mana Peampoon

Challenges

AMS accomplished much as discussed under Country Programmes. However, reporting these accomplishments, as indicated in the CBD technical rationale, has to document the following: 1) marine trophic index, 2) incidence of human-induced ecosystem failure, 3) health and well-being of communities who depend on local ecosystem goods and services, 4) trends in coral bleaching, and 5) ecological footprints and related concepts.

Despite 88 per cent of the region's coral reefs being at "high" to "very high" risk, only 3.88 per cent of its coastal and marine areas has been put under some form of conservation. This is such a low number given the multifarious threats the coral reefs are facing in one of the most important reef systems in the world.

As evidence mounts of increasing quantities of marine debris causing pollution, microplastics should be added among those that the CBD should closely look into. Microplastics are not only threats to the marine ecosystem, but also to terrestrial ecosystems and freshwater bodies.

The designated deadline of this target was 2015. Arguing that it is largely achieved through the interaction of the other targets should justify its re-inclusion in future targets of CBD. Since it is an upstream target, meaning it is influenced by actions to attain other targets, sound policy, pragmatic solutions, and concrete actions should be reflected in the next round of agreements of the COP inasmuch as it builds on what other targets have achieved.

Ways Forward

- Work on this target has been delayed due to the necessary scale of coverage at the regional level and associated investments needed for it. There is a need to decrease pressures on vulnerable ecosystems by integrating costs of maintaining coastal and marine ecosystems in resource management, establishing proper incentives and penalty systems, and reducing land-based sources of pollution and sedimentation including marine litter. To make this possible, economic valuation of the resources must be carried out.

- To minimise these threats, achieving Aichi Target 10 requires a more aggressive campaign to improve awareness of the values of vulnerable ecosystems (Aichi Target 1) and reduce the demand for threatened marine species. Some AMS suggest scaling up the conservation and protection of the remaining coral reefs, seagrasses, and mangroves to address impending impacts such as species extinction, reduced fisheries production, and others.

- An opportunity for promoting marine biodiversity conservation and filling conservation gaps in the region is recognising and supporting the establishment of places where OECM are established. The decision, primarily reached as another path to achieve biodiversity conservation particularly through Aichi Target 11 is also relevant to Aichi Target 10. According to FAO, which with other experts such as the IUCN, helped operationalise OECM, the idea behind it is that countries, fisheries, coastal communities, and others, often use spatial management tools for conservation and sustainable use. Such tools may have been put in place for many reasons, such as to protect juvenile fish, but the reality is that they have provided significant biodiversity conservation benefits, and thus may be recognised as OECMs from a biodiversity conservation practice.[16]

- The ASEAN Biodiversity Outlook 2 also recommended the following actions to promote coastal and marine conservation in the region: adopt an inclusive and integrated approach; increase the coverage and effectiveness of MPAs; consideration of connectivity; and improvement of fisheries-related policies and their implementation.

- Aichi Target 10 implementation calls for watershed or the reef-to-ridge approach in promoting biodiversity conservation and sustainability. Considering that these recommendations need to take into account actions to address land-based pollution and other anthropogenic pressures, it is imperative that actions under this Aichi Target take into account the various measures


Photo by Mana Peampoon

that will be undertaken by government agencies of the AMS. It is imperative that there will be inter-agency and inter-sectoral collaboration to significantly implement Aichi Target 10.

In 2019, the various agencies dealing with coastal and marine environment came together at the Regional Cooperation for the Protection of the Marine Environment in Singapore and diagnosed constraints in pursuing regional cooperation for the marine environment.

From an institutional perspective, it was agreed that one of the most serious problems both in national governments and ASEAN was that most of the bodies or agencies dealing with the marine environment worked in *silos*, and that there was little consultation or coordination with other bodies with responsibilities for similar or related issues.

- It was generally agreed that at international, regional, and national levels, there is a need for better cooperation and coordination among agencies or bodies dealing with different aspects of the management, protection and conservation of the marine environment.
- The same conference also saw a need for better communication and coordination across pillars in the ASEAN and generally across regional bodies involved with the management, protection, and conservation of the marine environment in the seas of Southeast Asia. There was also consensus that strengthening the institutional framework requires establishing institutional memory and transferring institutional knowledge.
- Other scholars put forward some key recommendations for better understanding of how global change will affect people dependent on coral reefs. These include: (1) baseline studies and frameworks for understanding human responses to climate change within complex social and ecological setting such as coral reefs, (2) better tools for exploring environmental benefits, markets, and financial systems faced by change, and (3) the integration of these insights into more effective policy making.[17]

STRATEGIC GOAL C:

To improve the status of biodiversity by safeguarding ecosystems, species, and genetic diversity

Photo by Amri Arfianto

TARGET 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

AMS are integrating conservation at the landscape level through the establishment of forest and marine protected area networks.

Challenges

- Inadequate coverage and effective management of protected area networks
- Climate change impacts
- Economic development and increased consumption
- Degradation of protected areas
- Poorly planned and managed tourism
- Other stresses: pollution, conflict over resources, urbanisation, habitat fragmentation, and loss of tangible cultural heritage

As of 2021, 50 AHPs have been recognised under the programme.

In 2021, 15.57% of terrestrial and 4% of coastal and marine areas are conserved through protected area policies.

ASEAN Heritage Parks (AHPs) are selected protected areas in the ASEAN region which are known for their unique biodiversity and ecosystems, wilderness and outstanding values. AHPs were given the highest recognition because of their importance as conservation areas.

Ways Forward

- Address gaps in communication capacity, policy support, and enforcement
- Implement an inclusive approach to protected area management and establishment
- Adopt nature-based solutions to climate actions in protected areas and OECMs
- Effectively manage protected areas through governance and management planning including legislation and funding
- Recognise internationally accepted standards
- Recognise, report, and amplify OECMs and their conservation benefits


Photo by Department of National Parks Thailand

Aichi Biodiversity Target 11: Protected areas
By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conserved measures, and integrated into the wider landscapes and seascapes.

Aichi Biodiversity Target 11 is where most, if not all, ASEAN Member States (AMS) have shown clear accomplishments. As of 2021, AMS have collectively established protection for 15.57 per cent of terrestrial and 4 per cent of coastal and marine areas. Some have committed to increasing the conservation areas beyond the percentages suggested by Aichi Biodiversity Target 11.

In terms of qualitative indicators, a number of AMS have taken steps to improve site management by updating and revising management plans within the context of the ASEAN Heritage Parks (AHP) Programme. Conservation at the landscape level is being considered by several AMS and reflected through the establishment of forest and marine protected area (MPA) complexes. The ASEAN Centre for Biodiversity (ACB) as the node for regional implementation support network for Aichi Target 11, supported by the Convention on Biological Diversity (CBD) Secretariat, facilitated a series of regional workshops to discuss ways to enhance the accomplishment of Aichi Target 11's quantitative and qualitative goals.

Further efforts are needed to progress towards meeting other elements of the target such as ensuring the management effectiveness of protected areas, improving the understanding and implementation of the various types of governance and equity in protected areas, and enhancing the extent of the connectivity of the protected area networks in the region.[1]

The ACB conducted a Protected Area Gap Analysis to assess how AMS have fared in their implementation of Aichi Target 11 using quantitative or qualitative indicators such as protected area coverage, areas important for biodiversity, connectivity, ecological representation, and effective management. Progress for indicators on equity, areas important for ecosystem services, and integration into the wider landscape and seascape remain a challenge to measure due to the lack of quantifiable indicators. Other effective area-based conservation measures (OECMs) that can have significant contributions to progress on Aichi Target 11 were also discussed.

Box 35. What are protected areas and why are they important to biodiversity?

A protected area is a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.[2] Establishing protected areas, geographical spaces set aside where regulations are put in place to limit human impacts and conserve nature, have long been used as a means to safeguard global biodiversity.[3] Well-governed and effectively managed, protected areas have safeguarded both habitats and populations of threatened species and have provided ecosystem services that impact well beyond their boundaries. Protected areas can secure biodiversity and provide ecosystem services that mitigate the impacts of climate change and enhance ecosystem resilience.[4]

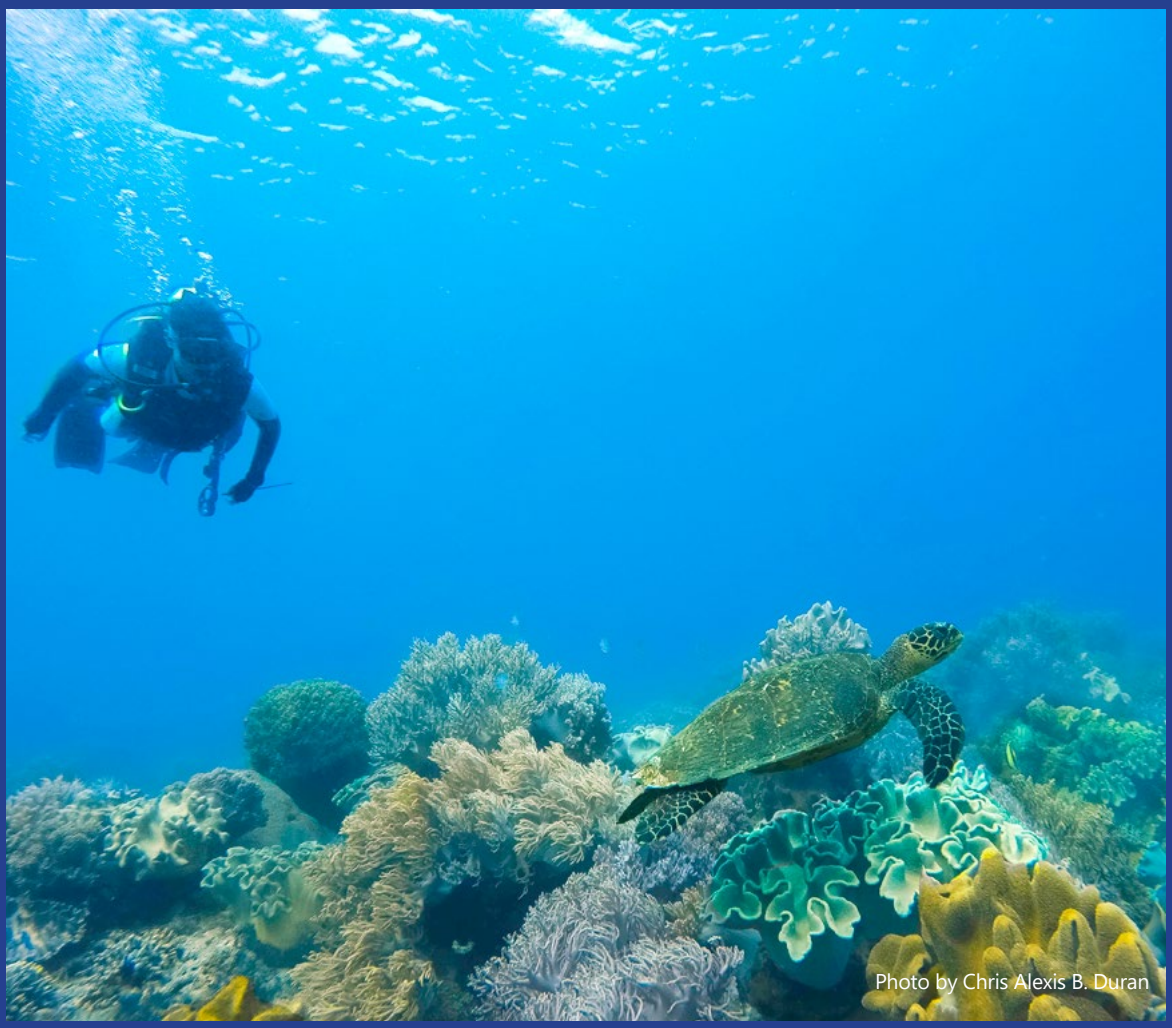


Photo by Chris Alexis B. Duran

Collective progress of AMS in expanding protected area coverage

The gap analysis shows that overall coverage of terrestrial protected areas across the region was 15.57 per cent (Table 10). The region's partial progress towards the target of 10 per cent coastal and marine area protection follows that of gains in the terrestrial area. The region's MPA coverage is only at four per cent (Table 10).

Areas of importance for biodiversity and ecosystem services

One of the qualitative indicators for Aichi Target 11 is whether these areas sought to be protected are important for biodiversity and ecosystem services. For this indicator, Key Biodiversity Areas (KBAs) have been used as a proxy and a commonly used indicator for assessing the protected area

Table 10. Protected Area of AMS as of November 2021

AMS	Terrestrial		Marine	
	Protected Area	% of Total Land Area Protected	Protected Area	% of Total Marine Area Protected
Brunei Darussalam[a]	2,794.00	46.87	52.00	0.20
Cambodia[c]	74,123.93	40.94	524.98	1.08
Indonesia[b]	328,705.85	17.13	239,281.28	7.35
Lao PDR[c]	38,000.00	16.05	N/A	N/A
Malaysia[ab]	44,205.00	13.33	23,942	5.30
Myanmar[b]	40,764.71	6.02	391.27	0.06
Philippines[c]	46,800.00	15.60	30,854.00	1.40
Singapore[b]	33.47	4.60	N/A	N/A
Thailand[b]	102,673.05	19.90	13,416.00	4.37
Viet Nam[c]	22,694.26	6.84	1,878.10	0.20
ASEAN	**700,794.28**	**15.57**	**310,339.96**	**4.00**

[a] *Data from UNEP-WCMC Protected Area Profile from the World Database of Protected Areas.
[b] Updated by the AMS post-31st AWGNCB Meeting
[c] 6th National Report to the CBD

coverage of areas of particular importance for biodiversity. The ACB Protected Area Gap Analysis overlaid KBA and World Database on Protected Areas (WDPA) spatial data to determine the protected area coverage of KBAs in the region.

More than one-third or 37 per cent of KBAs in the region are protected. Partially protected KBAs also account for 44 per cent of the total KBAs in the region.

These are mostly KBAs that overlap with protected areas, but the extent of the habitat of the trigger species goes beyond the borders of the protected area and are therefore only partially protected. Less than 20 per cent of KBAs identified for the region remain unprotected. Out of the 1,260 KBAs identified across the region, only 3 per cent or 38 are marine KBAs, 23 per cent or 290 are coastal and marine KBAs, and the remaining 74 per cent or 932 are terrestrial KBAs. Only


Photo by Martin Palis

Indonesia, Myanmar, and the Philippines identified marine KBAs. Internationally designated protected areas, such as World Heritage Sites and Ramsar sites, overlap with KBAs.

One of the major gaps in meeting Aichi Target 11 is in the representation of the marine ecosystems and the services it provides in both the KBAs and protected area networks. Post 2020, marine KBA identification and expansion of the MPA network should be prioritised. Another gap that needs to be addressed is the protection of the Alliance for Zero Extinction (AZE) sites.

AZE sites are subset of the KBAs that must be effectively protected if the world's most threatened species are to survive. ASEAN AZE sites are those KBAs in most urgent need of conservation to prevent imminent extinction of at least 115 threatened species that are critically endangered. In terms of the irreplaceability of sites for species, AZE sites are the 'tip of the iceberg' of KBAs requiring safeguarding. Out of the 82 AZE sites in the ASEAN Region, only nine (11 per cent) are protected, 46 (56 per cent) are partially protected, and the remaining 27 (33 per cent) are currently not protected.

Ecological representation

Ecological representation of the protected area network requires protected area systems to contain adequate samples of the full variety of the biodiversity found in all types of ecosystems and the range of species in the place. To assess the ecological representation element of Aichi Target 11, the ACB Protected Area Gap Analysis looked at the protected area coverage of ecoregions that was mapped for terrestrial ecosystems[5] and for marine ecosystems.[6]

The different terrestrial and marine ecoregions occurring in Southeast Asia and the protection levels for each was taken from Batistella et al.[7] The analysis used all designated protected areas recorded in the WDPA as polygons, or points with a reported area.

As extracted from the data of the Digital Observatory of Protected Areas of the Joint Research Center of the European Commission (DOPA-JRC), protected area coverage was at


Photo by Romeo Remalante


Photo by Dicky Simorangkir

least 17 per cent or 29 out of 84 terrestrial ecoregions in Southeast Asia and at least 10 per cent protected area coverage or eight (8) out of the 22 marine ecoregions. The protected area coverage ranges from a low of 0.04 per cent and high of 81.63 per cent for the terrestrial ecoregions and a low of 0.10 per cent to a high of 34.06 per cent for the marine ecoregions. Total protected area coverage of the 84 terrestrial ecoregions known to occur in Southeast Asia is at 12.83 per cent, and total MPA coverage of the 22 marine ecoregions is at 7.43 per cent.

Effective management of protected areas

Protected area managers and conservation scientists have raised the concern that protected area coverage alone is not a sufficient indicator for meeting global biodiversity targets and that protected areas are not achieving the conservation objectives because of a lack of effective management.[8] Protected area management effectiveness data collection tools have since then been developed to systematically assess protected area management effectiveness (PAME). As of February 2021, PAME assessments have been conducted in at least eight (8) AMS for the terrestrial protected areas and six (6) AMS for the marine protected areas and reported in the Global Database on PAME.

However, the assessments done for both the terrestrial and marine protected areas for all AMS are still far from complete, with only 404 assessed out of the 2,488 ASEAN protected areas reported in the WDPA. For this target, we followed the CBD's COP 10 Decision X/31, 19a, "...to expand and institutionalise management effectiveness assessments to work towards assessing 60 per cent of the total area of protected areas...' Only 37.42 per cent of the total area of terrestrial protected area network in the ASEAN region have completed PAME assessment, and the MPA network has barely been assessed at 4.34 per cent (Table 11).

This is far from the global target of 60 per cent protected area management assessment completed for protected areas, both for the terrestrial and MPA networks. More resources would need to be directed towards assessing the effectiveness of protected area management activities for each of the AMS and for these assessments to be

systematically reported and included in the GD-PAME. Completion of the management effectiveness evaluations has been used by many countries to report on the 'effectively managed' element of Aichi Target 11. However, this is far from sufficient in assessing progress for this element without additional information on the adequacy of certain aspects of management. Future targets relating to PAME should require that some benchmarks of quality are being met.[9] Staffing and budget capacity are aspects of management that can be related to conservation outcomes and could be used as indicators to monitor progress for this element. The conservation outcomes of protected areas as they relate to specific management inputs would also be a good indicator to monitor this element post 2020.

The IUCN Green List, a voluntary global standard aimed at increasing the number of effectively and equitably managed protected areas, also provides a potential means for tracking progress on the management effectiveness element.

Table 11. Protected area management effectivity (PAME) assessments undertaken for AMS as of February 2021.

Country	Percentage of terrestrial protected area assessed (%)	Percentage of marine assessed (%)
Brunei Darussalam	0.00	0.00
Cambodia	41.57	32.56
Indonesia	58.40	2.63
Lao PDR	0	no marine area
Malaysia	0.33	8.87
Myanmar	5.60	72.24
Philippines	12.65	7.17
Singapore	94.12	Not applicable
Thailand	40.77	0.00
Viet Nam	53.96	19.72
ASEAN	**37.42**	**4.34**

Source: Global Database on Protected Area Management Effectiveness (GD-PAME)

Effective management is one of the four components of the Green List Standard that also includes good governance, sound design and planning, and successful outcomes. Only one protected area in the region is currently included in the list, the Van Long Nature Reserve in Viet Nam. Four other protected areas in the region are currently under the candidate phase: Cat Tien, Con Dao National Park, and Pu Mat National Park in Viet Nam, and the Danum Valley Conservation Area in Malaysia.

Photo by Fra-and Timothy Quimpo

Connectivity

The connectivity of protected areas is essential for the effective conservation and management of biodiversity.[10] A well-connected network of protected areas supports processes essential for the persistence of viable populations such as gene flow, species range shifts and ease of species movements, and other protected areas' ecological flows.

The challenge is to determine how well-connected protected areas are[11] in order to propose the ProtConn indicator in examining the design of protected areas. This to support connectivity for all terrestrial ecoregions and contribute to the assessment of current and future progress towards protected area targets, in particular, the Aichi Target 11.

Protected area data used for the analysis was sourced from the WDPA, and results were made available in the Digital Observatory for Protected Areas of the European Commission. A refined version of the indicator was then used to calculate protected area connectivity at the country level focusing on the structure and spatial arrangement of the terrestrial protected areas network within a country.[12]

Marine protected areas were excluded from the assessment, and the indicator has not yet been tested as to its applicability to assessing protected area connectivity in the marine realm. The results were further interpreted to identify each country's main strategic priorities to improve or sustain protected area connectivity.

The result of the protected connected land assessments done at the country-level shows that the AMS lag behind the Aichi Target 11 elements on a well-connected protected area system. Table 12 shows the protected area connectivity of AMS. Results have shown that in some cases, low protected area coverage is the main reason for the shortfall. In some cases, protected area coverage is already above the targeted 17 per cent coverage, but protected area connectivity is low due to deficiencies in the design of the country's protected area system. Protected areas would need to be strategically designated in key locations to maximise connectivity.[13]

Other effective area-based conservation measures

Other effective area-based conservation measure (OECM) refers to a geographically defined area other than a protected area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values.[14] OECMs sit alongside protected areas as potential complementary avenues by which countries can account for the delivery of area-based conservation of biodiversity through the protection and management of special places.[15]

It is expected that recognising and reporting on OECMs will make a significant contribution to the progress on elements of Target 11 particularly in the protected area coverage. Examples of types of areas that may qualify as OECMS include privately managed areas with


Photo by Danny Ocampo

Table 12. Protected area connectivity of AMS

Country	Protected Connected Land (%)
Brunei Darussalam	37.56
Cambodia	12.06
Indonesia	8.7
Lao PDR	5.9
Malaysia	10.59
Myanmar	4.41
Philippines	12.39
Singapore	5.5
Thailand	6.12
Viet Nam	1.87

Source: Digital Observatory for Protected Areas (DOPA). Downloadable from https://data.jrc.ec.europa.eu/dataset/jrc-dopa-maps-and-datasets ©European Union, 2019.)

a primary conservation objective, protected sites managed for other purposes, but which deliver high conservation benefits through ancillary conservation or the indigenous and community managed-reserves.

As of February 2021, there were no available estimates of the coverage of OECMs at the global, regional or national levels including spatial data to assess impact on the elements of Target 11 as well as to the other Aichi Targets.

Although no available or limited information exists about the specific identification and extent of OECMs in the AMS, information from the NBSAPs and 5th and 6th National Reports to the CBD have indicated some of the potential areas that can be designated as OECMs. These include, but are not limited to, the Indigenous and Community Conserved Areas (ICCAs).

Protected areas and OECMs have many similarities, such as the requirement of a geographically defined boundary and a long-term commitment. But while protected areas are places designated to achieve positive biodiversity outcomes, the term 'OECM' applies to areas designated for any purpose, where positive biodiversity outcomes occur regardless of the original management objectives.[16]

Guidelines and appropriate legal mechanism to recognise OECMs by the AMS has not yet been formally undertaken. However, from 2019 to 2021, workshops and online webinars were undertaken to foster greater awareness and understanding by AMS on the identification and recognition of OECMs, in a way preparing them for scaling up these approaches under the post-2020 global biodiversity framework.


Photo by Timothy Glenn Palacio

Challenges

The Sixth AHP Conference (AHP6) stressed the importance of accelerating the implementation of the Regional Action Plan for ASEAN Heritage Parks 2016–2020 with specific, measurable, attainable, relevant, and time-based action plans that address the five elements of the target. The AHP6, likewise, recognised the need to generate active participation of local communities in biodiversity conservation and protected area management, and to enhance their capacity to sustainably manage these areas.

There is a need to consider climate change adaptation, such as the conservation and rehabilitation of habitats susceptible to extreme weather conditions, in management plans.

Good governance and effective management planning, including legislation and policy support that provide the guidelines and framework to encourage participation of key stakeholders of protected areas are essential to protected area management. It is likewise important to recognise internationally-accepted standards for protected area management and capitalise on good practices that can be modified and enhanced to conform to specific site conditions.

Adopting the Green List Standard developed by the International Union for Conservation of Nature (IUCN) may guide conservation outcomes in good governance, sound design and planning, and effective management. One AMS recommended that conservation efforts at the community level should be supplemented by the designation of large no-take areas.


Photo by Me Me Ko Lay


Photo by Aye Chan Tun

Ways Forward

The Regional Workshop on Accelerating Aichi Target 11 Implementation in the East and Southeast Asia Regions held in 2019 laid down valuable recommendations in moving this target forward.

- Accelerate the implementation of the AHP Regional Action Plan 2016-2020 and ensure that the actions items are specific, measurable, attainable, relevant, and time-based.

- There is a need to increase support for greater recognition of new areas to be considered as OECMs by way of legal recognition and resources for local co-management.

- Discussions related to protected areas need to include other sectors and perspectives to meet the challenges of the post-2020 global biodiversity framework. Work on OECMs is a catalyst towards fostering inclusiveness in the process and outcomes including sectoral integration.

- Parties to the CBD should take practical steps to add to their commitments to expand the coverage of Aichi Biodiversity Target 11.

- Collaborate on transboundary protected areas and connectivity.

- Integrate protected areas into wider seascapes and landscapes.

- Build further understanding, awareness, and capacity to recognise and report on OECMs, including legal frameworks/policies on OECMs (areas beyond national jurisdiction, production and protection forests, state and non-state forests, land under compensation mechanism, and others).

- Mainstream biodiversity and engage other sectors to financially sustain conservation costs.

The ACB's Protected Area Gap Analysis also proposes the following ways forward which will be a useful set of reminders to AMS in their implementation of a similar protected areas target in the post-2020 global biodiversity framework:

- Continued facilitation, regional support, and regional collaboration to halt the decline of biodiversity and avert the region's biodiversity crisis which also requires identifying appropriate actions, tangible implementation strategies and resources, including national and regional-level commitments, sustainable funding, human and technical capacity, coordination among multiple agencies and sectors, cooperation among key stakeholders, and communication at all levels.


Photo by Lam Soon Tak

- Opportunities for further progress could come through the recognition and support of the IPLC conservation initiatives, increased reporting on privately protected areas, and the systematic collection of information on OECMs. There is a need to expand protected area networks and identify OECMs that will encompass ecoregions in the terrestrial, marine, and inland waters, including the areas of particular importance for biodiversity with a wider representation of trigger species from different taxonomic groups. Enhancing cooperation with IPLCs in the creation, control, and management of areas outside of protected area boundaries will also greatly enhance the capacity and capability of the AMS to meet succeeding conservation targets in the post-2020 scenario.


Photo by Simoune Philippe S. Vale


Photo by Panji Anom Nuariman

- Building on the lessons learned in meeting Aichi Biodiversity Target 11, this is a critical opportunity to evaluate, recognise, and support effective conservation outcomes occurring outside of the protected areas and also improve the assessment of management effectiveness and equitability of protected areas and other area-based conservation measures. Protected areas and OECMs should be designed and managed to ensure site-based conservation efforts to enhance the connections between these sites, cover the most important sites for biodiversity, and address climate change impacts on shifting species distributions.
- There is also a need to align national targets to meet regional and global targets. The region will greatly benefit from the synchronisation of the national reporting of AMS. Identification of indicators for monitoring progress towards targets will greatly ease comparison of data across the region and will also facilitate reporting to the international conventions and multilateral agreements. There has been a noticeable increase in the use and quality of national biodiversity reporting indicators in the region from the 5th National Report (5NR) to the 6th National Report (6NR).


Photo by Gab Mejia

- However, for the region to accelerate the progress towards agreed-upon targets of multilateral environmental agreements, a more relevant and diverse set of indicators will need to be identified and monitored. The focus should be on the use of disaggregated global indicators, increased regional coordination to improve the efficiency and quality of indicator generation, and increased efforts at growing national-level monitoring capacity.

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.

The conservation of threatened species in the region remains a challenge because of habitat loss and the illegal wildlife trade. The implementation of comprehensive and collaborative conservation approaches at the global and regional scale could be pivotal in addressing these concerns.

Challenges/Pressures

- Human activities are the main causes of species extinction:
  - increasing agricultural and biofuel production
  - excessive harvesting of timber, wildlife, fish, minerals, and other raw resources
  - deforestation
  - habitat destruction
  - introduction of invasive species
- International wildlife trade
- Limited information
- Gaps in governance and law enforcement

The ASEAN region is home to 18% of the world's biodiversity.

Three countries in the region—Indonesia, Malaysia, and the Philippines—are megadiverse where 4 of the world's 36 biodiversity hotspots are located.

In Cambodia, there are only 92 **Irrawaddy dolphins** left in the Mekong River, according to a survey by the local government and the WWF, and may become extinct in a matter of years.

In Thailand, the population of the **leatherback turtle** is now less than 1% of its population from 60 years ago. No new nests have been reported since 2013.

Only 300 **Indochinese Tigers** are estimated to exist in the remaining wild areas of Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam.

In the Philippines, there are less than 3,000 **Visayan wrinkled** hornbills restricted to the areas of Negros and Panay.

In Malaysia, the **Sumatran rhinoceros** was declared as effectively extinct in the wild.

The conversion and reclamation of Southeast Asian wetlands threaten more than **50 million birds** that depend on these ecosystems as habitats and breeding sites. Around **80% of wetlands** in the region are under threat and up to **45% of intertidal wetlands** have been lost.

An estimated **25% of wildlife trading** takes place in Southeast Asia threatening the survival of many endangered species in the ASEAN Region.

Ways Forward

- Improve documentation of species status in protected areas
- Address gaps in communication capacity, policy support, and enforcement
- Impose strict policies, governance, atnd law enforcement on wildlife trade
- Establish a coordinated network of law enforcement agencies and relevant stakeholders, and engage IPLCs
- Explore mechanisms designed to generate economic incentives
- Facilitate knowledge sharing and cross-border collaboration
- Engage IPLCs and other stakeholders
- Enable protected area management plans to consider species population responses in climate action

Photo by Indra Hadiyana

Aichi Biodiversity Target 12: Reducing risk of extinction
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.

Overall, the ASEAN is progressing towards the target but at an insufficient rate. The Red List Index for Southeast Asia as of February 2020 shows a continuing and consistent increase in the rate at which the region is losing its biodiversity. Vertebrate extinction risks are highest in Southeast Asia and this is partly fueled by the huge explosion in trade demand for luxury food, medicine, tonics, horns, trophy parts, and captive animals. Many species in the region are bound for extinction soon if this trend is not reversed.[1]

While AMS have worked hard to prevent this, they are faced with enormous challenges—from climate change, human activities and population pressure, poaching and hunting, and the highly organised global wildlife trading and trafficking.

Biodiversity expeditions, species surveys and assessments, and reproduction have been among the approaches AMS have undertaken. They have also implemented various programmes and initiatives such as community-based collaboration, re-introduction, and covert operations to rescue wildlife from trafficking.

Crucial to conservation is identifying, locating, and protecting threatened species. But many species in the region are not yet known to science and may have already gone extinct before they were even discovered and characterised. A key response in the region has been to increase the number of protected areas, however, biodiversity loss is still not effectively addressed. In fact, the rate at which various species are disappearing is increasing such that calls have been made for Southeast Asia to be prioritised in resources and measures to avert mass extinction.

A few AMS have reported using *ex situ* facilities for breeding endangered animals. *In situ* approach is promoted with the establishment of protected areas, most of which were only very recently created and far from being effectively managed. *In situ* and *ex situ* conservation measures have been recommended as prevention approaches that will buy time for the region.[2]

AMS continually undertake biodiversity expeditions. This daunting task is made more difficult by the dwindling number of taxonomists. Regional consultations in the Philippines have echoed the need for scientific expertise in this field.

In many instances, AMS have held joint expeditions with external parties, significantly contributing to the discovery of more species in the region.

Myanmar, for example, conducted in 2019 its eighth field expedition since 2014 with researchers from the Chinese Academy of Sciences. The expedition found a high number of endemic birds, 250 reptilian, 150 snake, 80 lizard, 150 frog, and thousands of insect species. The Philippine rainforest is home to a diverse range of birds, plants, animals, and sea creatures. Biologists from the Field Museum of Natural History in Chicago, Illinois in the United States have collections that showcase the Philippines as one of the world's greatest concentrations of unique biological diversity. In 2011, eight co-authors from the country and the US described seven new species of small mammals in Luzon island.[3]

Unchecked population growth in Southeast Asia, among the highest in the world, puts its biodiversity in peril. Scientists point to the "huge explosion in Southeast and East Asian trade demand and harvest rate for wild species for luxury food, medicine, tonics, horns and other trophy parts, and captive animals" as the reason why vertebrate extinction risks are highest and habitat-loss rates are fastest in Southeast Asia.[4]

The increasing demand for alternative fuel sources such as biofuel, as well as, for food, timber and minerals is opening up forest lands for land use that conflict with biodiversity conservation goals.

A study of biofuel expansion in Southeast Asia and its biodiversity impacts report that sugar cane, corn, rapeseed as biofuel feedstock have high impact on land use while oil palm and soybean have very high impact on biodiversity. More than half of land use change to oil palm expansion was found to have occurred at the expense of primary or logged forests in Malaysia and Indonesia.[5]

Southeast Asia has the highest rate of deforestation among all tropical regions in the world. With each forest decimated, it is possible that a species has remained unknown with extinction. Scientists believe that the extent of undiscovered species is likely to be high as their recent discovery rates showed continuing increase.[6]

Raising and effectively deploying necessary financial and technical resources, including human capacity, to avert projected extinction of Southeast Asian species, is arguably the conservation community's biggest challenge in meeting Aichi Target 12.

Collective action by AMS and with other parties

Southeast Asian countries are the source, transit, and destination markets for illegal wildlife trade.[7] In November 2014, at Nay Pyi Taw in Myanmar, heads of state of AMS, Australia, the People's Republic of China, Republic of India, Japan, the Republic of Korea, New Zealand, the Russian Federation and the United States of America signed the 9th East Asia Summit (EAS) Declaration on Combating Wildlife Trafficking.

The EAS declaration expressed awareness of AMS being rich in biodiversity and home to many endangered species of wild fauna and flora; recognised the illicit trafficking and illegal trade in specimens of wildlife species as prejudicial to EAS interests; and reaffirmed their commitment to the ASEAN Wildlife Law Enforcement Network (ASEAN-WEN).

The EAS Declaration also cited the role of the ASEAN Centre for Biodiversity (ACB) as an effective regional centre of excellence in promoting biodiversity conservation and management, and regional initiatives such as the Heart of Borneo (HOB), Coral Triangle Initiative (CTI) on Coral Reefs, Fisheries and Food Security, ASEAN Heritage Parks (AHPs), and the Greater Mekong Sub-Region (GMS) in protecting and enhancing the region's biodiversity.[8]

Various AMS are parties to these regional initiatives: HOB–Brunei Darussalam, Indonesia, and Malaysia; CTI–Indonesia, Malaysia, Philippines, and Viet Nam; AHPs–all AMS; and GMS–Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam. China,

Box 36. Critically Endangered Species of Southeast Asia

- Sumatran rhinoceros (*Dicerorhinus sumatrensis*)
- Javan rhinoceros (*Rhinoceros sondaicus*)
- Tiger (*Panthera tigris tigris*), Indochinese & Malayan
- Tiger, Sumatran subspecies (*P.t. sondaica*)
- Saola (*Pseudoryx nghethinhenis*)
- Sumatran orangutan (*Pongo tapanuliensis*)
- Sunda pangolin (*Manis javanica*)
- Philippine crocodile (*Crocodylus mindorensis*)
- Yangtze giant softshell turtle (*Rafetus swinhoei*)
- Sumatran rhino (*D.s. lasiotis*)
- Vietnamese Javan rhino (*Rhinocerus sondaicus annamiticus*)
- Kouprey (*Bos sauveli*)
- Eastern black crested gibbon (*Nomascus nasutus*)
- White bellied heron (*Ardea insignis*)

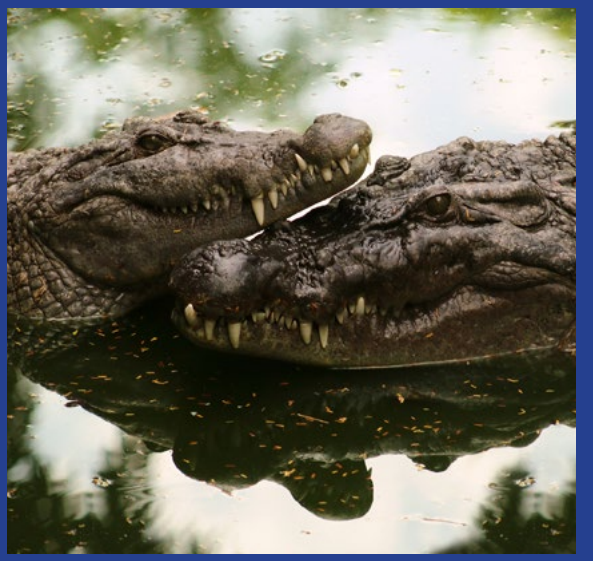


Photo by Kimberly Kyle Mith Santiago Montes

while not an AMS but signatory to GMS, shares jurisdiction with the five AMS over the Mekong River. Logging, mining, and illegal wildlife trade are the identified threats to the AMS and the rest of the EAS declarants, to the continuity of the landscape and the unique plants and animals found there.[9]

AMS took stock of the progress they have made in their implementation of regional and national strategies to combat wildlife crime at the ASEAN Ministerial Meeting on Illegal Wildlife Trade in 2019. They also discussed collaborative efforts and strengthening and harmonising strategic actions.

Moreover, they discussed the urgency of pursuing the targets under Goal 15 of the UN Sustainable Development Goals that specifically addresses trafficking of wildlife. They expressed a strong commitment to address wildlife crime as a serious transnational organised crime, and to further scale up efforts to combat it.[10]

AMS were supported by the regional collaboration to stem cross border wildlife trade from the UN Office on Drugs and Crime (UNODC) and TRAFFIC, wildlife trade specialists working to ensure that wildlife trade is not a threat to the conservation of nature. TRAFFIC is a leading non-governmental organisation working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.[11]

UNODC has actively tackled wildlife crime for more than ten years and created a dedicated *Global Programme for Combating Wildlife and Forest Crime* in 2014. It found that criminal groups use the same routes and techniques to traffic wildlife as they do for other illicit commodities, and exploit gaps in national law enforcement and criminal justice systems to conduct their illegal activities. The proceeds from this business are being used to finance other criminal activities and in some cases, the proceeds finance conflict and contribute to instability.

UNODC found an important role to play in strengthening the capacity of governments to prevent, investigate, prosecute, and adjudicate wildlife crime, complementing other international legal frameworks such as Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

In 2019, UNODC provided support to Lao PDR to assess its criminal justice system and preventive responses to wildlife crime through the implementation of the Wildlife and Forest Crime Analytic Toolkit and the Indicator Framework for Combating Wildlife and Forest Crime of the International Consortium on Combating Wildlife Crime (ICCWC). The toolkit allows countries to identify strengths, weaknesses, gaps, and key areas to prioritise in addressing these crimes. The results then feed into the design

and development of work plans for national capacity building and technical assistance, while establishing baselines against which future progress can be measured.

The Global Programme also implemented the ICCWC in three AMS: Lao PDR, the Philippines, and Thailand. It initiated fruitful partnerships to implement these tools with the UN Development Programme (UNDP), and the Asian Development Bank (ADB).

It rolled out the UNODC Guide on Drafting Legislation to Combat Wildlife Crime, a tool for AMS to amend or adopt legislation to better address wildlife crime. The Guide was used as basis for a regional workshop organised in Hanoi, Viet Nam with legislative experts and prosecutors from nine AMS. It resulted in improved understanding of the need to strengthen legislation on wildlife crime. UNODC also provided support for the Philippines to review its Wildlife Conservation and Protection Act with a focus on criminal provisions. A draft bill is being finalised and was supposed to be submitted to Congress in 2020.[12]

Another collaborative partnership of AMS that has benefited the battle against wildlife crimes is with TRAFFIC.

In February 2021, several AMS won in the 5th Asia Environmental Enforcement Awards conferred by the UN Environment Programme on government officials and teams that have excelled in enforcing laws against environmental crimes such as illegal wildlife trafficking. According to UNODC, wildlife and forest crime in the East Asia and Pacific region generates around USD 19.5 billion every year, making it a lucrative business that is often hard to detect.[13]

Identify, locate and protect threatened species

Cambodia set action plans for its roadmap towards conservation, sustainable use, and restoration of the natural assets. Despite this, it noted rising trend in the number and status of threatened species. Thus, it heightened discovery, identification, and description of new species, and protection, conservation, and collaboration programmes of endangered species. Some of these

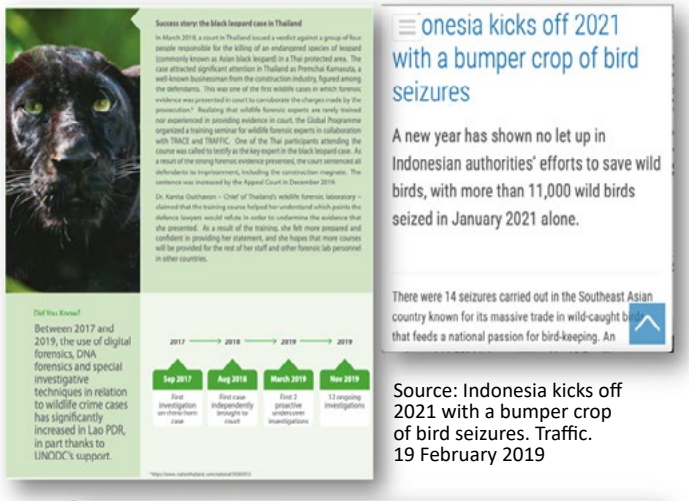
Box 37. Success stories in combatting wildlife crimes and trafficking in the ASEAN region

With UNODC help:

- gained headway in combatting wildlife crimes with the Black Leopard case in Thailand
- digital forensics in Lao PDR
- seizure of ivory in Cambodia and pangolin scales in Viet Nam

Seizure of wildlife traffickers in Indonesia with help from TRAFFIC

Source: UNODC Global Programme for Combating Wildlife and Forest Crime. Annual Report 2019



Source: Indonesia kicks off 2021 with a bumper crop of bird seizures. Traffic. 19 February 2019

Box 38. Recipients of the 5th Environmental Enforcement Awards

1. **Impact Category** – Philippines Operation Group on Ivory and Illegal Wildlife Trade comprised by representatives from the Department of Environment and Natural Resources-Management Bureau and the National Bureau of Investigation-Environmental Crimes Division for arresting illegal traders and recovering 13 rare animals in a single operation

2. **Citation** – Operasi Bersepadu Khazanah taskforce of Malaysia, composed of officials from the Department of Wildlife and National Parks Peninsular Malaysia under the Ministry of Energy and Natural Resources together with the Royal Malaysia Police for arresting 87 wildlife criminals, destroying 460 wire snares, with total seizure amounting to MYR 2.7 million (USD 670,000)

3. **Recognition** – Indonesia's Police Chief Commissioner Adi Karya Tobing, Police Commissioner Sugeng Irianto, and Rasio Ridho Sani, director general for law enforcements in the Ministry of Environment and Forestry who worked with Dutch authorities to crack down on a large-scale wildlife network that traffics body parts of endangered species

protection programmes are for the Sarus Crane (*Grus antigone*), the White-rumped Vulture (*Gyps bengalensis*), and Siamese Crocodile (*Crocodylus siamensis*).[14]

In 2018, with consideration by scientific authorities, Indonesia came up with a list of protected species of plants and animals to revise the previous list based on an attachment to Government Regulation No. 7 Year 1999 on Preservation of Plants and Animals.

Indonesia assigned 25 endangered animals for population programmes from 2015 to 2019 based on a decree of the Director General of Natural Resources and Conservation (KSDAE) dated June 2015. Population increase was going to be undertaken with a target of 10 per cent at monitoring sites until 2019. The 25 endangered species are all listed in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.[15]

Lao PDR reported the paucity of data on the status of biodiversity in the country, thus the difficulty in taking steps towards conservation. It reported an observation that the habitats of threatened species lie outside the protected areas, making it even more difficult for conservation measures to be undertaken. A study also pointed out that the range of wildlife sold in the seven largest markets in the country include a big number of threatened or near-threatened vertebrates.

Malaysia drew up the National Red List for Mammals v2.0 and published it in 2017 and prepared its National Red List for Plants (Dipterocarpacae) version 2.0. It implemented a nationwide turtle conservation programme with 28 turtle hatcheries (*in situ* and *ex situ*) established throughout Malaysia.

Myanmar has accumulated information needed for listing species under the IUCN Global Red List. As a result, they have assessed more than 4,400 species. Myanmar also contributes to the Wildlife Conservation Society and collaborates with international organisations, such as Wetlands International for research and documentation of waterbird species (migratory and endemic species); Asian Waterbird Census, BirdLife International and other international organisations in monitoring shorebirds, including the Critically Endangered (CR) spoon-billed sandpiper (*Calidris pygmaea*) in the Gulf of Mottama, the most extensive and significant intertidal mudflat system in Myanmar for shorebirds, fish, and other biodiversity.

Its highly productive intertidal mudflats provide a non-breeding site for an estimated 150,000–200,000 migratory waterbirds. Nanthar Island[16] is one of the most important flyway sites in Myanmar for endangered and threatened migratory birds species, including Spoon-billed Sandpiper (CR), Nordmann's Greenshank (Endangered, EN), Painted Stork (Near Threatened, NT), Indian Skimmer (Vulnerable, VU), and Great Knot (EN).

Scientific expeditions carried out by Filipino and international scientists in the Philippines have led to discoveries of numerous new species of fauna and flora. Between 2000 and 2020, an estimated 500 new species have been described to science, some of these are the Camiguin Hawk-owl (*Ninox leventisi*), Cordillera shrewmouse (*Archboldomys maximus*), Zambales forest mouse (*Apomys zambalensis*), Sierra Madre forest mouse (*Apomys sierra*), and a cloud frog from the islands of Leyte and Samar (*Platymantis navjoti*).

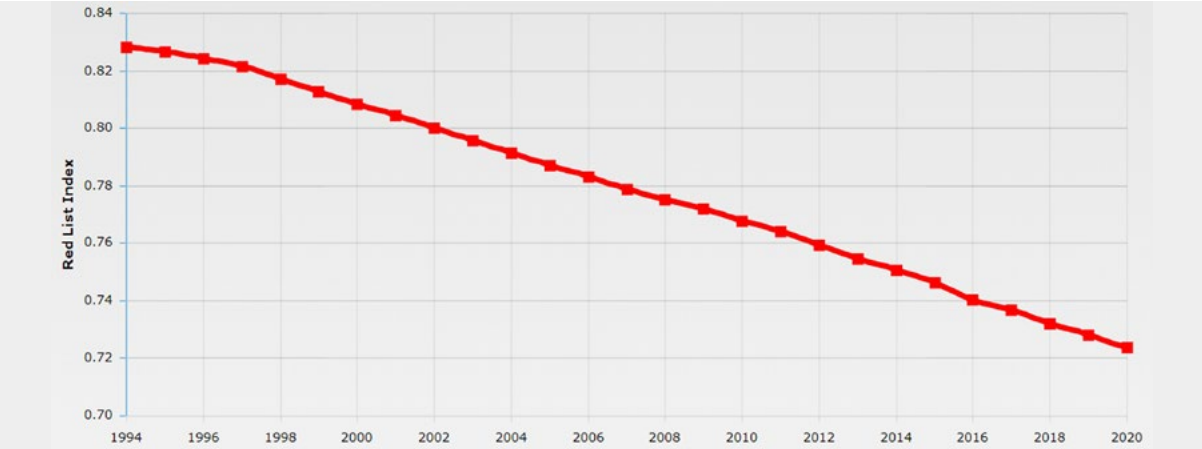
Scientists from the California Academy of Sciences, University of the Philippines, National Museum of the Philippines, and other collaborators, encountered more than 300 new species of terrestrial and marine invertebrates from the island of Luzon alone. Conservation efforts are also ongoing for some endangered and threatened species like the Philippine eagle (*Pithecophaga jefferyi*), Philippine cockatoo (*Cacatua haematuropygia*), tamaraw (*Bubalus mindorensis*), Philippine tarsier (*Carlito syrichta*), Philippine freshwater crocodile (*Crocodylus mindorensis*), and marine turtles.

An example of a conservation effort is the Tamaraw Conservation Programme that monitors the tamaraw population in Mts. Iglit-Baco National Park. The latest tamaraw count, conducted in the wild in April 2019, yielded 480 heads (DENR-MIMAROPA, 2014). In addition to species-specific conservation programmes, KBAs and critical habitats have been identified to provide the basis for conservation measures. KBAs represent known habitats of 855 globally important species of plants, corals, molluscs, elasmobranchs, fishes, amphibians, reptiles, birds, and mammals in the country.

As of 2018, there were 128 protected areas within KBAs with terrestrial protected areas covering 27,876.64 square kilometres and marine protected areas covering 10,477.46 square kilometres. In total, there are 56 per cent of established protected areas within KBAs. Six critical habitats with a total area of 93.92 square kilometres have also been

Figure 11. Some of the critically endangered and vulnerable species in Southeast Asia and the response of ASEAN to the situation

Figure 12. Red List Index, Southeast Asia



Index values are based on data from mammals (1184), birds (2691), amphibians (870), corals (628), cycads (42)
Interpreting the RLI:
RLI values relate to the proportion of species expected to remain extant in the near future without conservation action
-An RLI value of 1.0 equates to all species being categorised as Least Concern, and hence that none are expected to go extinct in the near future.
-An RLI value of zero indicates that all species have gone Extinct
-A downwards trend in the graph line (i.e. decreasing RLI values) means that the expected rate of species extinctions is increasing i.e. that the rate of biodiversity loss is increasing
-An upward trend in the graph line (i.e. increasing RLI values) means that there is a decrease in expected future rate of species extinctions (i.e. a reduction in the rate of biodiversity loss)
-A horizontal graph line (i.e. unchanging RLI values) means that the expected rate of species extinctions is unchanged
-An upward trend in the graph line (i.e. increasing RLI values) means that there is a decrease in expected future rate of species extinctions (i.e. a reduction in the rate of biodiversity loss)
Source: IUCN 2020. The IUCN Red List of Threatened Species. Version 2020-2.

established to protect the habitats and populations of threatened species of wild flora (e.g., *Rafflesia schadenbergiana*) and wild fauna (e.g., Philippine falconet, Philippine hanging parakeet, marine turtles, Philippine wild duck and other waterbird species), pursuant to RA No. 9147 or the Wildlife Resources Conservation and Protection Act.

Regional consultations in the Philippines echoed the need for scientific expertise, including taxonomists, to aid in the identification of species, wildlife rescue centres to support biodiversity assessments and monitoring. There is also a lack of baseline data on the population and conservation status of species that makes the work in conservation a challenge.

The Philippines also noted the shift in more plant species listed as endangered (176) in 2007 to vulnerable (406) in 2017, which is alarming as 75 per cent of those in the list are endemic to the country. The IUCN Red List version 2020-3, though, lists the critically endangered at 205 and the endangered at 236.

The country utilised modern technology, specifically geo-tagging, to demonstrate remote tree monitoring of the following tree species: Bagadlau (*Xanthostemon philippinensis*), Mapilig (*Xanthostemon bracteatus*), Mangkono (*Xanthostemon verdugonianus*), Palawan mangkono (*Xanthostemon speciosus*), Sierra madre mangkono (*Xanthations fruticosus*), Malabayabas (*Tristaniopsis decorticata*), Dalingdingan (*Hopea foxworthyi*), Yakal Malibato (*Shorea malibato*), Samar gisok (*Hopea samarensis*), and Yakal kaliot (*Hopea malibato*).

In 2017, the Philippines addressed the conservation status of specific aquatic groups, namely: (1) marine bony fishes: pelagic; (2) marine bony fishes: demersal and seahorses; (3) freshwater bony fishes; (4) cartilaginous fishes; (5) cetaceans (Order Cetartiodactyla); (6) invertebrates; (7) aquatic snakes; (8) ornamental aquatic organisms; and (9) aquatic plants. The recommendation for the inclusion of these species in the Philippine National Red List of Threatened Aquatic Species is being drawn up to ultimately guide the country in conservation management.

Viet Nam reported that it has updated its entry of threatened species from 880 to 1,211 in its own database, the Viet Nam Red Book, which documents conservation status of animal and plant species in the country. It has used technologies (e.g., remote sensing, geographic information system, camera trapping) in biodiversity monitoring and published conservation approaches and technical guidelines on the monitoring of wetland, forest, and marine ecosystems, and for reporting on the status of biodiversity. However, there is no long-term, systematic, and comprehensive plan on monitoring and

evaluation of biodiversity across the country yet.

Recent conservation activities in Viet Nam have led to an increase in restoration areas of protected ecosystems, newly discovered species to science, and conservation, restoration, and development of valuable genetic resources. Recently, more than 500 individuals of red-shanked douc langur (*Pygathrix nemaeus cinerea*) were newly observed in Kon Tum province and over 200 individual barbe's langur (*Trachypithecus barbei*) were recorded in Thanh Hoa province.

More recent actions from Viet Nam are the promulgation of a list of aquatic species that need to be protected, rehabilitated, and developed; approval by the Prime Minister for protection and development of aquatic resources up to 2020; the Master Plan for Elephant Conservation in Viet Nam for 2013–2020; and the National Tiger Protection Programme for 2014–2022. Viet Nam has also improved the quality and populations of endangered, precious, and rare species prioritised for protection; and worked to preserve indigenous, endangered, precious and rare gene sources (livestock, plants, micro-organisms). "Precious and rare" are categories of species conservation unique to Viet Nam.

Ex situ conservation measures

Public conservation agencies (LKs), numbering 84, including animal parks, special animal parks, zoos, safari parks, zoological museums, and animal museums carry out *ex situ* conservation in Indonesia. There are also 27 special conservation agencies that function as animal rescue and rehabilitation centres for endangered animals, including Sumatran tigers, parrots, orangutans, Javan gibbons, elephants, and dolphins.

Ex situ wildlife conservation efforts have succeeded in breeding several endangered animals, including Sumatran tiger (P*anthera tigris sumatrae*) that gave birth to two tiger cubs in the animal park and one of Sulawesi's endangered endemic species, the anoa, at the Anoa Breeding Center.

Meanwhile, a national turtle conservation programme with 28 turtle hatcheries, including *ex situ* and *in situ*, was established

Box 39. More species at risk

Mekong Irrawaddy dolphin – estimated 92 individuals left

Thailand leatherback turtles - listed as vulnerable

Indochinese tigers - 350 individuals left in Cambodia, China, Lao PDR, Myanmar, and Thailand

Visayan wrinkled hornbill – only 27 individuals in the wild; it is the latest addition to the threatened endemic hornbill species in the Philippines.

Sumatran rhinoceros – fewer than 80 survive in very small and highly fragmented populations; critically endangered

throughout Malaysia. In 2013, Viet Nam carried out a review of *ex situ* conservation facilities, assessing two zoos, nine animal rescue centres, seven botanical gardens, and some repositories of genes, seeds, and genetic specimens.

Re-introduction of species to habitats from which they have been eradicated

AMS have successfully re-introduced species to their habitats and are implementing programmes to this end.

Myanmar supports the most diverse, yet most imperiled chelonian faunas in Southeast Asia. At least 27 species of freshwater turtle and tortoises are known to occur in Myanmar, including eight endemic forms. Recently, the once-considered extinct Burmese roofed turtle (*Batagur trivittata*) was brought back from the brink by an ambitious conservation programme. In 2020, the captive population was reported to be approaching 1,000 turtles.[17]

Singapore undertook an ambitious plan to establish or re-introduce populations of 11 locally endangered species in 44 habitats to ensure that natural areas in the island-state retain their species diversity and habitat resilience. The native plant species have been successfully reintroduced to more than one site, while the corals, sponges, and fauna have been successfully reintroduced to at least one site, with the exception of *Gardineroseris planulata*.

Singapore also selected 11 species from different animal and plant groups for reintroduction, originating from different habitats across the country. Singapore took various factors into consideration such as availability of suitable habitats, feasibility of enhancing present habitat to create suitable habitats for the species of interest, and ease of breeding/ translocation. The selected species recovery projects aimed to promote the establishment of self-sustainable, wild populations of these threatened species.

In Cambodia, over 150 endangered Asian Giant Softshell Turtle (*A. cartilaginea*) hatchlings were released in 2017 into their natural habitat along the Mekong River in Kratie. The hatchlings were part of a community protection programme designed to increase the wild population of the species, and had been collected from nests that were guarded by local communities.[18]

To date, extensive rehabilitation and release of endangered wildlife has been conducted in Indonesia. One notable example is the release of four individual orangutans (*Pongo pygmaeus*) from rehabilitation in Bukit Baka Bukit Raya National Park in September 2018. This release is the result of the rehabilitation process of more than 100 individual orangutans conducted by International Animal Rescue Indonesia in collaboration with Bukit Baka Bukit Raya National Park Management and West Kalimantan Regional Natural Resources Conservation Offices. There are other endangered wildlife species that have been released, including the Javan eagle (*Spizaetus bartelsi*).

As a proof of real progress in this achievement of population growth target, in 2017 alone, nine births of endangered Indonesian wildlife species were recorded, including two tarsiers (*Tarsius fuscus*) in Bantimurung Bulusaraung National Park, South Sulawesi, one anoa (*Buballus* sp) in North Sulawesi, one female Sumatran elephant (*Elephas maximus sumatranus*) in Aceh, three female Sumatran elephants, one male Sumatran elephant in Way Kambas National Park, Lampung, and one Sumatran orangutan female (*Pongo abelii*) in Aceh. In addition, a new species, the Tapanuli orangutan (*Pongo tapanuliensis*) was identified in 2017.

In 2018, Wildlife Alliance and WWF have been working with government, communities, and global conservation experts to move tiger reintroduction plans forward and ensure that Cambodia makes a contribution to the global goal of doubling wild tiger numbers.

Actions taken under CITES

CITES regulates the international trade on marine fish and invertebrates, and prevents the importation and transshipment of illegal products.

Lao PDR implements the Lao Wildlife Law Enforcement Network (LAO-WEN) to reduce illegal wildlife trade in key markets and retail hubs by expanding the capacity to detect, discourage, and disrupt organised criminal


Photo by Prayitno Goenarto

networks, and prosecute those involved in illegal wildlife crime.

Activities to achieve this include targeted skills development, awareness campaigns, information-sharing, and enhancing regional cooperation between law enforcement agencies in Thailand, Myanmar, and Lao PDR; promote a working relationships across national and border agencies, and conduct coordinative meetings and trainings.

Wildlife poaching and trafficking continues, however. A heavily threatened group of Asian mammals are the slow lorises (*Nycticebus spp*.). Although forest loss is blamed for the decline of its population, it is illegal trade that is rapidly devastating their numbers.[19]

Wildlife trafficking is an urgent concern as it could cause a global health emergency such as COVID-19. Some of the most dangerous diseases, such as Ebola, Bird Flu, and MERS, were transmitted zoonotically. The COVID-19 pandemic has highlighted the importance of a One Health approach as the solution to reduce the threat of another pandemic. One Health recognises the interconnectedness of the health of people, animals, and their shared environment.[20]

Myanmar enacted the 'Conservation of Biodiversity and Protected Areas Law' in 2018. This law has increased the penalties and provisions for illegal use of wildlife and CITES-listed species, and for illegal activities in protected areas.

Myanmar undertook efforts to reduce illegal wildlife harvest, but in the absence of an increased enforcement budget, these efforts have undoubtedly been less successful than intended. Among these efforts have been coordination among enforcement agencies, transboundary enforcement programmes with India and China, training sessions for officers and protected areas staff, and a suite of public information programmes.

In the Philippines, despite the passage of the law and issuance of relevant policies, threats to wildlife resources continue. The government has stepped up its wildlife law enforcement action through inter-agency collaboration in the law enforcement chain, which led to significant curtailment of illegal activities on wildlife throughout the country.

The country formulated the Wildlife Law Enforcement with Action Plan (WildLEAP) 2018–2028 through a multi-stakeholder consultation process to fight against illegal activities against wildlife, especially for those species falling under the jurisdiction of the Department of Environment and Natural Resources (DENR). As the country guards against encroachment of poachers within its territory, it also guards its many seaports and airports against illegal wildlife trade (IWT).

Other recent initiatives in the Philippines that address poaching and illegal wildlife trade are the USAID-funded Protect Wildlife Project (2016–2021) and the ADB/GEF-DENR Project on IWT: Combatting Environmental Organised Crime in the Philippines (2018–2021). Protect Wildlife addresses human-induced threats such as poaching and trafficking of wildlife, destructive fishing practices, and loss of habitats from widespread conversion of forests, wetlands, and mangroves to settlements and agricultural lands. The IWT Project, on the other hand, combats environmental organised crimes through legal and institutional reforms and capacity building.

The combined factors of hunting (game and food) and illegal wildlife trading threaten about half of bird population in the wild. Hornbills, parrots, doves, cockatoos, and hill mynas are most favoured targets for pet trade. Likewise, elephant ivory from African countries have found their way to the Philippines through international crime syndicates.

Article 38 of Viet Nam's Forest Law 2017 outlines the protection of forest flora and fauna. In particular, species are classified as 'endangered, rare, and precious forest flora and fauna' (a term unique to Viet Nam and that does not have equivalence with the IUCN Red List categories), and as wild plant and animal species listed under CITES. Decision


Photo by Javica Faye D. Canag


Photo by Zaharil Dzulkafly

Nso. 11/2013/QD-TTg of the Prime Minister in 2013, prohibits the export, import, sale, or transportation of specimens of certain animal species that are under CITES.

In its fight against illegal wildlife trade, Cambodia is paying more attention to the entire illegal wildlife trade chain – to what is happening locally but also in the region and at the global level, from poachers to buyers of illegally acquired wildlife or their parts. Cambodia also carried out awareness-raising and research initiatives to provide information needed by policy and decision-makers (e.g., characterisation of species at the genetic level to facilitate tracing; valuation of threatened species and the cost of losing them). Among awareness-raising initiatives were training programmes, workshops, and conferences that influenced people's behaviour positively towards conservation of natural assets.

Many organisations partnered with the Government of Cambodia to rescue threatened species, often with the participation of local communities. For example: thousands of rescued animals found sanctuary at Phnom Tamao Wildlife Rescue Centre. Wildlife Alliance's Care for Rescued Wildlife programme was able to release over 3,500 of these rescued animals back into protected habitat and more than 70 animals were born or hatched at the rescue centre. The centre has breeding success of seven (7) vulnerable species in the IUCN list at its Angkor Centre for Conservation of Biodiversity.

The Wildlife Conservation Act 2010 of Malaysia, 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 Wildlife Forensic Laboratory and the Wildlife Genetic Research Laboratory were set up to conduct genetic research and to provide forensic evidence.

Viet Nam joined CITES in 1994 and since then has made great efforts to control trade in threatened wild species. However, the country remains to be a hotspot shipment


Photo by Chen Soon Ling

especially for ivory and horns. Some parts of the population still see wildlife products such as rhinoceros' horns, tiger bone glue and bear's gall as magic medicines. Demand for these products continues.

Viet Nam's Prime Minister has issued many directives to prevent the consumption and trade of threatened species. For example, in 2016, the Prime Minister issued Directive 28/CT-TTg adopting a number of urgent measures to prevent and fight against violations to wildlife species. The government developed a communication strategy to reduce wildlife consumption and stop the trade and consumption of wildlife products.

Representatives of Governments and Regional Economic Integration Organisations gathered in Hanoi in November 2016 and agreed to issue the Hanoi Statement on Illegal Wildlife Trade to combat illegal trade of wild fauna and flora. This endorsed recommendations on combatting the illegal trade and encouraged governments to take strong actions against wildlife crime, both on the demand and supply sides. Subsequently, in 2017, the CITES Management Authority of Viet Nam hosted a meeting to develop a CITES Action Plan that aimed to combat the illegal trade of species between Viet Nam and other countries.

In 2018, TRAFFIC developed a handbook to guide the reduction of demand for wildlife in traditional medicine practices. The handbook provides key messages that need to be communicated about the protection of wildlife and aims to educate towards eliminating wildlife components in traditional prescriptions.

Species conservation in protected areas

The ASEAN has collectively established protection for 700,089.28 square kilometres (15.56 per cent) of its terrestrial area and 270,931.30 square kilometres (4 per cent) of marine area.[21]

CBD drew up the programme of work on protected areas (POWPA) to support the establishment and maintenance of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas by 2010 for terrestrial protected areas and by 2012

for marine areas. POWPA also aims for the protected areas to collectively, through a global network, contribute to significantly reduce the rate of biodiversity loss.[22]

A study estimated the effectiveness of Southeast Asia protected areas in conserving forest cover and forest carbon stocks for 2000-2018. It found that its protected areas had three times less forest cover loss than similar landscapes that were not under protection. Protected areas that had completed management reporting using the Management Effectiveness Tracking Tool (METT) were also found to have conserved significantly more forest cover and forest carbon stocks than those that had not.[22]

AMS have stepped up the establishment of protected areas. Thailand, for instance, declared the following: 81 national parks, 38 wildlife conservation areas, 48 no-hunting zones including a Level 1 Lowland and Mangrove Conservation Area. It established ecosystem restoration projects on seagrass ecology, mangrove forest, land forest, coral reefs, sea turtles, and dugong and setup guidelines to control and prevent the loss of biodiversity due to invasive alien species. The Royal Forest Department implemented the Community Forest Development Project since year 1987. Although not recognised by the legal system, these are considered valuable in relation to sustainable livelihood.[23]

Viet Nam to date has 167 protected areas with a total area of 24,533.06 square kilometres, including 33 national parks, 62 nature reserves, 17 species and habitat protected areas, and 55 landscape protected areas.

At the time Cambodia adopted Aichi Target 11, it had already exceeded terrestrial coverage aspect of protected areas. Achieving its national targets require more actions like achieving 10 per cent of coastal and marine


Photo by Amri Arfianto

Box 40. Averting wildlife decimation

The Intergovernmental Task Force on Illegal Taking and Trade of Migratory Birds was created in 2016 to end the illegal killing, taking and trade of migratory birds along the East Asian-Australasian Flyway. The Task Force covers 22 countries.

areas; ensuring effectiveness and equity of protected areas management; connectivity of protected areas; and integration within wider landscape and seascape. It designated 10 additional protected forest areas with a total area of 16,300 square kilometres.

Photo by Heinn Htet Kyaw

In 2016, the responsibility for safeguarding all protected areas and biodiversity corridors was given to the Ministry of Environment, which developed the National Protected Area Strategic Management Plan to safeguard the network of protected areas. Cambodia also employed improved patrolling using tools like the 'Spatial Monitoring and Reporting Tool' (SMART) that enabled it to make positive progress towards achieving the target.

After more than five years of baseline social and biophysical research, intensive consultations and collaborative work with government agencies, NGOs, local authorities, tourism operators and community fisheries (CFis), Cambodia designated the country's first large-scale marine protected area (MPA) (524.98 km^2), Marine Fisheries Management Area (MFMA), in Preah Sihanouk province in 2016. MFMA is home to flagship species such as Irawaddy dolphins, dugongs and sea turtles, as well as to coral reef, seagrass and mangrove habitats which support many charismatic and threatened species.

One key project implemented by the organisation Mlup Baitong with support from Keidanren Nature Conservation Fund is the "Environmental Education for Conservation of sarus crane (*Grus antigone*) in Cambodia" in the Baitong Kampot coastal wetlands, an important feeding ground for this vulnerable bird species that has already gone extinct in several Asian countries. Up to 30 per cent of Cambodia's sarus crane population visit the wetlands in Kampot during the dry season to feed. Degradation and loss of wetlands, use of pesticides and hunting all contribute to dwindling populations of these large birds in Cambodia.

The project focuses on protecting these valuable wetlands and educating local people about environmental issues and 10 environmental lessons by engaging the young generations first, followed by capacity building for local communities in general.

In-situ conservation in Indonesia has been carried out by establishing protected areas such as national parks, wildlife reserves and botanical gardens throughout the country under the coordination of the Bogor Plant Conservation Center, which also takes care of restoration efforts.

In the efforts to maintain populations of endangered species, management stages have been established for both terrestrial and marine animals suffering from population pressure and vulnerability. Indonesia has published *Government Regulation No. 7 Year 1999 on Preservation of Plants and Animals Species* since 1999.

In addition to the establishment of protected status of flora and fauna, Indonesia has also protected several important spawning, foster, and foraging areas. As of 2018, it has established 172 locations of conservation areas for 20 priority species of protected and/or endangered biota as stipulated by it Ministry of Marine Affairs and Fisheries.

Consolidated protected area of AMS as reported in their 6NR to the Convention for Biological Diversity brings the total to 971,020.58 square kilometers of which 700,089.28 square kilometers are terrestrial protected areas and 270,931.30 square kilometers are marine protected areas. Table 10 under Target 11 reflects the terrestrial and marine protected area figures of AMS.

Challenges

Resource extraction and food production for a burgeoning population, not to mention corporate profit, is driving species extinction. Agricultural production needs to keep apace with increasing demand for food by a burgeoning population.

Demand for oil and gas products spiral even as oil fields begin to get depleted, driving economies to tap into other sources such as biofuels. As a result, biofuel feedstock production, which could be more profitable, competes for land with food production.

Infrastructure requirements for timber and industry demand for precious ores and minerals push land use and extraction beyond acceptable limits and into forest lands and wildlife habitats.

Meanwhile, international wildlife trade for food, medicine, clothing, accessories, and ornaments is causing further extinction of animal and plant species. Greater trade, transport, travel, and tourism have facilitated the introduction of invasive alien species that are causing biodiversity loss.

Habitat destruction in all parts of the world is unmitigated. Moreover, there is limited information on the extent that these activities are damaging ecological balance because in most cases their impact magnify and exacerbate each other. For instance, mining causes deforestation and species decimation. Deforestation in turn causes greenhouse gas emissions and global warming that further drives species loss.

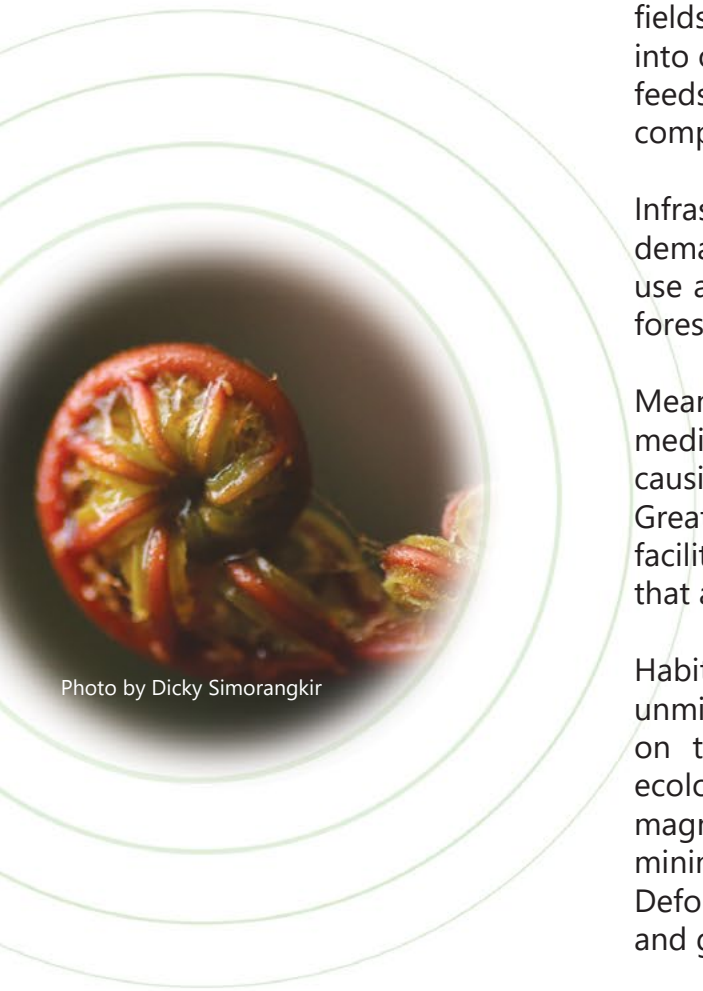


Photo by Dicky Simorangkir

Ways Forward

- Education must begin at the earliest possible time. Cambodia has done this through a biodiversity-themed event involving the youth. Biodiversity principles have to be drummed up among the learners at an early stage for early awareness and better appreciation.

- If the situation in the Philippines may be taken as an indication of the shortage of taxonomists in the region, the AMS can remedy this by increasing investments in and support for scholarships and training programmes in taxonomy and allied areas including environmental economics. Biodiversity education could possibly be more impactful with biodiversity loss quantified through valuation.

- Drawing the universities into the task through research programmes is possibly a workable approach to undertake such a challenging task.

- AMS should invest in a concerted and well-funded operation against these criminal syndicates. Linking with international agencies such as United Nations Office on Drugs and Crime (UNODC) has shown its benefits, hence fostering partnerships with these organisations that have common objectives is recommended. The AMS should also look internally into improving their systems and reduce opportunities for corruption.

- The use of high/modern technology for biodiversity protection has been demonstrated by UNODC as effective in helping combat wildlife crimes. Investing in effective crime prevention and enforcement should include allocations for the acquisition and use of cutting- edge technology. Addressing wildlife crimes in this manner may help prevent the next pandemic.


Photo by Yusuf Madi

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.

Collectively, the AMS have secured plant genetic resources from 55,000 accessions in 2010 to 58,000 in 2018, about 5 per cent of which are crop wild relatives. However, with the continuous decline in agrobiodiversity resources, efforts need to focus on opportunities where agricultural production is most viable and sustainable.

Challenges

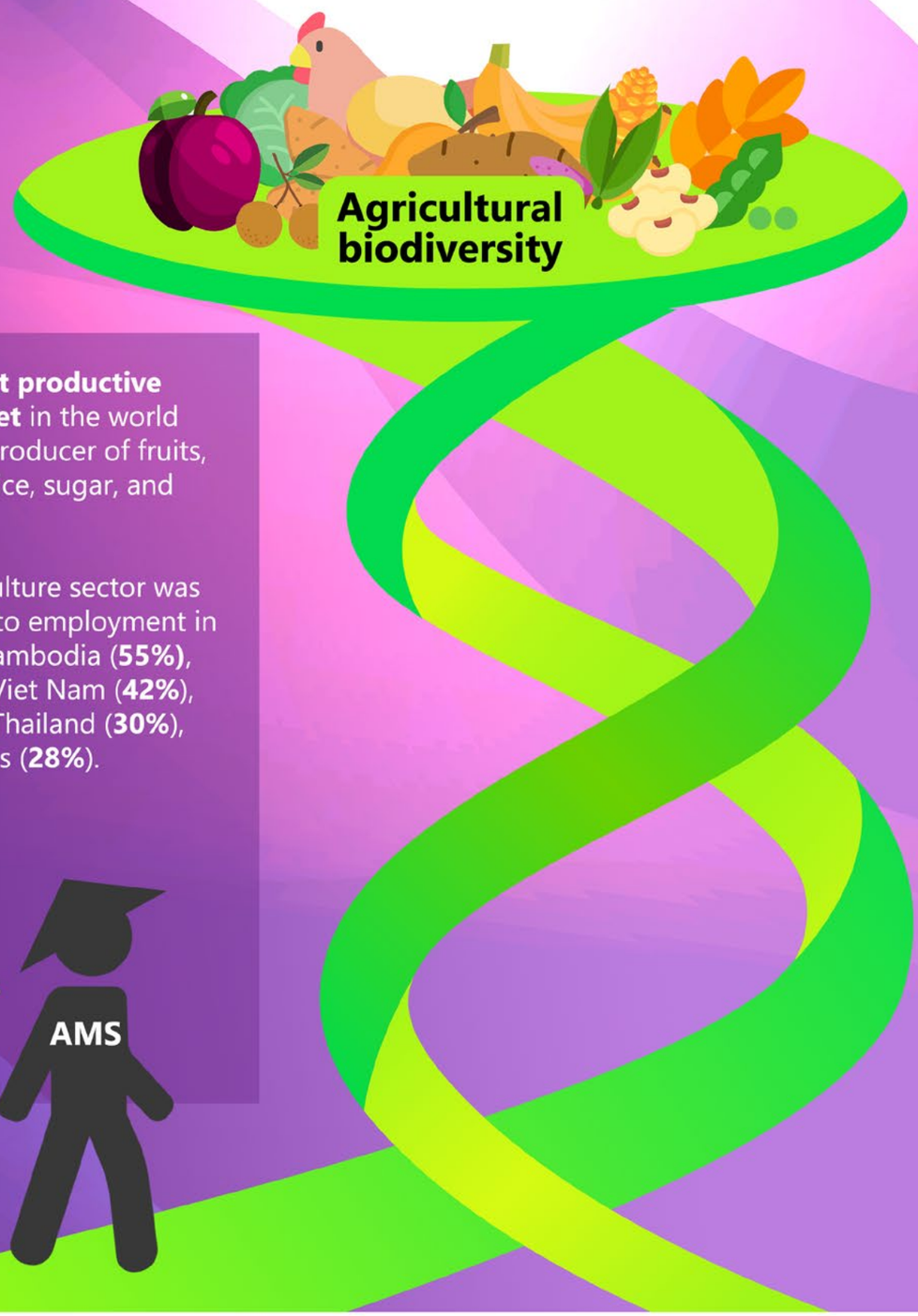
- Agricultural intensification
- Insufficient data
- Climate change
- Conversion to agricultural lands
- Decline in pollination services
- Proliferation of IAS
- Insufficient legislation and implementation
- Intellectual property rights issues

ASEAN is the **most productive agricultural basket** in the world and is the major producer of fruits, palm oil, rubber, rice, sugar, and seafood.

In 2018, the agriculture sector was a key contributor to employment in Lao PDR (**72%**), Cambodia (**55%**), Myanmar (**50%**), Viet Nam (**42%**), Indonesia (**32%**), Thailand (**30%**), and the Philippines (**28%**).

Seven (7) AMS are Parties to the International Treaty on Plant Genetic Resources for Food and Agriculture.

Agriculture is the main source of food and livelihoods to millions of families in the ASEAN region.



Ways Forward

- Establish a coherent and comprehensive inventory of genetic resources
- Develop National Agro-Biodiversity Programmes and Action Plans
- Mainstream agrobiodiversity into policies
- Ensure the safety and preservation of genetic resources
- Provide funds, technical support, and infrastructure
- Promote on-farm agro-ecological farming methods
- Aim for an inclusive and integrated approach to ecosystems management


Photo by Amri Arfianto

Aichi Biodiversity Target 13: Safeguarding genetic diversity
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 viable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.

AMS have made clear progress in their initiatives in preserving agrobiodiversity and minimising genetic erosion of cultivated plants and farmed or domesticated animals and their wild relatives. Generally, AMS undertook programmes to build *ex situ* and *in situ* collections as well as their gene banks as insurance to agrobiodiversity loss.

Aside from their commitments to accomplishing the Aichi Targets, AMS collectively committed to various initiatives towards attaining said targets, through the development of a regional action plan with the support of the ACB, the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), and Maejo University in Thailand. Moreover, the *Biodiversity-based Products as an Economic Source for the Improvements of Livelihoods and Biodiversity Protection* Project is being implemented with the assistance of the ACB and *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) GmbH.

Viet Nam has undertaken *ex situ* conservation of a high number of medicinal plant species. It established ten medicinal plant research centers and more than 50 medicinal plant gardens to conserve and develop this rich resource. The National Institute of Medicinal Materials has preserved 905 genetic resources by *in situ* conservation and 630 species of medicinal plants by *ex situ* conservation, of which 26 species are threatened. Moreover, the Botanical Garden of Hanoi at the University of Pharmacy houses about 20,000 samples of its medicinal plants collected from its establishment in 1910.

Remarkable in the breadth of implementation of *in situ* conservation is Cambodia's assignment of a 506-hectare area in the Cardamom Mountains, an internationally recognised biodiversity hotspot; and Indonesia's identification of 22 biodiversity parks across the country for the purpose of agrobiodiversity conservation.

Malaysia for its part, was successful in *ex situ* conservation of farm animal species through live breeding cryopreservation to serve different but complementing purposes, and through *in vitro* collection, including gene banks for aquatic and marine species.

In terms of gene bank accessions, Malaysia, Indonesia, and Viet Nam led in initiatives to build their respective collection of agrobiodiversity species.

Indonesia relied on advanced technology to maintain the sustainability of germplasm. Between 2012–2016, 366 applied technology engineering in aquaculture were used to increase availability and quality assurance of broodstocks and seed production of aquaculture commodities.

Lao PDR being the epicentre of agriculturally important plant species and varieties and a global repository of glutinous rice varieties with more than 13,500 rice samples representing 3,000 rice varieties should be afforded all possible approaches for conservation measures.

Viet Nam has a very comprehensive accession, covering not only their macro but also the microbiota.

Food and nutrition security is seldom linked to the diversity of ecosystems. However, the various farming systems made possible by species and gene pools that ultimately lead to food and nutrition security are actually forms of ecosystem services. Moreover, research by Bioversity International in collaboration with the Earth Institute found that child malnutrition incidence could be brought down by food production founded on a diverse farming system enhanced by ecosystem services.

The homogenous diet that people are accustomed to is not only nutritionally deficient but increases their vulnerability to poor food access in the midst of climate change[1], disease outbreak, uncertain rainfall, price fluctuations of cash crops, socio-


Photo by Jesse Alegre

political disruption, and the unpredictable availability of agrochemicals.[2]

This species and genetic diversity in agroecosystems or agricultural biodiversity/ agrobiodiversity is a vital sub-set of biodiversity.

The UN identified agricultural biodiversity or agrobiodiversity as necessary to deliver on seven SDGs, highlighting the underpinning character of agrobiodiversity in attaining the Goals.

Agrobiodiversity, which is essential for sustainable food and nutrition security, helps maintain and increase soil fertility, mitigate the impact of pests and diseases, provide additional benefits for human productivity and livelihoods, and enable the AMS to better cope with the impacts of climate change.[3]

In 2016, the UN Biodiversity Conference held in Cancun, Mexico, themed *Biodiversity Mainstreaming for Wellbeing*, discussed these links; and in a call to mainstream biodiversity into agricultural sectors, suggested the necessity for this to be based on scientific research and local traditional knowledge.[4]


Photo by Kyaw Naing Lin

AMS and agrobiodiversity initiatives

Laying the groundwork for the development of a regional action plan to mainstream agrobiodiversity, ACB, SEARCA, and Maejo University, held a regional workshop on 12–14 September 2017 participated by 70 individuals from the environment and agriculture ministries of AMS, universities, research organisations, non-government organisations, and development partners.

At the workshop, which was aimed at raising awareness of the importance of agrobiodiversity for sustainable development and food security, the participants identified and discussed strategic action points for the plan of action based on the CBD programme of work.[5]

A year later, AMS made a pronouncement that they are mainstreaming biodiversity within and across sectors, particularly in agriculture and forestry through a biodiversity-based products project. AMS implemented the *Biodiversity-based Products as an Economic Source for the Improvement of Livelihoods and Biodiversity Protection Project* (BPP) with the support and collaboration of GIZ and ACB. AMS would have as their aim the scaling up of efforts in biodiversity conservation while involving indigenous populations.[6]

A much earlier initiative showed that agrobiodiversity was already a concern of much importance even in the 2000s. In a national case study that examined the impacts of sectoral economic activity on biodiversity, IUCN in 2001 noted that in Viet Nam, the use of high-yielding crop varieties has led to a loss of agrobiodiversity. Highlighted was the case of biodiversity loss in rice where about 20 traditional varieties were cultivated in the past. Today, the country is down to five genetically engineered rice varieties.[7]


Photo by Hu Toh Kai

Assessment of Progress

How AMS have progressed with the establishment of genebank accessions is indicated by programmes on *ex situ* and *in situ* collection and gene bank accession, trends in genetic diversity of cultivated plants, livestock, and fish species. Also documented here are related activities carried out by AMS towards accomplishing the primary indicators such as the building of their databases, which may be minor but are valuable in providing direction to agrobiodiversity preservation.

Ex situ conservation for crops and livestock

Ex situ and *in situ* conservation approaches are not mutually exclusive, and should complement each other. *Ex situ* conservation is primarily being carried out at a 5.06-square kilometre area of the Cardamom Mountains of Cambodia, one of the world's 34 internationally recognised biodiversity hotspots and a global repository of genetic diversity of plants and animals, as well as in biodiversity parks in Indonesia. However, these protected areas have *in situ* conservation functions, especially for plants that need to be assisted by animals in pollination and/or seed dispersion. From 2015 to 2017, 22 biodiversity parks with a total area of 17.16 square kilometres were established across Indonesia.

Malaysia has well-developed *ex situ* conservation facilities for local farm animal genetic resources. Its gene banks at the National Institute of Veterinary Biodiversity in Jerantut, Pahang and the newly launched National Animal Embryo Centre at MARDI Research Station in Kluang, Johor have maintenance and live breeding, as well as cryopreservation facilities for semen, embryo, and other genetic materials.

It has also established *in vitro* collection of farmed aquatic species and their wild relatives, and has established gene banks of gametes, embryos, and tissues of indigenous freshwater and marine species. It has fish

Table 13. Gene bank accessions per AMS

AMS	Accessions and Initiatives to Build Them
Cambodia	Its National Herbarium at the Centre for Biodiversity Conservation. Royal University of Phnom Penh, houses about 12,500 specimens. The Cambodia Agriculture Research and Development Institute (CARDI) has a gene bank of cereals, legumes, and vegetables; on-field conservation area for fruit trees and root crops; and an *in vitro* culture facility for ornamental plants, bananas, and potatoes, It maintains 8,261 accessions/samples of 38 crops. The International Rice Research Institute reintroduced 766 traditional Cambodian rice varieties from its genebank which it held in trust for the latter.
Indonesia	Genebank hosts seed collections for crops, and several accessions are conserved *in vitro*. Indonesia also has Germplasm Collection Gardens for fruit and garden plantations. These facilities are in various research institutions according to their mandated commodities. The Centre for Animal Research and Development (Puslitbangnak) is in-charge of conserving livestock genetic resources, especially for cattle. This is done through isolation/selection of superior cattle on islands devoid of other cattle species to prevent crossbreeding with other cattle. For example, preservation of Bali cattle is carried out on Nusa Penida Island (Klungkung Regency) to maintain genetic purity. The Provincial Government of Bali has begun an effort to certify Bali beef as a genetic resource on the island. As of 2018, the total collection of managed national genetic resources in Agricultural Germplasm Banks in BB Biogen is 10,790 accessions. In addition, there is a collection of 1,404 microbial agricultural national genetic resources. Collection of national genetic resources for food crops is also stored in various regions, such as in Central Java, Aceh Province and Bone Bolango Regency Gorontalo Province.
Lao PDR	Vegetable diversity is high with 2,100 accessions of local vegetables, non-timber forest products, and highly diverse livestock and in-land fisheries. It identified underutilised plant species and is now using Nor Loy (*Arundinaria petelotti* Camus) and Nambak oranges (Citrus). Seven villages and 143 households have domesticated and planted Nor Loy near their villages for soil stabilisation purposes and as a food and income source.
Malaysia	The National Animal and Embryonic Centre (NAEC) conserves local genetic material (14,014 semen and 173 embryones) and imported genetic material (2,768 semen and 80 embryones) for animal genetic resources conservation. MARDI museum hosts 31,500 insect and 2,175 microbial specimens associated with agriculture. The Collection of Functional Food Cultures conserves, manages, and utilises 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 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 and 3,579 accessions are fruits, herbs, and vegetables). MARDI also conserves underutilised fruit genetic resources in the field. It has 3,643 accessions, including fruits, herbs, medicinal plants, traditional vegetables, bio-pesticide plants, and aromatic plants. 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. MyGenebank, a national, higher capacity genebank was established in 2015 to serve as the coordinating hub of germplasm exchange in the country performing primarily characterisation and evaluation.
Myanmar	Has a morphological characterisation on Sein Ta Lone Mango (*Mangifera indica* L.) accessions from five different regions (2018); and the genetic variability of Myanmar mango land races (*Mangifera indica* L. var. Sein Ta Lone) from different eco-regions, using microsatellite markers (2018); Collected accessions from crops and regions for the National Seed Bank that have been identified as priorities in national gap analysis. Has more than 12,000 crop species accessions in cold storage and more than 2,400 accessions in long-term international cold storage systems. Seed collection data includes a total of 12, 670 accessions of rice, wild rice, food legume crops, oilseed crops, and other crop species. Myanmar has crop germplasm of almost 2,500 safety back-up in other gene banks in Norway, Korea, Philippines, and Columbia.
Philippines	As of 2007, there were 173,205 accessions of *ex situ* germplasm collections assembled and maintained by 45 government and non-government organisations including state colleges and universities, the Bureau of Plant Industry, and the International Rice Research Institute.

Philippines	Established a network of agencies from focal agencies and involved in the implementation of the programme of conservation and storage of gene sources. Has 3,948 species of plants and large fungi belonging to 307 families that are being used as medicines. Over ten medicinal plant research centres and more than 50 medicinal plants gardens have been established to conserve and develop this rich resource. The National Institute of Medicinal Materials has preserved 905 genetic resources *in situ*. Four organisations have cold storage warehouses for seed preservation; however, the cold storage warehouses are relatively small in size.
Viet Nam	In 2011–2015, the Plant Resources Center of the Viet Nam Academy of Agricultural Sciences stored over 38,334 specimens and collected 7,721 seedlings from more than 100 plant species across Viet Nam belonging to various plant groups, including cereals, legumes, vegetables, spices, and root crops. There has been a particular focus on collecting genetic resources for plants that are at high risk of erosion and have important value in agriculture. Forest tree seeds, imported plants and rare native plants with high economic value have been stored, as a result of the Conservation of forest tree genetic resources and plant varieties projects conducted from 2010 to 2015. As a result, 86 provenances and 593 individuals were obtained from 79 species of native, rare and/or economically valuable forest trees. Thus, the current seed bank stores 3,727 provenances (genetic resources) and individual seed lots of 90 native species and imported tree species. Since 1989, the National Livestock Research Institute has implemented the Livestock Genetic Resource Conservation Scheme to conserve genetic resources and rare livestock breeds. Under this project, 70 threatened livestock and poultry species have been preserved. The fisheries sector has preserved and stored 43 aquatic genetic resources with a total of 4,039 individuals, including imported species (original seeds), and rare and valuable native species. In 2015, 11 species of microalgae as food for aquatic seed production were stored. The plant protection micro-organism gene fund currently maintains 700 cultivated microbial gene sources, including 622 bacterial gene sources and 48 bacteriostatic gene sources. It also regularly stores 870 plant protection microbial genetic resources, including 803 plant pathogen microbial genetic resources and 67 useful microbial genetic resources. Medicinal plants: based on the directory of 40 valuable medical herbs issued by the Ministry of Health, different material areas of medical herbs have been developed, providing materials for medicine processing.

sperm cryo-bank and freshwater repository while marine species collections are preserved in fisheries research centres.

Myanmar utilises research centres and its Department of Agriculture to host *ex situ* conservation of medicinal and indigenous orchids, plantain, root crops, fruits, vegetables, legumes, tea, and others.

Viet Nam has expanded *ex situ* conservation facilities to 11 wildlife rescue centres, 3 zoos and botanical parks (Thu Le; Bach Thao, Thao Cam Vien), 15 botanical gardens within protected areas (about 80 km^2), and a 3-square kilometre medicinal herb garden. The National Institute of Medicinal Materials has preserved 630 species of medicinal plants by *ex situ* conservation, of which 26 species are threatened.

Genetic diversity of terrestrial domestic animals

The demand for livestock products is growing strongly in Southeast Asia, which is driving increased use of higher productivity and mostly exotic livestock breeds among small-scale producers and larger commercial producers.[8] As farmers strive to cater to the demand, the risk of native, endemic breeds being edged out by exotic breeds present a challenge to agrobiodiversity.

AMS such as Cambodia have been receiving support to build their capacity in animal breeding to enable them to perform phenotypic and molecular characterisation of locally adapted breeds and in-country research on characterisation of breeds of populations of cattle, sheep, goat, and guinea

fowl; establishment and strengthening of molecular genetic laboratories; equipment and supplies required for functional semen-cryopreservation laboratories; and training-capacity building in molecular genetic characterisation of domestic animals.

Indonesia conducts conservation of genetic diversity especially for cow cattle through the isolation and selection of superior cattle on islands devoid of other cattle species to maintain genetic purity.

Viet Nam identified and preserved 70 threatened livestock and poultry species under a livestock genetic resource conservation scheme. The government has prioritised the conservation of genetic resources as an important part of promoting production.

Malaysia takes a two-pronged approach in *ex situ* conservation of local farm animal genetic resources involving cryopreservation of genetic materials to preserve the current genetic status and maintenance and breeding of live animals for further diversification of the breeds. Government supplies breeders with embryos and semen for cows, goats, and kampung chicken to facilitate the breeding process.

Lao PDR, on the other hand, has high livestock diversity with a number of indigenous breeds of chicken, buffalo, and pigs still existing.

Trends in the genetic diversity of cultivated plants, fish species of major socio-economic importance

Agrobiodiversity in Lao PDR is not only locally important but is significant on a global scale as the country is a centre of origin of many agriculturally important plant species and varieties. In particular, it is a globally important repository of glutinous rice varieties. Since the early 1990s, more than 13,500 rice samples have been collected from


Photo by Nurul Ain Hamdan


Photo by Aung Kyaw Moe

Lao PDR, of which 85 per cent are glutinous types. These samples represent more than 3,000 rice varieties.

Cambodia in 2016 accepted 766 traditional Cambodian rice varieties from the International Rice Research Institute which held 2,895 types of rice seeds in 2016 for the country. Rice and other crops in Cambodia have high genetic variation.

In the Philippines, about 3.1 per cent of the rice produced are traditional varieties. In the Ifugao Province, 90 per cent of rice planted is a traditional rice variety locally known as Tinawon or heirloom rice, an old cultivar maintained by farmers of the Tuwali tribe farmers.

The Philippine Department of Agricullture and the International Rice Research Institute collaborated on conducting the Heirloom Rice Project to enhance productivity and livelihood and conserve *in situ* on-farm farmer–preferred heirloom/traditional, climate-resilient varieties and upland food crops by increasing the productivity of these varieties through technologies, processes, and management options to smallholder groups and enterprises as models.[9]

About 44 traditional rice varieties in Hingyon and 25 varieties in Lake Sebu are planted mainly for home consumption. The distinctive agricultural biodiversity and cultural importance of these products and target sites are currently being assessed and validated for recognition as nationally important agricultural heritage systems (NIAHS) sites.
Nearly 75 per cent of rice production areas in Asia is planted to modern varieties. This is prevalent in the lowland areas where genetic diversity was originally very high. Since then, rice genetic diversity has greatly declined due to the adoption of modern varieties with a narrow genetic base.[10]

Lao PDR is not only a centre of agricultural diversity, it also has incredibly high aquatic diversity with the Mekong River and its tributaries hosting the largest in-land fisheries in the world. Non-timber forest products abound in Lao PDR, as well, such as plants, barks, vines, tubers, and other forest products. To maintain the sustainability of germplasm, Indonesia relies much on advanced technology. Between 2012 to 2016, 366 engineering technologies in aquaculture were applied to increase availability and quality assurance of broodstocks and seed production for aquaculture commodities.

In the case of rice, preserving accessions of traditional rice varieties and continuing to plant them in Asia will help avert their loss and significant reduction in genetic diversity as farms adopt modern varieties.

Databases

Documentation through databases and lists are important tools that would help the AMS determine where it is and how it is doing in the work to stanch biodiversity loss.

Table 14. Database/List of genetic resources in some AMS and measures for their expansion

AMS	Database/List and Measures taken by AMS to Build These
Cambodia	Cambodia CHM and Rio conventions web portal on plant genetic resources for food and agriculture, other plant genetic diversity and animal genetic diversity Lists of wild root and tuber food plants, wild vegetable species used for food, nuts and pulses found in upland areas and wild fruit species; list of priority neglected and underutilised species Inventories of cultivated plants can be found on internet (e.g., https://commons.wikimedia.org/wiki/Category:Cultivated_plants_of_Cambodia) Scientific as well as popular literature in Khmer, English, or French (e.g., *Medicinal Plants around our Houses* or the series *Cambodia Medicinal Plants* published by the Department of Health, Ministry of Health, or *Flore Photographique du Cambodge*; *the 2004 Medicinal Plants of Cambodia* by Lavit Kham; *Useful Plants of Sandan - A brief guide for visitors to Sandan Community Ecotourism Site Cambodia* by Winrock)
Indonesia	Indonesian Red List Book Volume 1: 50 Types of Commercial Wood Tree Indonesia Biodiversity Information Facilities (InaBIF / http://inabif.lipi.go.id) Information and Registration System of Indonesian Botanic Gardens' Plant Collections (SIGit) Center for Agricultural Biotechnology and Genetic Resources Research and Development (BB Biogen), Agriculture Research and Development Agency, Ministry of Agriculture has had a Germplasm Bank (http://biogen.litbang.pertanian.go.id/bank-plasma-nutfah) to collect various types of plant national genetic resources, especially food crops. Minister of Agriculture Decree No. 341 Year 2001 a National Germplasm Commission was established and in 2018, it was amended to National Commission on Genetic Resources to serve functions aimed at increasing management effectiveness
Malaysia	Agrobiodiversity Information System (AGROBIS) with 17,243 accessions listed
Viet Nam	Aquatic genetic data is updated at the website http://gca.ria1.org. Agricultural crops website: www.pgrvietnam.org.vn The Viet Nam Institute of Forestry Science has published seven Atlas of Viet Nam books on forest trees containing 800 species. In 2012–2015, the database of floral resources was updated and posted on the website www.vafs.gov.vn. Medicinal plants: a software for genetic resources management was developed and applied by the Institute of Medicinal Materials; Livestock: The Institute of Animal Husbandry developed a software including VietBiodiva and VietGen to manage livestock breeds Micro-organisms: The Micro-organism Museum (National University of Hanoi) and Food Industrial Institute have a website and an online catalogue Most of the stored genetic resources have been put in databases. Currently, the unified database has more than 35,755 records of registration and background data, containing 46,914 data records describing and initially evaluating genetic resources. More than 5,686 images of genetic resources have been captured, processed, and managed.

Photo by Wahyu Budiyanto

Challenges

Indigenous and traditional agricultural communities are custodians of agrobiodiversity through the traditional resource management practices[11] that they have followed as part of their culture and as handed down from generation to generation. This aspect of agrobiodiversity could not be seen in the 6NRs. Inclusion through case studies would be instructive and a valuable material to showcase sustainable living.

It is not very easy to appreciate the significance or impact of numbers unless historical information on them (i.e., accessions) is made available. It is therefore suggested that numbers on accessions should have time indications and more importantly, reflect the progress made over the years.

Ways Forward

- Research exploring the potential for consumption of underutilised species is ongoing in Malaysia and Lao PDR, which could be replicated in other AMS.

- Work in documenting agrobiodiversity, and biodiversity in general, urgently needs to be intensified against background extinction rates. This would facilitate systematic conservation work in the AMS and provide the research and development community a vital resource in their work.

- AMS could work with higher education institutions that have established their BIS or have inventories to initiate a national BIS.


Photo by Ari Kustiawan

STRATEGIC GOAL D

Enhance the benefits to all from biodiversity and ecosystem services

Photo by Ari Kustiawan

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.

The AMS have focused on rehabilitating terrestrial habitats, particularly through reforestation, to increase carbon stocks while maintaining other ecosystem services for communities.

Challenges

- Undervalued ecosystem services
- Degradation of ASEAN inland waters
- Changes in ecosystem services are not widely tracked
- Insufficient data on the management of key ecosystems
- Conflict between biodiversity conservation and economic development
- Lack of specific national law or regulatory framework for PES

Integrated resource management is a key strategy for AMS to ensure connectivity of terrestrial and inland aquatic habitats in the region.

Ways Forward

- Integrate ecosystem services and sustainable management in all industries
- Adopt integrated, proactive, and innovative approaches including nature-based solutions to restore
- Focus on the restoration of ecosystems with greater CO_2 sequestration value
- Develop policies that disincentivise the use of fossil fuels
- Establish financial contribution mechanisms
- Capture, consolidate, and map carbon data assessed by government, academic, and research institutions for proper monitoring

Photo by Nikki Sandino M. Victoriano

Aichi Biodiversity Target 14: Ecosystem services

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.

Rich and diverse ecosystems in the region provide significant benefits, also known as ecosystem services, to millions, both within and beyond the ASEAN borders. ASEAN Member States (AMS) have focused on rehabilitating terrestrial habitats, through reforestation, implementation of integrated resource management and other strategies, to increase carbon stocks while maintaining other ecosystem services for communities.

Aside from climate regulation and carbon sequestration, the region is also focusing on water availability as a key ecosystem service to be maintained through biodiversity conservation. With 16.2 per cent of the world's total renewable water resources in the region, AMS have been implementing integrated resource management to ensure connectivity of terrestrial and aquatic ecosystems and maintain its water resources.

AMS reported the formulation of various action plans and activity programmes based on national needs. National legislations and codes that dealt with payment for ecosystem services (PES) schemes were enumerated. Restoration projects that focused on degraded agricultural lands included the rural poor as their stakeholders.

Most AMS have progressed towards this Aichi Target but at a rate that is not likely to achieve the target. Aichi Target 14 contributes directly to SDG 5 (gender equality), as it identifies underserved groups and communities as its beneficiaries. In addition, it is related to SDGs 6 (clean water and sanitation), 14 (life below water), and 15 (life on land). Progress in achieving Aichi Target 14 is also linked to Aichi Targets 6 (sustainable management of aquatic resources), 7 (sustainable agriculture, aquaculture and forestry), 10 (relief of pressure on vulnerable ecosystems), and 15 (restoration of ecosystem resilience).

Studies continue to discover how biodiversity is linked to the capacity of ecosystems to provide services integral to addressing the needs of the under-served populations.

Achievement of Aichi Target 14 would therefore ensure access to basic human needs, including water, food, clean air, shelter and energy, and intangible services, such as climate regulation and water conservation, for millions both within and beyond the ASEAN borders. In addition, this is the only Target to identify underserved groups and communities as its beneficiaries.

In light of climate change, ecosystem services like carbon sequestration, climate regulation, and storm protection, become even more valuable as nature-based strategies in mitigation and adaptation efforts.[1] For example, forested areas provide a cooling effect to immediate areas. A study found that tropical forests in particular are able to lower temperatures by more than 2° during daytime.[2] They also reduce impacts of disasters by preventing soil erosion and controlling floods.[3]

People in urban environments may value particular ecosystems for the health benefits that they provide. For instance, a study on therapeutic horticulture in Singapore infers that people who practice it reduces depression by seven per cent, high blood pressure by nine per cent, and improves the overall well-being.[4] Engaging with nature passively (e.g., visiting outdoors and green spaces) and actively (e.g., gardening) alleviates stress through increased self-esteem and life satisfaction, thus, reducing depression. The practice is nothing new. In fact, in the 1940s, horticultural therapy was used for war veterans to combat stress.

More often than not, these intangible ecosystem services are not monetised in conventional markets, due to their intangibility, even though they are often of great value to communities.[5] In addition, supply of food, energy and materials is oftentimes prioritised over conservation.[6]

Target 14 emphasises the restoration and safeguarding of ecosystems that provide these essential services for AMS.

GBO 4 reported there has been little sign of progress towards meeting Aichi Target 14 by 2020 on a global scale.[7] In fact, trends seem to be moving in the opposite direction of what was targeted, when considering the provision of ecosystem services that are of particular importance to identified populations.

According to the global assessment report of IPBES in 2019, ecosystem services are deteriorating worldwide.[8] The IPCC Report on the Global Warming of 1.5°C articulated that minimising the increase of global temperature will reduce further impacts to ecosystem services. International cooperation and local efforts are therefore needed to help reverse the deterioration of ecosystem services at the global level.

At the regional level, most AMS have progressed towards the target but further actions need to be done.

Box 41. Types of Ecosystem Services

Provisioning services. These are products obtained from the ecosystems, such as food, water, fuel, and timber. These often have a clear monetary value attached.

Regulating services. These are benefits received from the regulation of ecosystem processes, such as air quality maintenance, water regulation, flood control, and biological control.

Cultural services. These include the nonmaterial benefits that relate to spiritual enrichment, educational and recreational experiences.

Supporting services. These provide indirect and long-term benefits to communities by supporting the other ecosystem services. Examples include soil formation, nutrient cycling, and provision of habitats.

Box 42. Beekeeping in Thailand provides income and promotes forest conservation[9]

Since 2003, a community enterprise in Nai Nang Village, Krabi Province of Thailand has been promoting the restoration of mangrove forests around the village through the use of bees as the main pollinators.

After being introduced to the community-based ecological mangrove restoration model through the *Mangrove Action Project*, the conservation group formed an apiculture group in 2014 to provide its members with alternative income sources while helping in conserving mangroves. The group then started producing Nai Nang Honey, a pesticide-free product which is sustainably harvested once a year. In 2016, 51 members (40 men who are beekeepers and 11 women who are value-added honey product producers) benefitted from the initiative.

Aside from promoting the pollination of crops and mangrove forests, the Nai Nang Honey initiative also provides financial support for mangrove conservation efforts – 15 per cent of the honey product sales goes towards the Nai Nang Village Mangrove Conservation Fund.

Photo by Amin Asyraf Tamizi

Maintaining ecosystem services through natural resource management

AMS have focused on rehabilitating terrestrial habitats, particularly through reforestation, to increase carbon stocks while maintaining other ecosystem services for communities. Countries such as Lao PDR, Malaysia, Thailand, and Viet Nam have indexed over 10,000 square kilometres of land among themselves for forest rehabilitation and conservation of protected forest area. In addition, AMS have programmes committed to planting trees with the support of communities on allocated land areas. AMS' participation is anticipated to increase through the *ASEAN Green Initiative* where 10 AMS committed to plant at least 10 million native trees in a span of 10 years, in line with the UN Decade on Ecosystem Restoration.

This is a welcome shift towards sustainable development and green economies, where economic development is driven by "green" investments in initiatives improving resource efficiency, reducing carbon emissions and pollution, and conserving the environment.[10] An example of an AMS initiative is the *Philippine Master Plan for Climate Resilient Forestry*, which is estimated to yield more than 300 million tons of expected net carbon benefit from 2015 to 2028.

Particular types of forests, especially mangroves, not only contribute to disaster risk reduction, but also serve as important carbon sinks by storing 6–8 Mg CO_2e per 0.01 square kilometre each year[11]. With a third of the world's mangrove forests located in the region,[12] ASEAN would have the opportunity to capture even more carbon through mangrove conservation.

AMS continue to support mangrove conservation initiatives throughout the region. For instance, Malaysia's permanent forest estate now includes 5,440.32 square kilometres of mangroves, with five (5) sites designated as Ramsar sites, or wetlands of international importance.[13] In the Philippines, the *Mangrove and Beach Forest Development Project*, which is included in the *National Greening Programme* of the country, aims

to preserve mangroves and ensure that they provide ecosystem services to coastal communities.

Aside from climate regulation and carbon sequestration, the region is focusing on water availability as a key ecosystem service that should be maintained through biodiversity conservation. Although ASEAN has 16.2 per cent of the world's total renewable water resources, and has access to abundant freshwater,[14] water still needs to be conserved if other ecosystems and communities are to continue to benefit from these.

Forest conservation is one way to ensure that water sources are not depleted. Although it may seem like having more trees would increase the demand for water, studies continue to show that maintaining forested areas help regulate precipitation, and therefore, increase water availability.[15] Forests also filter pollution and help reduce soil erosion, thus improving water quality, as well.[16]

Another approach to enhance water availability is by conserving waterways and other aquatic ecosystems, which occupy almost 2,000,000 square kilometres in the region. Ecosystems such as lakes, rivers, and wetlands provide water for consumption and other uses, habitats for biodiversity, as well as means for transport of materials and people from one place to another.[17] In particular, agriculture benefits the most from the available freshwater in inland waters, but would not be the only sector affected.

For example, the Mekong River Basin, which crosses Myanmar, Thailand, Lao PDR, Cambodia, and Viet Nam, is an important water source for agriculture and fisheries, as well as providing hydropower.[18] If water availability in the Mekong is affected by climate change, it is not only rural communities that would suffer, but also urban centres.

While carbon storage and water availability are the foremost ecosystem services focused on for Aichi Target 14, there are also other ecosystem services that contribute to the wider needs of the region. Diverse


from Khao Yai National Park

Box 43. Taking stock of Ecosystem Services Assessment in the ASEAN

The *Biodiversity and Ecosystem Services Assessment and Economic Analysis for Management, Policy and Innovative Financing Applications* (BESA++) policy briefs were produced from the assessment of the valuation of ecosystem services at both the national and local levels in Cambodia, Lao PDR, Malaysia, the Philippines, and Thailand.

In particular, the briefs provide an assessment of the knowledge and awareness of protected area managers and policymakers on BESA++. The following are some of the common observations and recommendations made across the study sites:

- There is a significant variance in the volume of studies on ecosystem services among AMS. Limited expertise and scarce resources are contributing factors.
- Valuation studies must follow standard research protocols to establish credible research results.
- National BESA stocktaking should be regularly updated and made accessible to relevant users to aid and inform policy formulation and the planning and implementation of biodiversity programmes and plans.
- As science-based information and data are vital to policy formulation and strategic planning, personnel of agencies working on the management of natural resources have to be properly equipped and trained on valuation systems and financing instruments.
- Results of valuation activities should be packaged and communicated effectively to target users to maximise their value.

ecosystems, such as healthy mangroves, enrich livelihoods, health and well-being, provide opportunities for enhancing gender equity, and empowering women.[19]

For example, a community beekeeping enterprise was established in Nai Nang Village, Krabi Province, Thailand to aid in the conservation efforts of mangroves around their village as well as to provide alternative sources of income to villagers.[20] In Indonesia, a mangrove conservation project in the Mootilango Village, Gorontalo Province that involved five women groups, of which 50 members were trained in mangrove-based food processing as an alternative source of income.[21]

Valuation of natural resources and incentivising ecosystem conservation through payments for ecosystem services

Payments for ecosystem services (PES) have been identified as an approach to incentivise biodiversity conservation. Viet Nam was the first country in the region to introduce a national PES programme launched in 2011.[22] A study published in 2018 found that the PES scheme introduced in Lam Dong Province, Viet Nam in 2009 had, over the years, contributed significantly to the increase of forest cover. Local livelihoods were also improved and income inequality reduced through the introduced scheme, demonstrating the effectiveness of PES as an instrument for natural resources conservation and poverty alleviation. Now, Viet Nam, which has 80 terrestrial protected areas benefiting from PES, has become a model for other countries in implementing PES as a national policy.[23]

Implementation of PES schemes and valuation of natural resources in other AMS are at different stages. For instance, Cambodia still in the stages of considering launching a national biodiversity valuation initiative based on their experience with IPBES. Lao PDR is also exploring the possibility of developing a PES scheme with hydropower companies in the country. On the other hand, the states of Perak and Sabah in Malaysia are already implementing pilot programmes, which use a PES framework, to preserve their water catchment and supply.

Sustainable forest management as a key strategy for conservation and climate change mitigation

Regional strategic documents, including guides and frameworks, undergird the initiatives towards sustainable forest management. The *ASEAN Socio-Cultural Community Blueprint* (ASCC) 2025 was adopted in 2015 as part of the *ASEAN 2025: Forging Ahead Together*.[25] It promotes agricultural practices that minimise negative effects on the forest and other natural resources, as well as reduce greenhouse gas emissions.[26]

In 2016, the *Strategic Plan of Action (SPA) for ASEAN Cooperation in Forestry* (2016–2025) was agreed upon to provide guidance on sustainable forest management. Comprising five strategic thrusts (most of which directly contribute to the achievement of Aichi Target 14), SPA outlines actions which would contribute to enhancing the role forestry has in climate change mitigation, and further promote PES from forests.[27]

AMS also continue to recognise the importance of ecosystem services in their own national strategic documents. For example, in developing its First National Biodiversity Strategy and Action Plan (NBSAP), Brunei Darussalam integrated the Aichi Targets with their national goals,[28] while Cambodia has included PES schemes in their strategic documents.

The *ASEAN Criteria and Indicators for Sustainable Management of Tropical Forests* was developed. This tool provides guidance in evaluating how the region is doing with regards to integrated protection and conservation of forests and the ecosystems services.[29] National indices were also reviewed individually by AMS. For instance, ecosystem services are included in the City Biodiversity Index as a measure of the cities' performance in biodiversity management and protection. Brunei Darussalam is developing standards for forest management certification based on the principles of the International Timber Tropical Organization (ITTO).[30]

The *ASEAN Guidelines for Agroforestry Development* was endorsed during the 40th AMAF in 2018 to help achieve targets related to sustainable growth, reduction of emissions, climate change mitigation, and watershed protection.[31] These guidelines, which also promote the recognition of the value of goods and ecosystem services, have become the basis for the development of "road maps" for agroforestry development, national agroforestry policies and working groups on agroforestry within the region.[32]

Rounding out conservation efforts by integrating ecosystems from ridge to reef

There was a continued push towards maintaining a continuum, from forests to lowland and urban areas to coastal and marine systems in the region. Terrestrial ecosystems, especially forests, play a large part in providing ecosystem services not only to people in their immediate vicinity but also to millions who are located far from the resource. Continued deforestation and land conversion in the region have resulted in habitat loss, increased carbon emissions, and coral siltation, among others. ASEAN has recognised this and continues to do corrective and restorative measures.

In 2019, a two-day workshop facilitating a dialogue between EU and the ASEAN highlighted the need for better valuation of biodiversity and ecosystem services, and mainstreaming these into development and investment.[33] National assessments and valuations of ecosystems continue to be conducted to increase understanding of the natural resources available in AMS.

Table 15. Integrated resource management initiatives and strategies implemented in AMS

AMS	Country strategies for integrated resource management
Brunei Darussalam	• Continuous monitoring of the water quality in river basins.[34]
Cambodia	• National marine park system integration of both terrestrial and aquatic ecosystems. • Roadmap developed to create additional corridors connecting protected areas.
Indonesia	• Undertakes recovery of degraded and maintains healthy watersheds. • Zoning of coastal and small islands helped develop 548 marine tourism sites.
Lao PDR	• Implemented integrated water resources management plan in more than 80 per cent of priority river basins since 2016.
Malaysia	• Developed integrated shoreline management plan. • Developed 10 integrated river basin management plans for 10 river basins.
Myanmar	• Focused on key river basins in which to conduct major studies. • Updated and expanded its 2004 wetlands inventory to include information on fish diversity and fill in geographic gaps.
Philippines	• Evaluated reefs and update information from nationwide assessments conducted.
Singapore	• Recognised as a model city for integrated water management and an emerging Global Hydro hub. Water management anchored on three key strategies: collect every drop of water, reuse water endlessly, and desalinate seawater.[35] • The country also aims to ensure ecological connectivity and conserve ecosystem services through programmes which establish a matrix of natural and green areas in the city-state.
Thailand	• Private sector formulated guidance on conservation of biodiversity and ecosystem services. Public firms are also actively participating in conservation and rehabilitation initiatives. • Committees set up to promote participation in wetlands management.
Viet Nam	• Shifted from single sector to integrated resource management. • Proposed to establish four river basin committees.


Photo by Mohd Fahimee Jaapar

Challenges

- Critical ecosystem services in the ASEAN region, such as access to and availability of freshwater, climate regulation, and capacity to support livelihoods and food production for a growing population are undervalued and not reflected in market prices of products.[36] This is caused in part by a lack of awareness of the different ecosystem services and benefits of biodiversity. Many people are now recognising the importance of biodiversity and ecosystem services in economic development and resilience; however, there is still a need to continue with education and awareness initiatives on this topic.

- Degradation of ASEAN inland waters is partly due to gaps in proper resource valuation in policy and practice. Destructive human activities, including deforestation and the like, also contribute to the decline of inland water resources in the region,[37] in addition to increasing carbon emissions,[38] increasing flood risks[39] and siltation in downstream areas.[40] Emerging climate change impacts, such as sea level rise and the corresponding saline-water intrusion into freshwater resources, have affected the biodiversity of aquatic ecosystems and reduced water quality.

- AMS have also dealt with habitat loss, increased carbon emissions and coral siltation, which are only some of the results of continued deforestation and land conversion. This issue is compounded by data deficiencies on the management of key ecosystem types, such as the wetlands.

- Changes in ecosystem services are not widely tracked because of lack of resources in AMS.

- The transition to a framework of sustainable development is also not without challenge, with AMS having to balance biodiversity conservation and economic development and consider the trade-offs of particular strategies and practices.

- Most AMS do not have a specific national law or regulatory framework for PES, which could help increase adoption. In addition, some National Strategic Plans may need to be revised to include PES in their agenda.

Ways Forward

- There is a need for a deliberate consideration of ecosystem services and sustainable management in all industries. This would address the undervaluation of ecosystem services and biodiversity in the region. To this end, the continued education and awareness initiatives could greatly contribute, as well as promote public and private investment in biodiversity and ecosystem services and payment for ecosystem services approaches.[41]

- AMS should also consider integrated, proactive, and innovative approaches to restoration and sustainable management of ecosystems, especially inland waters and coastal habitats.[42] More than 600 million people depend on marine and coastal resources for their livelihoods, therefore sustainable management of these aquatic resources is an imperative for the region.

- A push towards maintaining a continuum of ecosystems is important to retain the natural resources found in the 40–50 per cent of intact forest left in the region. Efforts should also focus on the restoration of ecosystems with greater CO_2 sequestration value, such as mangrove forests and peatland ecosystems, to attain a better payoff from such initiatives. These could also provide other benefits such as provision of water for agriculture and protection from rising sea levels.

- AMS should consider nature-based solutions, especially in sectors that depend on natural resources, to maintain or enhance ecosystem services. This would not only safeguard the natural environment, but also benefit communities and economies.

- Developing policies that remove incentives to use fossil fuels would help reduce dependence on non-sustainable sources of energy, and expedite the transition towards sustainable energy.

- Incentives could enable the achievement of several Aichi Targets, including Aichi Target 14. Development of financial contribution mechanisms, such as Viet Nam's PFES, a policy for socialisation of investment sources, may prove to be beneficial for AMS. Specifically, protected areas may benefit from this as financing for forest communities prevents unsustainable forest and wildlife activities.

- AMS need to capture, consolidate, and map carbon data assessed by government, academic and research institutions for proper monitoring of the carbon status in the region.[43] This would contribute to improved tracking and reporting of changes in ecosystem services.

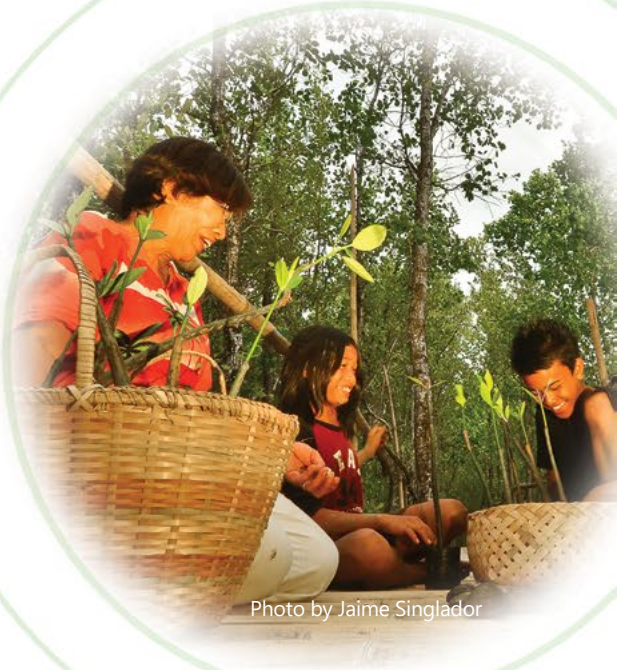


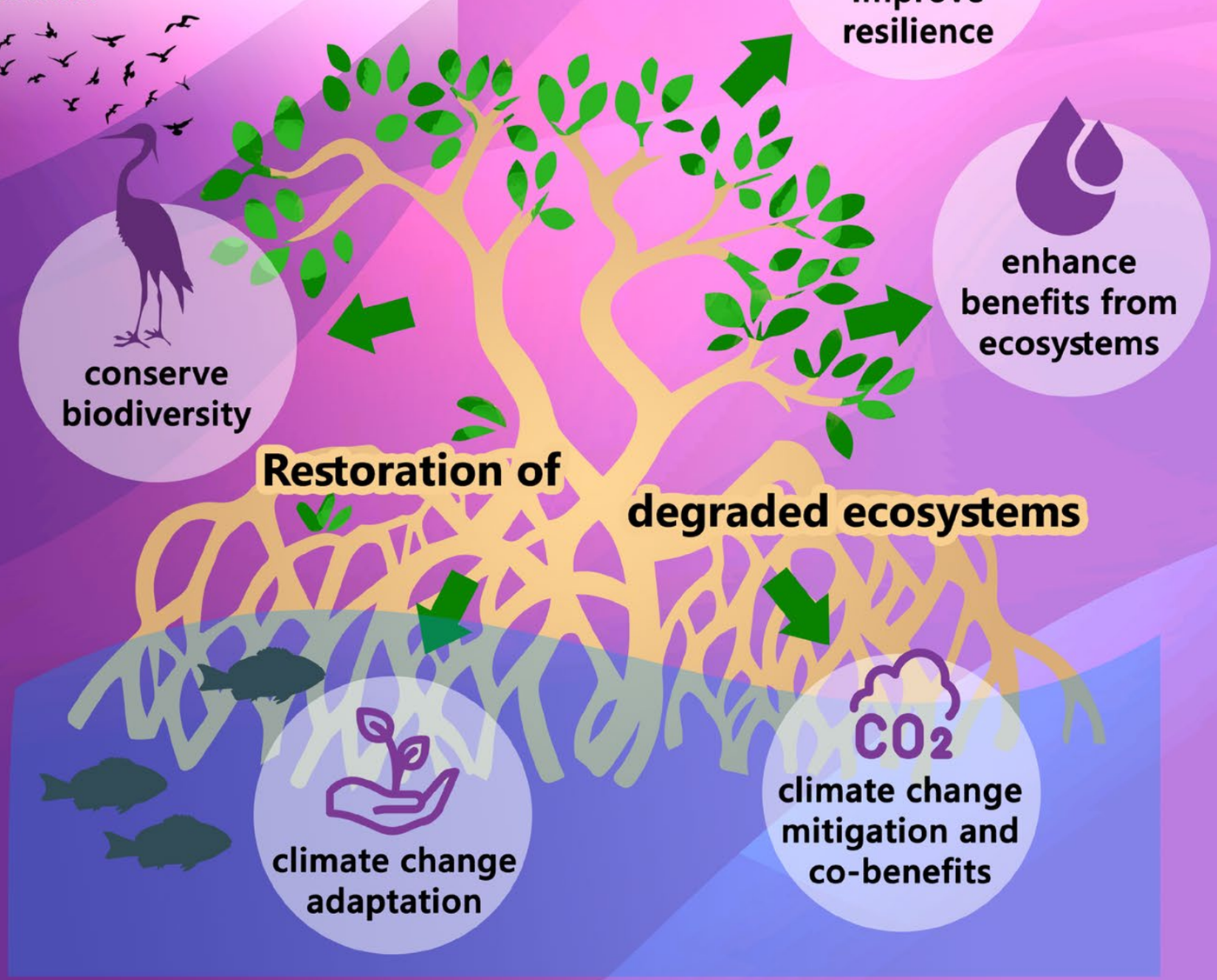
Photo by Jaime Singlador

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.

Half of the AMS are on track to achieving Aichi Target 15 while the other half are progressing towards the target but at an insufficient rate.

Challenges

- Limited data on the extent of ecoystem degradation
- Climate change legislation is still a work-in-progress
- Habitat loss and fragmentation
- Illegal logging, forest encroachment and land conversion into high-value crops plantation



Regional and AMS initiatives on ecosystem restoration include reforestation, rehabilitation of mangroves and wetlands, and development of supporting policy frameworks.

Ways Forward

- Develop and implement comprehensive land-use mapping and planning approaches
- Promote afforestation programmes
- Promote integrated landscape approaches with stakeholder engagement
- Identify priorities and opportunities for restoration
- Optimise environmental permitting procedures and market instruments

Aichi Biodiversity Target 15: Ecosystem restoration and resilience
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 combatting desertification.

The loss of species and ecosystem services due to the degradation of both terrestrial and aquatic ecosystems has resulted in a significant loss in the annual global gross product. This worsening degradation negatively impacts food security and provision of important ecosystem services to communities around the world.

Restoration of degraded ecosystems could help improve resilience, conserve biodiversity, and enhance benefits from ecosystems and ecosystem services. It also provides opportunities for adaptation to and mitigation of climate change. Aichi Target 15, thus, aims to restore at least 15 per cent of degraded ecosystems to address climate change and combat desertification.

Most AMS are on course to restoring at least 15 per cent of their degraded ecosystems while some are proceeding at an insufficient rate. Across the region, initiatives towards ecosystems restoration primarily involve reforestation, mangrove and wetlands rehabilitation, and the development and adoption of support policy frameworks and networks.

Progress in achieving Aichi Target 15 affects progress towards Targets 5 (reduction of habitat loss), 7 (sustainable agriculture, aquaculture and forestry) and 14 (restoration of ecosystem services).[1] Conversely, progress towards Target 15 is affected by progress towards the following Targets: 2-4 (addressing underlying causes), 5, 7, 14, and 20 (addressing mobilisation of financial resources).

The achievement of Aichi Target 15 would directly contribute to the achievement of SDGs 1 (poverty alleviation), 13 (climate change), 14 (oceans, seas, marine resources), and 15 (terrestrial ecosystems).[2]

The loss of species and ecosystem services due to the degradation of terrestrial and marine ecosystems amount to an estimated 10 per cent of the annual global gross product, according to the United Nations Environment Programme (UNEP).[3] Moreover, climate change further heightens land degradation by disrupting biodiversity, ecosystem health, and food systems.[4] The worsening degradation negatively impacts food security and provision of important ecosystem services to communities around the world.

The FAO *State of World's Biodiversity for Food and Agriculture*, launched in 2019, said that 24 per cent of the 4,000 wild food species are decreasing in abundance in at least 91 countries.[5] IPBES projected in the *Assessment Report on Land Degradation and Restoration* that by 2050, climate change and degradation can diminish crop yields by 105 per cent globally and by up to 50 per cent in some regions.[6] This would likely result in the forced migration of 50–700 million people.

Ecosystem restoration, which refers to the process of managing or assisting the recovery of degraded, damaged or destroyed ecosystems to improve resilience, conserve biodiversity,[7] and enhance the ecosystem services that communities receive,[8] should therefore be a priority.

Ecosystem restoration provides opportunities for improving adaptive capacities of both ecosystems and societies, and for sequestering carbon, thus contributing to climate change mitigation[9] and biodiversity conservation.[10]

Countries have committed to a global goal to restore 3.5 million square kilometres of degraded and deforested landscapes by 2030 under the *Bonn Challenge*. This will generate USD 9.0 trillion in ecosystem services and removing up to 26 gigatonnes of greenhouse gases from the atmosphere. Currently, over 1.72 million square kilometres and 62 entities have pledged to the Challenge.[11]

In 2019, UN declared 2021–2030 as the *UN Decade on Ecosystem Restoration* to accelerate the achievement of global restoration goals.[12] Aside from the global *Bonn Challenge*, regions have also established individual initiatives such as the Initiative 20x20 in Latin America, which aims to restore 200,000 square kilometres by 2020, and the *African Forest Landscape Restoration Initiative* (AFR100) which is targeting the restoration of 10,000 square kilometres by 2030.

Assessing the global progress in achieving Aichi Target 15 can be challenging. Initiatives, both planned and currently being implemented, can put the world on track to restoring 15 per cent of degraded

Ecosystem restoration refers to the process of managing or assisting the recovery of degraded, damaged, or destroyed ecosystems to improve resilience, conserve biodiversity.

Ecosystem rehabilitation means to repair and replace the essential or primary ecosystem structures and functions which have been altered or eliminated by disturbance. Holistic in nature, it puts emphasis on the reestablishment of important missing altered species, habitats, and processes, and the reduction and elimination of stressors.


Photo from Agusan Marsh Wildlife Sanctuary

ecosystems, however, the trajectory suggested low confidence in meeting this aspect of the target by 2020.

Thrusts of ecosystem restoration in the region

Two ecosystems are of special note in the ASEAN region: tropical forest ecosystems, which are established reservoirs of biodiversity directly supporting more than 650 million people; and the inland water ecosystems, which cover wetlands, peatlands and freshwater bodies supporting millions of people, mostly rural and indigenous communities.[13] The region is home to 60 per cent of tropical peatlands and 42 per cent of mangrove forests in the world.[14] Deforestation, a key driver of biodiversity loss in Asia,[15] therefore, will not bode well for the region.

In response to the increasing loss of biodiversity and degradation of ecosystems, the ASEAN Socio-Cultural Community (ASCC) Blueprint 2025 aims to strengthen regional cooperation in protecting and restoring ecosystem and biodiversity resources and combat desertification.[16] When applied to marine and coastal environments, which are ecologically sensitive areas, this ensures coordination and collaboration among relevant ASEAN and other regional marine-related initiatives.

AMS have thus taken a special focus on rehabilitating terrestrial and coastal habitats.

This strategy helps the environment to increase carbon storage, allow ecosystems to regain resilience to climate change, and continue to provide ecosystem services, such as water provision, protection from sea level rise, and biodiversity conservation.

Reforestation, which increases carbon stocks and helps maintain forest ecosystem services, is an important tool which is being used in many countries. On the other hand, restoring wetlands provides opportunities for improving food security and increasing potential for ecotourism activities and alternative livelihood resources. Wetlands also clean the soil of heavy metals, thus providing clean drinking water to communities in the surrounding areas, and serve as buffers against storm surges, flooding and sea level rise. They also serve as important carbon sinks, with peatlands storing 30 per cent of the world's land-based carbon.

Development and uptake of climate-smart policies, strategic plans and awareness campaigns for improving resilience under the protected area system are instrumental in ecosystem restoration in the region. For instance, Cambodia, Indonesia, Myanmar, the Philippines, Singapore, and Thailand have developed national action plans specifically aimed to restore degraded ecosystems. Rehabilitation and restoration programmes for specific ecosystems have also been established in Brunei Darussalam, Lao PDR, Malaysia, and Viet Nam.

The establishment of a protected area system has also been an important step for AMS, as this enhances carbon storage, improves resilience to extreme weather conditions (e.g., storms, flooding and fire occurrences) and maintains habitats and biodiversity, and in the process, helps communities adapt

to climate change by maintaining other important ecosystem functions and services.[17]

For example, Cambodia pointed to their protected area system as a strategy to guaranteeing the resilience of the ecosystems and landscapes covered – more than 40 per cent of the country has been classified under the different categories of their protected areas. In addition, AMS highlighted their commitments to different multilateral environmental agreements (including the CBD, UN Convention to Combat Desertification, and the UN Framework Convention on Climate Change and the Paris Agreement).

Multinational efforts in the region have specifically targeted the restoration of vulnerable ecosystems. For example, 14 countries (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Viet Nam, China, North and South Korea, Japan, and Timor Leste) have established the *Partnerships in Environmental Management for the Seas of East Asia* (PEMSEA).[18] PEMSEA aims to develop an integrated coastal management system to cover more than 30,000 kilometres of coastline (covering 17 per cent of the total coastline) in the region. This initiative aims to protect and rehabilitate coastal environments in the region, which will benefit 150 million people in coastal and watershed areas.

Reforestation and REDD+ as key strategies for rehabilitation of forest ecosystems

On the forestry side, programmes such as Reducing Emission from Deforestation and Forest Degradation (REDD+) acknowledge the importance of restoring forests for climate change mitigation and adaptation. Aside from adopting REDD+, ASEAN has also adopted the Warsaw Framework for REDD+,19 which would provide safeguards and clarity on REDD+ implementation.[20]

REDD+ projects have been implemented in different AMS like Cambodia, Malaysia, and Viet Nam. Myanmar is now implementing its REDD+ Readiness Roadmap, while Indonesia


Photo by Achier Chung

has adopted procedures for implementing REDD+ projects. Lao PDR, on the other hand, has secured a grant agreement in support of its REDD+ strategy. Viet Nam, for its part, developed a REDD+ Geographical Information Portal which increased access to information on the progress of REDD+ implementation in the country.

AMS also aimed to restore and protect forest cover in the region via different programmes (Table17).

The ASEAN Green Initiative (AGI) concretises regional cooperation in promoting the restoration and sustainable use of terrestrial ecosystems, and the adoption of nature-based solutions with the end goal of halting biodiversity loss, combatting desertification, reversing land degradation, and responding to climate change. It also aims to contribute to strengthening environmental linkages within cities, particularly between urban, peri-urban, and rural areas, and to increasing green spaces that are accessible to the public, which provide benefits to human health and well-being.

This incentive and rewards programme is open to government agencies, communities, organisations, and individuals with ongoing and new tree planting initiatives, mainly using indigenous species, from 2021 to 2030, in the ASEAN region. Registrants will be assessed based on four selection criteria, namely: ecological soundness, socio-economic impacts, sustainability, and compliance with governance and institutional mechanisms. +

Table 16. Initiatives to restore and protect forest ecosystems in AMS

AMS	Country targets / initiatives
Brunei Darussalam	• Tropical evergreen rainforests cover 75 per cent of the country's total land area, of which 41 per cent is comprised by natural forest reserves that are protected by law.[21]
Cambodia	• The project *Enhancing Climate Resilience of Rural Communities Living in Protected Areas of Cambodia* which ran from 2013 to 2018, restored plant species in 18.75 square kilometres of degraded forests.[22]
Indonesia	• The country increased its forest and land cover index from 57.83 in 2016 to 60.31 in 2017 • Terrestrial ecosystem restoration activities have also rehabilitated almost 6,000 square kilometres since 2015.
Lao PDR	• In 2016, the country reported natural forest regeneration and community reforestation reaching 1,082 square kilometres, even though it had experienced an overall loss in forest cover.
Malaysia	• The country continued to engage non-government organisations in a forest restoration programme in Pahang state from 2017 to 2018. • The project *Restoration, Reclamation and Rehabilitation of Degraded Forest Areas* also targeted 16.04 square kilometres of forest in peninsular Malaysia.
Myanmar	• The National Forestry Master Plan aims to establish 9,800 square kilometres of community forests by 2030. More than 2,300 square kilometres of total land area are now under community forestry, however not all are certified yet.
Philippines	• From 2011 to 2017, the National Greening Program (NGP) reforested 18,000 square kilometres of land in the country. The NGP aims to reforest a total of 96,000 square kilometres of public and unproductive/denuded/degraded forestlands by 2028.
Singapore	• The National Parks Board of Singapore has several restoration initiatives like the Forest Restoration Action Plan, which aims to plant more than 250,000 trees and shrubs in nature parks and nature reserves through community facilitation, and the OneMillion Trees Movement, which involves the planting of 1 million trees across the country within 10 years.
Thailand	• The country aims to meet its target of expanding forest areas into 40 per cent of the total land with the commitment of organisations and agencies from every sector.
Viet Nam	• From 2011 to 2015 more than 10,000 square kilometres of land were afforested and reforested; 3.61 square kilometres regenerated; and 49,000 square kilometres set aside for forest protection and rehabilitation. Damaged forest areas also decreased by 10 per cent in the period of 2016–2018 compared to 2011–2015.

A renewed focus on restoring wetlands and coastal ecosystems in the region

The ASEAN has initiated substantial conservation and restoration efforts, by designating 59 Ramsar sites (covering 26,592 square kilometres) and identifying more sites for nomination.[24]

The ASEAN Flyway Network[25] and the ASEAN Mangrove Network[26], have been established to promote cooperation in the rehabilitation of mangroves, wetlands, and other threatened natural resources in the region. They also serve as venues for sharing best practices and lessons learned in ecosystem restoration.

From 2012 to 2015, four countries in Asia, including Cambodia and Thailand, participated in the project, *Mangrove rehabilitation in Asia–Local Action and cross-border Transfer of Knowledge for the Conservation of Climate, Forests and Biodiversity*.[27] With the assistance of the project and the Fisheries Action Coalition Team, Cambodia was able to introduce sustainable fishery methods in Tonle Sap Lake. In Thailand, the Mangrove Action Project developed and implemented alternative restoration techniques for mangroves along the Andaman Coast, Trang Province.

In addition, the *Second ASEAN Congress on Mangrove Research and Development* was held on September 2017 with the theme, *Sustainable Management of Mangroves in the Course of Climate Change*. One of the main topics was regarding mangrove restoration and rehabilitation.[28]

AMS have also established restoration activities for mangroves in their respective countries. From 2015 to 2016, Indonesia planted more than seven (7) million mangrove trees and 80,000 vegetation individuals, which resulted in increased fish resources and incomes for fisherfolk. By 2018, Malaysia had planted 6.62 million seedlings over 28.74 square kilometres through 13 coastal erosion prevention and rehabilitation projects.

Under the NGP, the Philippines indexed 500 square kilometres of mangroves and beach forests for development, planting and enrichment. The *Philippine Master Plan for Climate-Resilient Forest Development 2015–2028* is estimated to yield more than 300 million tonnes of net carbon benefits from avoided deforestation and new plantations of mangrove forests and watersheds. On the other hand, Viet Nam had completely planted 19.68 square kilometres coastal area of protection forests in 2015.

Singapore has recognised the importance of mangroves as part of nature-based coastal protection and aims to restore and enhance its coastal areas. The country provided additional surfaces and shelter for coral and other coastal organisms to inhabit (the latest

project was the 2018 *Grow-a-Reef Garden* project), therefore supporting the biodiversity and resilience of the ecosystem.

In addition, AMS developed innovative initiatives to support mangrove restoration. For example, Malaysia developed its *National Coastal Vulnerability Index* to help assess coastal ecosystems. On the other hand, Indonesia established *Mangrove Restoration and Learning Centers*, where mangrove restoration discussions and education, research, and tourism in coastal ecosystems are conducted. Thailand, on the other hand, also developed policy frameworks and established committees for wetland management in support of their conservation and restoration.

Peatlands, a type of wetlands, have also received special focus in the region. From 2009–2014, the *ASEAN Peatland Forests Project* (APFP), funded by the *Global Environment Facility* (GEF), focused on demonstrating, implementing and scaling up the sustainable management and rehabilitation of peatlands in the region.[29] Indonesia, Malaysia, the Philippines, and Viet Nam were the four AMS involved in the project.

Aside from regional peatland management programmes, AMS also implemented activities within the countries. In Brunei Darussalam, timber harvesting and related use of resources in peat swamps, which cover 18 per cent of the land area, are not allowed.[30] The country has also developed a Biodiversity Action Plan with Brunei Shell Petroleum in the Lower Belait Valley and Wetlands International to restore degraded peatlands, including the Badas Peat Dome (the largest in Brunei Darussalam).[31]

On the other hand, almost 1,500 square kilometres of peatlands are under restoration concession in Riau, Indonesia, resulting in more opportunities for a diversified employment market, in addition to peat swamp conservation. In Malaysia, the Peatland Fire Prevention Programme targets to rehabilitate 100 square kilometres of degraded peat swamp forests by 2025.

Photo by Martin Palis

Box 44. Multi-stakeholder partnership in the rehabilitation of peat swamps in Malaysia resulted in local community empowerment

The North Selangor Peat Swamp Forest (NSPSF) encompasses 736 square kilometres in the northwest area of Selangor State in Malaysia. Composed of the Sungai Karang Forest Reserve (50.12 km²) and the Raja Musa Forest Reserve (23.49 km²), 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, as guided by the Integrated Management Plan (IMP-NSPSF 2014–2023). The Plan focuses on five key management strategies: hydrology restoration/rewetting; fire prevention and control; promotion of natural regeneration; assisted re-vegetation; and enrichment planting. This is in addition to the enforcement of the 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 NSPSF. In 2012, a community-based organisation known as Friends of North Selangor Peat Swamp Forest (FNSPSF) was established to galvanise the local community in the rehabilitation of the peatland. FNSPSF provides a platform for partnerships between the private sector, civil society, local communities and authorities in restoring peatlands.

The organisation supported state authorities in patrolling and monitoring the buffer zone area, in addition to participating in the restoration activities and peat firefighting operations. Participation of the FNSPSF in restoration activities has also improved their members' livelihoods as community members are able to run small business activities related to the peatlands (e.g. establishment of a nursery, handicrafts production and ecotourism opportunities).

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 communication, education, and public awareness activities, and is involved in organising 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 10 square kilometres of forest in Raja Musa Forest Reserve.

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

Source: Malaysia 6th National Report

Photo by Myat Thurein

Challenges

- There is a dearth of data on the extent of ecosystem degradation in the region.
- The formulation of climate change legislation is still an ongoing process. Also, newly minted REDD+ programmes have yet to yield results as implementation is still under way.
- The rate of forest loss in the region was down to 0.26 per cent per year in 2010–2015, from 1.2 per cent in 2000–2010. However, habitat loss, forest degradation and fragmentation remain a serious concern.[32] These problems lead to loss of habitats of key species important to the environment and communities.
- Other issues such as unregulated conversion of forests into plantations for high-value crops (rubber and oil palm in particular), illegal logging and forest encroachment also continued to negatively affect the restoration of forest ecosystems.

Ways Forward

The following are actions to help accelerate progress in achieving Target 15, if more widely applied.[33]

- Develop comprehensive land-use mapping and planning approaches. Areas that need to be protected and restored, such as those that enhance ecological connectivity and minimum areas for native vegetation, should be considered.

- Promote passive and active afforestation programmes to increase the contribution of biodiversity to carbon sequestration.

- Promote integrated landscape approaches, such as ridge-to-reef approach, with stakeholder engagement. The aim is to develop a strategy that restores ecosystems on a larger scale while meeting the long-term socio-economic needs of the local communities.

- Implement restoration activities which could also serve as alternative sources of income, therefore making restoration an economically viable activity for the involved communities.

- Identify opportunities and priorities for restoration while taking into full account the current use of land, including by indigenous peoples and local communities.

- Make use of environmental permitting procedures and market instruments.

- Promote the ASEAN Green Initiative (AGI), a recognition scheme for government agencies, communities, organisations, and individuals with tree planting initiatives in the region. This will contribute to strengthening environmental linkages within cities, and rural areas, and increase green spaces that are accessible to the public, providing benefits to human health and well-being.


Photo by Pamela Reblora

In addition, the following are more specific recommendations for ecosystem restoration initiatives:

- Continue to support research and development efforts regarding the effects of climate change on species and ecosystems to identify appropriate management practices.

- The establishment of ecological links and transboundary initiatives could be a solution to habitat loss and fragmentation,[34] and could contribute to the restoration of larger ecosystems and biodiversity conservation.

- Pursue sustainable management of marine and coastal resources.[35] Restoration of coastal ecosystems, such as mangrove forests, seagrasses and coral reefs, should be an integral part of coastal city planning.[36] This would ensure sustainability of coastal resources, and at the same time, increase resilience to climate change and promote carbon sequestration.

- Consider climate-smart tools and techniques in implementing protected area management plans. Restoring protected areas should especially aim to enhance resilience to extreme weather conditions (e.g., storms, flooding, and fire occurrences) and enhance ecosystem services to maintain habitats and biodiversity in light of climate change.


Photo from Lampi Marine National Park

- Continue to preserve and restore ecosystems with greater CO_2 sequestration value (e.g., mangrove forests and peatlands). Whenever possible, ecosystems with greater carbon sequestration capacities should be considered for protected area status, or as basis for coordinated conservation action.

- Capture, consolidate and map carbon data assessed by governments, academic, and research institutions for the proper monitoring of carbon stocks in the region. AMS could also explore producing their own forest reference emissions level reports to determine their annual emissions.

- Share best practices and lessons learned from REDD+ activities and programmes through Clearing House Mechanisms (CHMs).

TARGET 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, consistent with national legislation.

Challenges

- Operationalisation of legislative and policy frameworks on ABS to ensure the implementation of all provisions of the Nagoya Protocol
- Limited capacity-development and awareness-raising initiatives
- Difficulty in translating Protocol into readily understandable concepts for a wide range of audiences and stakeholders
- Advances in technology provide easy access to data, thus, bypassing established ABS framework

Most AMS are on track to achieve this target but at an insufficient rate. Seven AMS are Parties to the Nagoya Protocol but they have yet to exert more effort to operationalise the Protocol.

Seven AMS are Parties to the Nagoya Protocol.

Ways Forward

- Increase public participation, awareness and communication of ABS-related issues.
- Recognise linkages among policy, institutional, and regulatory measures.
- Strengthen environmental legislation with the ABS framework in mind.
- Take clear actions on the designation and capacity building of all national focal points and competent national authorities.
- Ensure that clear processes and procedures in accordance with the national legislation are made explicit
- Develop a guiding ABS framework for common and transboundary resources.


Photo from Hoang Lien National Park

Aichi Biodiversity Target 16: Access to and sharing benefits from genetic resources
By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation is in force and operational, consistent with national legislation.

As a region that is rich in biodiversity, the ASEAN has had the biotechnology industry take interest in its genetic resources. Benefits from the use of these resources by other entities sometimes do not reach AMS, therefore regulatory systems are needed to ensure the fair and equitable sharing of the benefits gathered from the access and use of the states' genetic resources.[1]

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation (ABS) to the CBD provides a legal framework which ensures the fair and equitable benefit-sharing from the use of resources.[2] The region has largely been working towards implementing the Nagoya Protocol through supporting the development of related national legislation in AMS.

Most AMS are on track to achieve the target, although, a few countries are progressing towards the target at an insufficient rate as indicated in their 6NR. Of the 10 AMS, five have acceded and two have signed in to the Protocol. ABS legislation and policy issuances have also been implemented throughout the region.

Initiatives including capacity building, establishment of ABS clearing-houses and databases, and designation of national authorities on ABS, have been implemented to support the protection and conservation of genetic resources in the region.

Key lessons that can be learned are (a) natural capital accounting and assessment of existing ABS frameworks in each country are needed to fully support the implementation of the Protocol, and (b) countries should also strive to implement an overarching national ABS framework to maximise benefits from the Protocol.

Adopted on 29 October 2010 in Nagoya, Japan and entered into force on 12 October 2014, the Nagoya Protocol covers genetic resources under the CBD, benefits from the use of said resources, and traditional knowledge associated with these elements.

Implementing the Nagoya Protocol could also enhance the ability of biodiversity to contribute to development and human well-being, aside from contributing to the conservation and sustainable use of biodiversity resources. In particular, the Protocol helps to:

- establish more predictable conditions for accessing genetic resources;
- ensure benefit-sharing, especially when such resources leave the country providing them; and
- provide incentives for biodiversity conservation and encourage the uptake of sustainable livelihoods.[3]

Achieving Aichi Target 16 in the region would help achieve Aichi Targets 6, 8–10 and 12–13 by making sure vulnerable species are not overexploited, invasive alien species are controlled, habitat loss is reduced, and cultural knowledge and practices are promoted and preserved. Target 16 also directly contributes to SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss) and Goal 17 (Strengthen the means of implementation and revitalise the global partnership for sustainable development).

Global progress towards Aichi Target 16 has largely been on track. By having the Nagoya Protocol in force since 2014, the first element of the target has been achieved.[4] The second element of having the Protocol operational is still in progress. By December 2016, 91 countries had ratified the Protocol, while 62 were planning to ratify or were in the process of ratification.[5]

Currently, after three years, 123 countries had ratified the Protocol, in addition to the 92 countries that were signatories.[6] Parties and non-Parties to the Protocol alike were either


Photo by Pamela Reblora


Photo by the BBP Project

implementing new ABS measures or revising their existing measures to conform to the standards set forth by the Protocol.

Capacity development and related initiatives are still being implemented in countries around the world to promote and increase awareness of the Nagoya Protocol. The Protocol also provides for establishing an access and benefit-sharing clearing house (ABSCH), where information can be shared regarding the access and use of genetic resources and the associated traditional knowledge.[7] This took form in an ABSCH website which is accessible to the public. The ABSCH is also informed of any issuance of prior informed consent (PIC) and mutually agreed terms (MAT).

Policy frameworks in support of the implementation and ratification of the Nagoya Protocol

Indigenous people and local communities are inextricably connected to biodiversity,[8] as they are usually the ones who have direct access to, and regularly utilise biodiversity and genetic resources. The loss of biodiversity oftentimes results not only in loss of livelihoods and ecological benefits, but also in the loss of indigenous culture and knowledge related to these resources. The Nagoya Protocol thus provides a framework for obtaining PIC and coming to MAT, while respecting traditional knowledge in utilising genetic resources.

Contracts such as bioprospecting agreements, material transfer agreements (MTAs) and joint research agreements have also been instrumental in ensuring that the interests of the providers of genetic resources are safeguarded. In particular, ASEAN has made use of bioprospecting agreements where resource users are given permission to "search for wild species with genes that produce better crops and medicines, or [explore] biodiversity for commercially valuable genetic and biological resources.[9,10] These agreements usually contain MATs, which specify the terms and conditions for when genetic resources are physically transferred from providers to users.

Before the Nagoya Protocol entered into force, AMS had varying degrees of political support and administrative structure with regard to ABS. Some countries, like Indonesia and the Philippines, already had regulations in place pre-Nagoya Protocol, although they need to be revised to meet the obligations of Parties to the Protocol. Other countries either had the basic national framework to support the implementation of the Nagoya Protocol (e.g., Thailand) or needed to develop their own ABS-specific policy frameworks (e.g., Lao PDR and Myanmar).

Currently, two AMS have ratified (Cambodia and Indonesia) and five have acceded (Lao PDR, Malaysia, Myanmar, Philippines and Viet Nam) to the Nagoya Protocol (Table 17).

Table 17. Support for the Nagoya Protocol in AMS[11]

AMS	Date when the country became a party to the Nagoya Protocol	Initiatives and national legislation in place for operationalising the Protocol
Cambodia	Signed on 1 February 2012; ratified on 19 April 2015	The country is working to establish its national ABS even as it has acknowledged the use of other intellectual property rights instruments, such as geographic indication, to facilitate commercialisation of some of its popular genetic resources. The Ministry of Environment is also finalising an Environment and Natural Resources Code containing provisions related to ABS.
Indonesia	Signed on 11 May 2011; ratified on 12 October 2014	Access to genetic resources and their use had already been regulated through various laws and regulations in the country prior to the ratification of the Protocol. National regulation through Decree of the Ministry of Environment and Forestry No. P.2/MENLHK/SETJEN/KUM.1/I/2008 on Access to Wild Species Genetic Resources and Benefit Sharing on Utilisation of Genetic Resources serves as the guidelines for the implementation of the Nagoya Protocol.
Lao PDR	Acceded on 12 October 2014	The Ministry of Science and Technology has already developed the Biosafety Law (2014) and the Lao National Framework on the Access to Genetic Resources and the Fair and Equitable Sharing of Benefit Arising from their Utilisation (2013). The country is still in the process of drafting the ABS Decree as an extension to the Biosafety Law.
Malaysia	Acceded on 3 February 2019	After drafting an ABS law in 2013,[12] the country passed Act 795, *Access to Biological Resources and Benefit Sharing*, in October 2017.[13] This provides a legal framework for the implementation of Protocol guidelines. At the state level, the Sabah Biodiversity Enactment 2000 was amended to cover ABS, while the Sarawak Biodiversity Regulations 2016 was passed to guide implementation.
Myanmar	Acceded on 12 October 2014	Although the Protocol is not yet fully implemented in the country, Myanmar has started implementing the use of Standard Material Transfer Agreements (SMTAs) for mobilising their genetic and biodiversity resources. The country is also conducting a gap analysis of the laws and policies to support the full implementation.
Philippines	Acceded on 28 December 2015	Some of the ABS frameworks in the country include the Wildlife Act (Republic Act 9147), which provides for the conservation, preservation and protection of wildlife species and their habitats, and Administrative Order 1 of 2005, which provides guidelines for bioprospecting activities. A presidential issuance was drafted to establish an interagency body dealing with wealth creation, while the legislative measure, Philippine Genetic Resources Access and Benefit-Sharing Act, which updates the existing ABS policy in the country to align it with the Protocol, is pending in Philippine Congress.
Viet Nam	Acceded on 12 October 2014	The 2008 Law on Biodiversity provides the basic legal framework for ABS in Viet Nam. Over the years, Viet Nam has continued to build on the Law on Biodiversity and provide further clarifications and guidelines to streamline the implementation of ABS in the country. Decree No. 59/ND-CP in 2017 further clarified ABS concepts; regulated state management of ABS; tasked agencies with developing databases on genetic resources and sharing related information; and issued templates, contracts and decisions related to ABS.


Photo by the BBP Project

One of the ABS projects completed in the ASEAN provided support for ratifying and implementing the Nagoya Protocol in Lao PDR, Myanmar, and Viet Nam. From April 2015 to January 2017, the ACB and the United National Environment Programme (UNEP) Regional Office for Asia and the Pacific (ROAP) conducted a project supporting the ratification and implementation of the Protocol in the three AMS.[14] Through the project, the countries were given support in drafting national regulatory and institutional frameworks and piloting ABS measures in their respective jurisdictions. A Project Identification Form (PIF) for ABS implementation was also developed for Myanmar.

Thailand has been implementing ABS legislation for a long time already,[15] and is taking steps at the national level to complete the process of accession to or ratification of the Protocol. An analysis of the 10 existing laws and regulations related to biological resources showed that none of these stipulates mandatory sharing of benefits. In 2019, the country developed the Draft Biodiversity Act, which aims to set standardised regulations for state agencies regarding biodiversity utilisation, and common standards to promote biodiversity both for *sui generis* laws and general laws. It would also stipulate liabilities and penalties for those who adversely impact biodiversity.

In June 2018 it was noted at a Regional Workshop on ABS that Brunei Darussalam was undergoing a national review of the Nagoya Protocol.[16] The country has so far opted not to pursue signing and/or ratifying the Protocol. It does however employ an ABS framework.

Singapore has not yet made a decision on becoming a party to the Nagoya Protocol.[17] The country does implement an ABS framework, although the protection of traditional knowledge is not an issue, since Singapore does not have IPLCs engaged in traditional practices.[18] The country has also signified intent to support regional cooperation on ABS, if such cooperation would not be specific only to the Nagoya Protocol.[19].

Box 45. Thailand's Community BioBanks

The concept of Community Biobanks was developed by Thailand's Biodiversity-Based Economy Development Office (BEDO) to highlight the importance of community participation and consent, as well as, just and fair benefit-sharing. Community BioBanks aim to conserve biodiversity resources and local knowledge using a participatory approach. Through conserving and propagating, BioBanks promote the protection, conservation, and sustainable use of selected plants.

One example is the centre that Pakchong Research Station in Nakhom Ratchasima is developing to collect different banana varieties. They have partnered with Kasetsart University, which is serving as the information centre. In Mae Rim District, Chiangmai, a development example plot for banana varieties was established in the botanical garden of Kasetsart University.

Another example is the integrated Longan variety collection garden in Lampoon Province, which was established in collaboration with local village persons and researchers. This shows the potential for developing community ABS systems that can be highly scalable in other similar areas.

Aside from the conservation aspect, BioBanks could also serve as information centres for national and community resources, as well as, learning centres for biodiversity and local wisdom, including community development, cultural histories, and local resources.

Source: *6NR Thailand*

Initiatives encouraging the adoption and implementation of ABS frameworks

Regional capacity-building activities on the development of draft national ABS frameworks and enhancement of existing regulatory and institutional ABS frameworks have been conducted in AMS. It is expected that regional cooperation on capacity building regarding the development and implementation of national ABS measures will be sustained given the continuing need to build capacity among AMS in Article 15 CBD and Nagoya Protocol implementation.

Regional workshops were conducted with the Secretariat of the CBD on ABS prior to COP 10 in October 2010.[20]

AMS and Timor Leste have been involved in projects for building capacities in developing policies and national regulatory and institutional ABS frameworks with regional and international partners. For example, in 2015–2016, a project for pilot-testing mutually agreed terms in Lao PDR, Myanmar, and Viet Nam by the ACB has built the capacities of stakeholders in the countries to negotiate MATs.[21]

National capacity building initiatives were also implemented in various AMS. Workshops on ABS for local communities were conducted in Cambodia and Myanmar, while Viet Nam formulated plans for implementing a capacity building scheme in the country[22] and Malaysia has held sessions with its stakeholders. In addition, the goal of Lao PDR is to create a National ABS Pilot Project through research and development for commercialised products, and to build capacity for Competent National Authorities and concerned stakeholders.

The ACB is currently developing a framework on which to further pursue, if there is interest among AMS, a database on traditional knowledge associated with genetic resources in the region. It is foreseen that having such a database would not only contribute to scientific knowledge, but also document the indigenous knowledge systems to support the rights of IPLCs.[23]

Some AMS have also developed ABS clearing-houses for their own resources. Indonesia developed its Biodiversity Database, which serves as a reference to monitor national targets, as well as a database for biodiversity profiles, potential bioresources, PICs and

Photo by the BBP Project

MATs, among other information. Malaysia, like Indonesia, has set up digital databases, while Cambodia's is still under construction.

On a similar vein, Thailand has developed Community BioBanks, physical centres where the country could gather and propagate their natural resources. These have also become information centres for local knowledge.

Another ACB project, the *Biodiversity-based Products as an Economic Source for the Improvement of Livelihoods and Biodiversity Protection* (BBP) Project, has been contributing towards the fulfilment of Aichi Target 16 in ASEAN.[24] The said Project aims to support the promotion of BBPs which could provide a source of income and encourage biodiversity protection. Project sites include four national parks and protected areas in Cambodia, Lao PDR, and Viet Nam.[25] This encourages the establishment of ABS frameworks in the countries to ensure regulated access and benefit-sharing in the use of the biodiversity resources (Table 18).

AMS, including Cambodia, Indonesia, Malaysia, and the Philippines, have designated National Focal Points (NFPs) and Competent National Authorities (CNAs) within their countries to serve as experts in the issue of ABS. In addition, Malaysia has designated 13 Competent State Authorities to guide implementation of the Protocol in each state.

Lessons learned from implementing ABS frameworks in the region

The ACB's capacity building efforts have shed light on how the different countries are tackling the implementation of ABS frameworks in their contexts.[33]

- A thorough assessment of the current frameworks related to ABS could help determine the legal certainty, clarity, and transparency of these access regulations.
- The countries are the ones to decide which benefit-sharing schemes are appropriate for their individual contexts.

Table 18. Products and project sites focused on BBP Projects in the region

AMS	Product and project sites being developed and promoted
Cambodia	Villagers in Phnom Kulen, a community-protected area in the country, are involved in developing black ginger products[26] and vine/climbing fern handicrafts.[27] The BBP Project built up the black ginger chain especially by providing support for farmers in cultivation, processing and market linkages, to increase the value that the villagers receive from the resources.
Lao PDR	In Nam Ha National Protected Area, villagers participated in producing bamboo handicraft and furniture, which could generate extra household income for about 600 persons.[28] Even with 150 bamboo species, Lao PDR is looking forward to protecting the environment vis a vis the reduction of slash and burn practices and the conservation of wild bamboo forests.
Viet Nam	The BBP Project is assisting beekeepers in Ba Be by developing an organisational structure for them, and providing support for them to learn advanced techniques in beekeeping.[29] This initiative would further help build a brand for the honey produced in Ba Be, as well as enhance links between the producers and traders. For the beekeepers, this is especially important as honey could potentially contribute up to 20 per cent to their total income. Another product that the project is focusing on in Ba Be is the medicinal plant *bo khai* (*Erythropalum scandens*), which is traditionally used to relieve rheumatic pains.[30] Of the two species of *bo khai*, the red one was found to be exploited to exhaustion. The BBP Project therefore aimed to train local *bo khai* farmers and support them in their cultivation of the plant, as well as create business links
	The Dao people in Hoang Lien National Park have built up their traditional knowledge on the use of many medicinal herbs found in the area.[31] Around 1,000 households in Sa Pa harvest, process and sell medicinal herbs to manufacturers of medicinal baths and essential oils. They therefore would benefit from the sustainable cultivation and use of these herbs, as well as improved marketing of products. The BBP Project is also supporting the processing side of the value chain for medicinal tea (*giao co lam*) from Sa Pa as well.[32] This will help boost supply and also create more jobs for villagers and provide additional sources of income.


Photo by the BBP Project

Photo by the BBP Project

- Although tracking utilisation is difficult and not without challenges, it must be done to safeguard the rights of the providers of the genetic resources and also conserve biodiversity.
- AMS have repeatedly brought up the interface the Nagoya Protocol has with the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and other similar policy frameworks.
- AMS are also aware of the importance of safeguarding traditional knowledge related to genetic and biodiversity resources.

Other lessons from the implementation of ABS systems in AMS are as follows:

- Countries cannot facilitate access to natural resources if they do not know which resources they have. Therefore, natural capital accounting must first take place to identify where the resources are. This would then help countries facilitate access, and obtain benefits from these resources.
- The cases in Malaysia and the Philippines, which both have practical legislative systems supporting ABS, also show that to benefit from the Nagoya Protocol, AMS should implement ABS systems at a country level, instead of between individuals.

Photo by Nguyen Tan Tuan

Challenges

- AMS need to operationalise their legislative and policy frameworks on ABS to ensure the implementation of all provisions of the Nagoya Protocol within their respective territorial jurisdictions, as well as send notification to the ABS clearing-house of the issuance of any PIC and MAT. This also includes, at the discretion of AMS, matters relating to the access to, and the fair and equitable sharing of benefits from the utilisation of traditional knowledge associated with the genetic resources of IPLCs.

- Aside from the political side of the implementation of the Protocol, a number of AMS also have to deal with staff and team members who might not have a background yet in ABS. Capacity building and awareness raising initiatives therefore have been continued in the region. For other AMS, funding for planning and implementing the Protocol has been an issue.

- Many AMS are also seeking to involve a wide group of sectors in the implementation of ABS policies, which are observed to be cross-cutting. However, it is a challenge for them to translate the aspects of the Protocol into readily understandable concepts for a wide range of audiences and stakeholders, from different ethnic groups to commercial enterprises to national agencies. Spreading the ABS framework over a wide range of ministries, agencies, and offices within a country also affects the capacity-building efforts.[34]

- One issue that has not yet been addressed is whether digital sequence information on genetic resources should be included within the scope of the Nagoya Protocol.[35] So far, an Ad Hoc Technical Expert Group has been established to consider any potential implication of the use of digital sequence information on the Nagoya Protocol, however their findings have not yet been presented.[36]

- Another challenge that AMS would have to face is the quick development of technology, which enables entities to easily collect and publish data, possibly without going through the ABS systems in place.

Ways Forward

- Increase public participation, awareness, and communication of ABS-related issues. Showing the relevance of ABS through scientific and technological research is just one of the many ways to do so.

- Recognise linkages among policy, institutional, and regulatory measures. Such measures should be coordinated to emphasise the integrated nature of the ABS framework.

- Strengthen environmental legislation with the ABS framework in mind.

- To ensure that the Nagoya Protocol is fully operational among party members, AMS may want to designate national focal points and competent national authorities, and develop their capacities.[37] Programmes for capacity building need to consider what AMS are currently doing, and target how else they could improve in their implementation.[38] In the long run, AMS need to understand the ABS framework in a way that enables them to deal with challenges such as synthetic biology and digital sequence information.

- AMS should also ensure that clear processes and procedures in accordance with the national legislation are explicitly set out for the guidance and compliance of all users of genetic resources and associated traditional knowledge. This is important so that AMS are able to safeguard the rights of IPLCs.[39]

- For party members, AMS that do not have national ABS frameworks need to establish ABS measures in their domestic legislation, and administrative and policy measures. Learning-by-doing and innovating-by-learning approaches have been helpful in helping such AMS to identify mechanisms that would initially implement ABS principles while in the process of developing the national legal frameworks.

- For party members that already have existing measures, AMS need to align these measures with the Nagoya Protocol. It would also be helpful for ASEAN as a whole to have a guiding ABS framework for common and transboundary resources, thus enhancing multilateral benefit-sharing.


Photo by Norma Rui G. Villamater

STRATEGIC GOAL E

Enhance implementation through participatory planning, knowledge management and capacity building

Photo by Aung Chan Thar

TARGET 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

All AMS have taken the fundamental step of developing or updating their National Biodiversity Strategies and Action Plans (NBSAPs). The next equally important step is to expedite NBSAP implementation.

All ASEAN Member States have submitted their NBSAPs, taking into account the Strategic Plan for Biodiversity 2011–2020. At least four AMS have successfully submitted their 6th National Reports via the online encoding facility.

Challenges

- Difficulties in using the Convention on Biological Diversity (CBD) online reporting tool, thus, the delay in report submissions
- Difficulties in accessing data from other government agencies
- Limited resources to implement the NBSAPs
- There is a noticeable increase in the use of quality indicators in national biodiversity reporting

The CBD developed and introduced the use of the 6NR encoding tool in 2018 to facilitate and support the submission of the 6NR.

Ways Forward

- Design a more user-friendly and easy to navigate reporting tool
- Ensure that the targets in the NBSAPs are consistent and clearly aligned with the global strategic plans and the Aichi Targets
- Make deliberate efforts to identify the roles and issues relating to gender and equitable sharing of responsibilities, roles, and benefits in biodiversity conservation
- Synergise actions at the global, regional, and national levels to maximise the impacts and ensure the efficient use of finite resources for conservation measures


Photo by Danny Ocampo

Aichi Biodiversity Target 17: Biodiversity strategies and action plans
By 2015, each Party has developed, adopted as policy instrument, and has commenced implementing an effective, participatory, and updated national biodiversity strategy and action plan.

All ASEAN Member States (AMS) have submitted their respective National Biodiversity Strategies and Action Plans (NBSAPs) to the Convention on Biological Diversity (CBD), taking into account the post-2010 versions of the Strategic Plan for Biodiversity (2011–2020). The CBD developed and introduced an encoding tool in 2018 to facilitate and support submissions of the 6th National Reports (6NRs). Four AMS were able to submit their reports using the encoding tool.

The NBSAPs are key instruments in aligning national policies with the CBD. These strategies and plans have received the support of various stakeholders and have led to the mainstreaming of biodiversity into a wider sector and facilitated the achievement of the Aichi Targets to varying extent.

The United Nations Environment Programme (UNEP) in 2018 evaluated[1] 25 countries in terms of their progress in developing and implementing of the NBSAPs since the pre-2010 assessment and readiness to mainstream biodiversity concerns across sectoral and cross-sectoral plans and policies. The study found that the post-2010 NBSAPs "seem to be on the right track and biodiversity mainstreaming is gaining recognition."

The UNEP report also pointed out that the second-generation NBSAPs are more targeted than the first as mainstreaming of biodiversity is given more consideration and are better suited to serve as frameworks for implementation. The new NBSAPs have shown progress in terms of "vertical" mainstreaming by empowering regional institutions, and indigenous peoples and local communities (IPLCs). In addition, the UNEP report also observed that the NBSAP goals, targets, and actions are more direct and oriented towards traditional nature conservation.

However, the study also concluded that a number of NBSAPs have not been endorsed to the ministry of the respective AMS that is directly responsible for CBD implementation and their preparation process was not as inclusive.

The report cited Lao PDR's NBSAP for strongly reflecting mainstreaming of biodiversity in terms of identifying strategic programmes and policies, determining effective ways for mainstreaming principles and practices, and ensuring that its implementation considers the priorities of relevant biodiversity conventions.

Additionally, the report underscored Myanmar's effort to prepare subnational biodiversity plans for at least three of its states/regions by 2020 that are calibrated with its NBSAP. NBSAP development should be done through a participatory process involving government, civil society, local communities, academia, and the private sector. Guidelines and principles for Biodiversity Strategies and Action Plan (BSAP) preparation should ensure consistency of approach and integration with the NBSAP.

It is worth noting that the post-2010 NBSAPs have further been improved by emphasising tools for institutional, legal, and financial implementation. AMS have identified various options to finance the implementation of their NBSAPs. The Biodiversity Finance Initiative (BIOFIN) approach has been taken up in four (4) AMS to support conservation activities aligned with their NBSAPs.

However, a more comprehensive and systematic effort to mobilise financial resources for the implementation of NBSAPs is recommended.


Photo by Danilo O. Victoriano Jr.


Photo by Thant Zin

Challenges

During the *Regional Workshop on Prioritizing Aichi Biodiversity Targets in the ASEAN for Implementation in the NBSAPs and Preparation of the Sixth National Reports to the Convention on Biological Diversity (CBD)*, organised by the ASEAN Centre for Biodiversity (ACB) and the National Biodiversity Authority (NBA) of India in 2018, AMS expressed that institutionalising the NBSAP has remained a challenge. This implies the need for policy framework and directives at the national and local levels to ensure NBSAP mainstreaming into the strategies and work plans of all national agencies that should be monitored against agreed indicators and related metrics.

In 2019, the *Regional Workshop on Accelerating Aichi Target 11 Implementation in the East and Southeast Asia Regions* held in the Philippines identified the following challenges encountered by AMS in the preparation of the 6NR.

- There is a need to improve the CBD Online Reporting Tool based on the feedback of AMS regarding the reporting process and modality.

- A strong stakeholder involvement should be a key element in the consultation process to ensure a good buy-in for a more effective NBSAP implementation.

- Methods of evaluating progress in NBSAP implementation may be enhanced to include extensive use of literature review, case studies, online platform, expert assessment, on-the-ground science-based evidences, and national indicators. In relation to this, the acquisition of data from concerned ministries, and limited capacity and fund support also need to be addressed.

- Eliminating discrepancies in data due to area overlapping and differing map scales should be a priority action item.


Photo by Thant Zin

Table 19. Some initiatives and challenges experienced in NBSAP implementation

AMS	Initiatives and challenges in NBSAP implementation
Brunei Darussalam	• Brunei Darussalam's NBSAP was developed in February 2015. It covers the country's biodiversity plans of action for 2015–2035 under the four strategic objectives of promoting and implementing biodiversity management strategies, promoting green development, establishing research and development networks and cooperation, and supporting initiatives to increase biodiversity awareness, understanding, and experience.
Cambodia	• Cambodia updated its NBSAP in 2014 and 2015 with support from the Global Environment Facility (GEF) through the UNEP and Harvest USAID. It was approved and launched in 2016. • The updated NBSAP adopts 20 national targets in line with the Aichi Targets and the Strategic Plan for Biodiversity 2011–2020. • Two years after the adoption of NBSAP, Cambodia expanded its protected area system. Its extended network of biodiversity conservation corridors (well-connected protected areas) has reached 41 per cent of its territory.
Indonesia	• Indonesia updated its 1993 Biodiversity Action Plan into the Indonesian Biodiversity Strategy and Action Plan (IBSAP) 2003–2020, which aligns with global agreements, prioritises mainstreaming initiatives, and incorporates new elements such as economic utilisation of biodiversity for community welfare. • Mainstreaming, a key strategy for NBSAP implementation is reflected in the 2015–2019 National Development Plan (RPJMN) and the Government Work Plan (RKP). • Monitoring of national targets is carried out following the framework and mechanism of monitoring, evaluation, and reporting (MEP) listed in the 2015–2020 IBSAP and coordinated by the CBD National Focal Point (NFP) with support from four ministries that are strongly relevant to Indonesia's biodiversity affairs. The NFP CBD is also assisted by a task force that consists of representatives from government institutions, non-government institutions, universities, and/or a practitioner.
Lao PDR	• Its first National Biodiversity Strategy to 2020 and Action Plan to 2010 was developed in 2004. The 2nd NBSAP 2016–2025 is currently in effect with 29 overarching national targets spread across five (5) national strategies. • To address gaps in NBSAP implementation, Lao PDR is working with UNDP to develop a project concept for funding by international sources such as GEF 7, specifically on decision-making tools, enhancing policy mechanisms, and protected area management. • There has been considerable progress in the implementation of the NBSAP; however, their effectiveness towards meeting the goals has yet to be assessed. • The country's NBSAP has yet to clarify the various roles and issues relating to gender and equitable sharing of responsibilities and roles. A key issue is to ensure that there is adequate representation of all genders in the stakeholder working groups and the technical working groups.

AMS	Initiatives and challenges in NBSAP implementation
Malaysia	• Malaysia's first National Policy on Biological Diversity (NPBD) was formulated in 1998. • The second generation NPBD 2016–2025 reflects the country's improved commitment to biodiversity with its five (5) goals, 17 targets, and 57 actions. • During the 6NR reporting period, Malaysia experienced a change of government following the 14th General Election (GE-14). This resulted in the restructuring of ministries and functions to reflect current needs and priorities.
Myanmar	• Myanmar's 2011 NBSAP was updated in 2015 to cover the final period of the CBD Strategic Plan to 2020, and submitted in 2016 to the CBD. • A National Biodiversity Conservation Committee was formed to coordinate the implementation of the NBSAP. • More than 70 per cent of the 61 national targets have either been achieved or partially achieved two years prior to the 2020 deadline. Myanmar has exceeded its target to protect Ramsar and UNESCO sites with more areas covered than was expected. • A key to the effective NBSAP implementation was the enactment of the new Conservation of Protected Areas and Biodiversity Law which enables a more strategic and effective approach to natural resource management and land tenure. The strong leadership, particularly of the Ministry of Natural Resources and Environment, and effective lobbying, led to the passage of the law. Provision of important information to parliamentarians was likewise a crucial factor to the passing of this law, and the new forest law. • Myanmar needs to give more attention to Target 5.1 (loss of forests) and Target 6.2 (unsustainable fisheries) for which it has reported to have been moving away from accomplishing the set goals.
Philippines	• The Philippine Biodiversity Strategy and Action Plan (PBSAP) 2015–2018 was adopted in 2016 with the Department of Environment and Natural Resources-Biodiversity Management Bureau coordinating its implementation and mainstreaming into the plans and programmes of concerned government agencies and local government units. • It is the third update of the country's BSAP which envisions that by 2028, the country's biodiversity is restored and rehabilitated, valued, effectively managed and secured, with ecosystem services able to sustain healthy and resilient Filipino communities. • The PBSAP contains 20 specific targets and related indicators, financing needs and strategies, monitoring mechanisms, and institutional arrangements and responsibilities. • A Reference Sheet is now being prepared to guide various stakeholders in the review and monitoring of the implementation of the PBSAP. Other monitoring systems are in place and being used as guides to measure the implementation of specific targets like the Manuals on Biodiversity Assessment and Monitoring System for Terrestrial Ecosystems, Inland Wetland Ecosystems, and Coastal Marine Ecosystems.
Singapore	• Singapore implements two (2) key national strategies to conserve its remaining natural areas: the NBSAP and the Nature Conservation Master Plan (NCMP), which were both developed by the National Parks Board of Singapore. • The NBSAP serves as the framework in implementing the country's 18 national targets for biodiversity conservation through innovative and ecology-based strategies. • The NCMP operationalises the biodiversity efforts outlined in the NBSAP putting emphasis on (1) conserving key habitats and connecting them ecologically, (2) enhancing and restoring habitats and implementing species recovery projects, (3) applying research to conservation biology and planning, and (4) encouraging community stewardship and outreach in nature.
Thailand	• Thailand developed its fourth NBSAP to cover a 7-year period (2015–2021). The plan was formulated to integrate biodiversity management and utilisation, enable intersectoral participation, and ultimately halt biodiversity loss. Its 6NR states that biodiversity management has yet to significantly permeate policies, plans, and measures, at the provincial and local levels. • The latest revision, the Master Plan for Integrated Biodiversity Management has four main strategies to be implemented in two phases of operation. The second phase (2017–2021) comprises action plans for meeting the 25 national targets.
Viet Nam	• The first NBSAP of Viet Nam was approved in 1995, and the second in 2007. • The National Strategy on Biodiversity to 2020, with a vision to 2030, was adopted in 2013. It has five more broad objectives and specific and measurable goals and indicators. • Viet Nam's 6NR reported progress towards national targets and the Aichi Targets, particularly in the areas of legislation, policy development, mainstreaming biodiversity, and increasing forest cover, and protected areas.

Ways Forward

- Global and local initiatives call for ambitious targets and urgent on-the-ground actions as biodiversity resources are fast being depleted. This entails a re-examination of national targets to make them more measurable, determine gaps and overlaps, and ensure that plans are well-integrated and in close alignment with the post-2020 global biodiversity framework and the SDGs.

- For future national report submissions, there is a need to make the reporting tool user-friendly and easy to navigate, and for it to ensure that the sections are not repetitive. CBD should provide enough time for beta-testing, usability tests, and promotion of the tool to intended users to increase their acceptance and familiarity with the online platform. Annual updates on the reporting challenges and progress toward accomplishing it will facilitate in making the national reports.

- Comprehensive and systematic mobilisation of financial resources is vital for an effective NBSAP implementation.

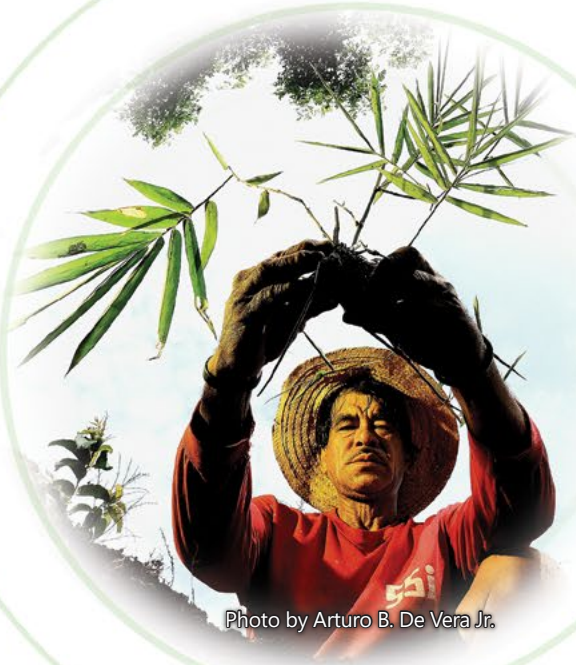


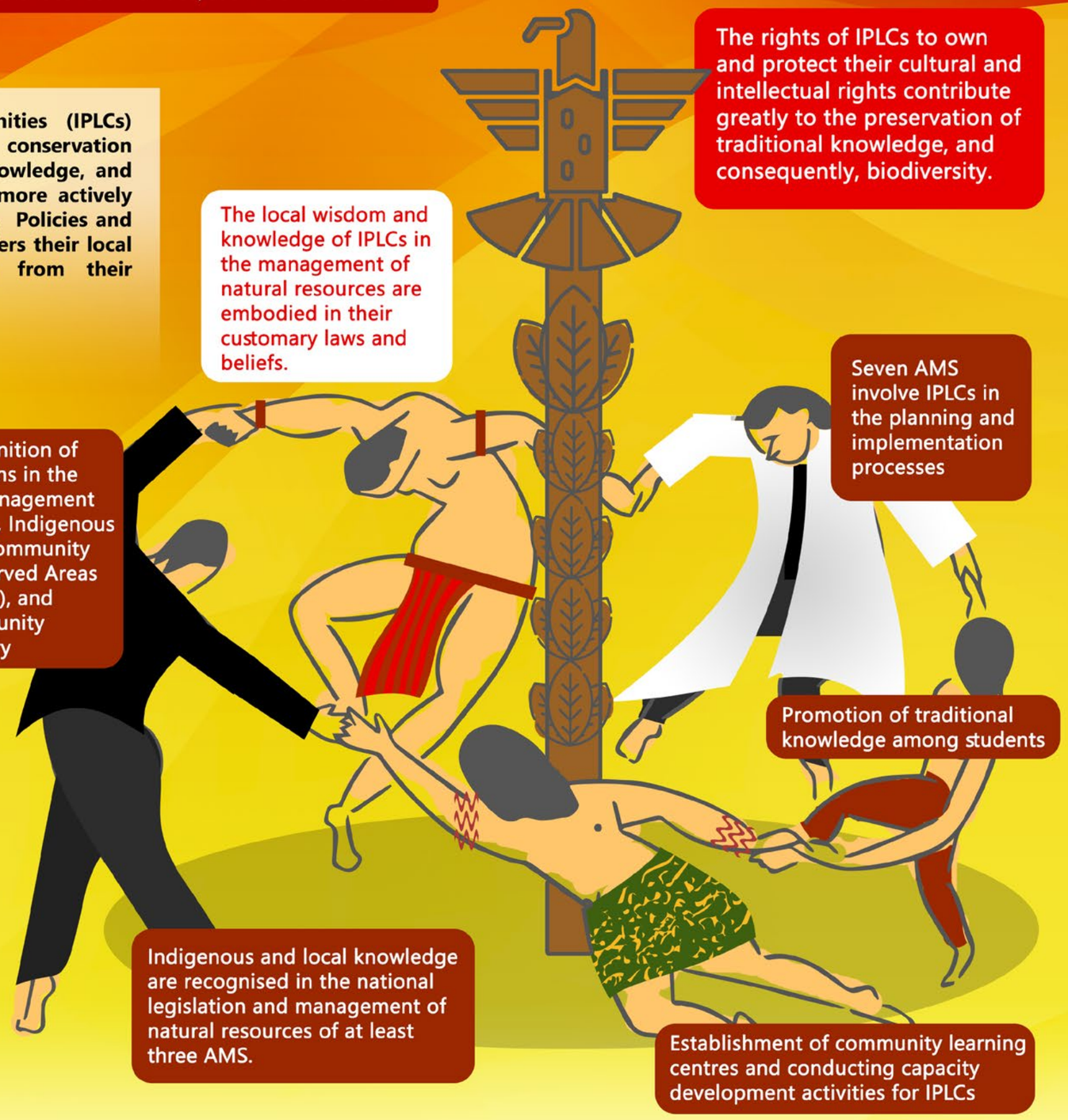
Photo by Arturo B. De Vera Jr.

TARGET 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Indigenous peoples and local communities (IPLCs) significantly contribute to biodiversity conservation through their stewardship, traditional knowledge, and cultural heritage. Most AMS have been more actively engaging IPLCs in conservation initiatives. Policies and programmes that are inclusive and considers their local situations may enhance the benefits from their contributions.

Challenges

- Traditional knowledge and customary use are under threat
- The change from the use of geographically specific languages to more cosmopolitan forms
- Substantial amount of traditional knowledge remains undocumented
- Land disputes make IPLC partnership initiatives challenging
- Biopiracy



Ways Forward

- Incorporate the conservation of cultural traditions and beliefs of the IPLCs in biodiversity programmes and strategies
- Strengthen policies and mechanisms to protect the collective rights of IPLCs
- Address land disputes
- Establish national databases and a Traditional Knowledge Digital Library metadatabase at the regional level
- Ensure that research activities have clear guidelines on the sharing of genetic materials and traditional knowledge


Photo by Khine Zar Mon

Aichi Biodiversity Target 18: Traditional knowledge
By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

ASEAN Member States (AMS) recognise the importance of local wisdom and indigenous knowledge and practices in the sustainable use of biodiversity. In fact, some of them have involved the IPLCs in drawing up laws and agreements on natural resources management and conservation.

Some AMS took steps to document the occurrence, associated remedies, and uses of medicinal plants. Meanwhile the efforts of IPLCs to protect biodiversity through "sacred forests and watersheds" have gained relevance. Some IPLCs such as the Penan Community of Long Iman in Malaysia turned their community gardens containing medicinal plants into ecotourism sites.

The Philippines has legally recognised the value of traditional knowledge and provided for the rights of IPLCs to full ownership and protection of their cultural and intellectual rights. A number of AMS reported that traditional knowledge and practices have contributed to the protection of sacred sites, forests, caves, and bodies of water. They adopted several conservation tools to strengthen traditional practices that include the recognition of customary nature, co-management of protected areas, identification of Indigenous and Community Conserved Areas (ICCA), and adoption of community forestry practices.

Majority of the AMS consulted and involved IPLCs in the planning and implementation processes of NBSAPs and other natural resource management projects such as Reducing Emissions from Deforestation and forest Degradation + (REDD+), Nagoya Protocol, ICCAs, and Forest Law Enforcement, Governance and Trade (FLEGT). Students were periodically given orientation on environment and natural resources-oriented laws/codes of five (5) AMS (Cambodia, Indonesia, Lao PDR, Myanmar, and Thailand) which contain provisions to adopt indigenous and local knowledge on medicinal plants.

Cambodia and Malaysia conducted capacity building activities for IPLCs on community mapping and establishment of community learning centres. Community-based forests and community protected areas were established in Cambodia covering a total of 24,100 square kilometres to give opportunities to local communities that are dependent on these resources for their livelihood. The Philippines implemented the Philippine ICCA Project from 2015 to 2019 to strengthen the conservation, protection, and management of KBAs in the country by institutionalising ICCAs as a sustainable addition to the national protected areas estate. As of 2018, a total of 2,831.84 square kilometres have been documented as formally registered with the global ICCA registry.

The Strategic Biodiversity Plan aimed "to enable the participation at all levels to foster full and effective contributions of indigenous people and local communities" as well as of other stakeholders in the full implementation of its objectives.[1]

Noting the links between biological diversity and cultural diversity, the CBD acting as a global focal point for biological diversity, and the UNESCO acting as a global focal point for cultural diversity, launched a Joint Programme in 2010, called *Linking Biological and Cultural Diversity*.

Overall, the Joint Programme aimed to shed light into links between biological and cultural diversity through information sharing, further investigating conceptual and empirical aspects, and fostering learning and supporting activities to raise awareness.

Links between biological and cultural diversity were pointed out by the Joint Programme to be evident in language and linguistic diversity, material culture, local, traditional and indigenous knowledge, technology and innovation, modes of subsistence, social and economic relations, belief systems, and values.[2]

Box 46. Headline indicators as measure of progress for Aichi Target 18

In its 2014 report, the CBD cited decisions made by the COP 11, including one on the use of headline indicators as proxies to measure progress made in achieving Target 18. According to the report, Target 18 is extremely complex to measure and information is variable across countries and communities and frequently not accessible.

Thus, COP 11 decided to use headline proxies based on trends in the following: linguistic diversity and numbers of speakers of indigenous languages; land-use change and land tenure in the traditional territories of indigenous and local communities; practice of traditional occupations; and which traditional knowledge and practices are respected through their full integration, safeguards, and the full and effective participation of IPLCs in the national implementation of the Strategic Plan.

Photo by Ko Thet-Pyay

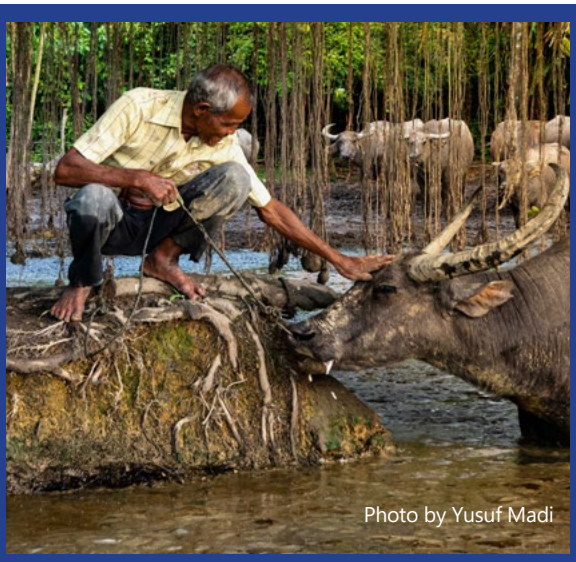


Photo by Yusuf Madi

Box 47. Spatial association of cultural and biological diversity as proxy indicators

In its 2018 summary for policymakers of the assessment report on land degradation and restoration, IPBES highlighted the spatial association of cultural and biological diversity using language and mammal and bird species richness, respectively, as proxy indicators. IPBES measured language diversity as the geographic concentration of the points of origin of each language while biodiversity is the total species richness of mammals and birds. Findings showed that areas that are high in language diversity are also the areas that have high mammal and bird species richness. According to the IPBES study, many indigenous peoples and local communities consider land degradation as a cause of a pronounced loss of their cultural identity.

In 2015, the United Nations General Assembly adopted the *2030 Agenda for Sustainable Development* for a stronger engagement and inclusion of indigenous peoples through a direct reference to them in its political declaration and in Goal 2 on Zero Hunger and Goal 4 on education. Its section on follow-up and review also called for the participation of indigenous people who, according to the UN Department of Economic and Social Affairs on Indigenous Peoples, are almost universally in situations of disadvantage vis-a-vis other segments of the population.[3]

Assessments of Progress in Achieving Target 18

The Global Biodiversity Outlook 5 (GBO 5) reported an increase in recognition of the value of traditional knowledge and customary sustainable use, both in the global policy fora and in the scientific community. However, this progress could be said of only some countries. There is limited information to show that traditional knowledge and customary sustainable use have been widely respected and/or reflected in policies or the extent to which IPLCs are effectively participating in associated processes. In essence, GBO 5 indicated that Target 18 has not been achieved.[4]

GBO 5 noted the increasing number of positive examples of national progress. However, it also documented the poor recognition of the role of traditional knowledge and indigenous people in conservation and sustainable use of biodiversity.

This is exemplified in the following: only 40 countries that acceded to the CBD indicated in their 6NRs to have involved IPLCs in the revision processes of their NBSAPs; there is limited global level information on the extent to which traditional knowledge and customary use are being integrated in the implementation of the Convention; the lack of communication between IPLCs and the scientific community; and the lack of local and traditional knowledge that have been accounted for in biodiversity assessments.

The concerns of IPLCs cut across most, if not all, of the strategic goals, thus the accomplishment of Target 18 elements and other actions relevant to IPLCs would accelerate the achievement of other targets and goals. For purposes of illustration, Table 20 shows these targets and goals with corresponding key potential actions that, according to the CBD, need to be more widely applied in order to accelerate toward some of the strategic goals and the Aichi Targets.

Table 20. Key potential actions of Aichi Target 18 that need to be widely applied to accelerate toward the strategic goals and other Aichi targets

Strategic Goal	Targets	Key Potential Actions
(B) "Reduce the direct pressures on biodiversity and promote sustainable use"	5, 6, 7, 8, 9, 10	Developing integrated policies to address habitat loss and degradation, covering positive and negative incentives; engagements with sectoral groups, indigenous and local communities, landowners, other stakeholders and the general public; effective protected area networks and other area-based conservation measures; and enforcement of relevant regulations and laws. Making greater use of innovative fisheries management systems, such as community co-management that provide fishers and local communities with a greater stake in the long-term health of fish stocks combined with the elimination, phasing out or reform of subsidies that contribute to excess fishing capacity, phasing out destructive fishing practices, and further developing marine protected area networks.
(C) "Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity"	11, 12, 13	Promoting public policies and incentives that maintain local varieties of crops and indigenous breeds in production systems, including through increased cooperation with, and recognition of, the role of indigenous and local communities and farmers in maintaining *in situ* genetic diversity.
(E) Enhance implementation through participatory planning, knowledge management and capacity building	17, 18, 19, 20	Pursuing initiatives that support traditional and local knowledge of biodiversity and promote customary sustainable use, including traditional health care opportunities to learn and speak indigenous languages, research projects and data collection using community-based methodologies, and involving local and indigenous communities in the creation, control, governance and management of protected areas.

Modified assessment indicators based on 6NR reports

Indeed, a consolidation of accomplishments of AMS towards Target 18 without the prior guidance of the CBD in the COP 11 decisions was hindered by a seeming lack of measurable indices. Such indices, as earlier discussed, were laid down in 2014 by CBD as part of the COP 11 decisions.

But even with the use of the COP 11 proxy indicators, this report would not be able to properly capture the progress made for Target 18 because AMS generally used actions toward the target rather than the results of the actions themselves.

Thus, this consolidated summary gleans the progress made by AMS from a preponderance of items reported in the 6NRs that are aggregated under various topics.

National legislation and relevant international obligations

It is in the area of integration of traditional knowledge, innovations, and practices into national legislation and relevant international commitments that most AMS have gained the most groundwork to attain Aichi Biodiversity Target 18. This is evident in the legal recognition of customary tenure, co-management of protected areas, ICCAs, and community forests, or through their inclusion in national frameworks or roadmaps.

The Environment and Natural Resources Code of Cambodia, which is being finalised, calls for due recognition of customary rights to non-commercial traditional use of natural resources and occupancy of IPLCs.

Similarly, Indonesia's forestry regulation (No. P. 34-2017) recognises and protects local wisdom in natural resources and environmental management. It set a clear basis for implementing a policy to increase community participation in forest


Photo by Tran Viet Linh

Box 48. The *Tagal* system of Malaysia

The *tagang/tagal* community-based resource management system in Malaysia and is enforced through a customary law (Peraturan dan Undang-Undang Keil Tagang) in Sarawak. It was established by the local communities. The community co-management partnership with the state authority is enforced through a customary law (Section 58 of the Sabah Native Court Rules of 1995) and Section 36 of the Sabah Inland Fisheries and Aquaculture Enactment 2003. The Department of Agriculture Sarawak conducts fish assessments to identify high conservation rivers for setting up tagang system in Rajang delta, Baleh, and Kubaan Peak. There are now 126 *tagang* in Sarawak.

management by compiling indicative maps for social forestry areas, allocating 127,000 square kilometres of forest lands for implementing social forestry programmes. Indonesia also held a community forestry communication forum which was attended by development partners who examined the linkages between communities and sustainable forest management.

Malaysia replicated the implementation of its *tagal* system, which was found to be successful in community-based resource management (CBRM), from inland fisheries to other areas such as rice-field water canals, brackish water rivers, and coastal waters. The *tagal* principle has been replicated in Sarawak and Parang states and is used to protect and restore the population of sea cucumber. Now, Malaysia is conducting fish assessments to identify high conservation value rivers where the CBRM system will be set up.

Myanmar, incorporated a customary tenure measure into its Conservation of Biodiversity and Protected Areas Law enacted in 2018 that supports the legal recognition of customary land use tenure.

Lao PDR passed its National Framework on the Access to Genetic Resources and the Fair and Equitable Sharing of Benefit Arising from their Utilization in 2013. This provides comprehensive guidelines on how traditional knowledge associated with genetic resources held by indigenous and local communities should be accessed with prior and informed consent or approval and involvement. Detailed guidelines and information, education, and communication (IEC) materials on this such as books, brochures, and posters have already been distributed to the public.

Viet Nam's local customary law for forest and fishery protection maintains practices of ethnic minority groups. The ethnic customs of the Ede in the central highlands, for example, have 236 regulations that define responsibilities of each individual to the community in natural resource management.


Photo by BMB-DENR

The legal system in the Philippines recognises the value of the indigenous peoples' traditional knowledge and provides safeguards to protect this knowledge. In 2016, the Department of Environment and Natural Resources (DENR), in partnership with the National Commission on Indigenous Peoples (NCIP), launched the ICCA.

ICCAs in the Philippines include sacred sites and natural features, indigenous territories, cultural landscapes, and seascapes. These are repositories of natural wealth and biological resources that provide environmental services.

Six ICCA pilot sites covering 800 square kilometres were established in the country through the DENR and UNDP-GEF Project on Expanding and Diversifying the National System of Terrestrial Protected Areas in the Philippines in 2010–2015. As of 2018, the country already has 2,832 square kilometres formally registered with the global ICCA registry.

The participation of local communities in Thailand in biodiversity management was reported to have contributed to efforts to achieve three Aichi targets, namely: 5, 13, and 18. Over 1,400 species of medicinal plants are used in traditional Thai medicine.

Myanmar has gained headway in implementing the NBSAP and associated programmes. There are ongoing consultations for developing three national parks. The new Myanmar Land Use Policy (2016) and the Conservation of Biodiversity and Protected Area Law (2018) recognise customary land use tenure.

The application for ICCA recognition of Malaysia for the State of Sabah's Bundi Tuhan Native Reserve and Sungai Pin Conservation Area, and Myanmar for the Phar-Baung-Taung is indicative of progress in conservation work.

Participation of IPLCs in biodiversity conservation programmes

Stakeholder participation in initiating, designing, or implementing programmes is said to establish a sense of ownership among the stakeholders and subsequently improve the institution's intended outcomes.

Participation of IPLCs in biodiversity protection initiatives happened in various forms such as in research to characterise best practices, consultations, planning, implementation, forest management and rehabilitation, capacity building, and programmes incentivising nature protection.

For Cambodia, the 2018 Rectangular Strategy Phase IV promotes inclusive and sustainable development and sustainable management of culture. It is generally accepted that the views of indigenous ethnic minorities and local communities about management of natural resources and development projects that are proposed in areas where they live and areas that can affect their livelihoods need to be sought and taken into account.

The effective participation of local communities and indigenous ethnic minorities is outlined in Cambodia's Environment and Natural Resources Code. The Government creates the General Directorate for Local Community (GDLC) that will work with the Ministry of Environment (MoE) to manage and coordinate local development and protected areas, and thus contribute to the protection and conservation of natural resources, biodiversity, and ecosystems in protected areas.

In Taman Negara National Park, Royal Belum State Park and Endau-Rompin Johor National Park in Malaysia, ecotourism development was carried out by engaging, as well as empowering IPLCs through training courses. This allowed them to preserve their customs and traditions while providing opportunities for them to participate in the local economy.

In Viet Nam, community-based conservation management, sustainable use of biodiversity resources, and ecotourism have become models of enhancing livelihoods at the local level, especially in protected areas and biosphere reserves. These livelihood models generate employment and income for the local community, and work as a mechanism for better management and protection of 58,700 square kilometres of forest.

Documentation of traditional knowledge, innovations, and practices

Protection of traditional knowledge is at the core of conservation efforts. An important part of protection is the documentation of traditional knowledge, practices, and ways of life.

The Manobos, the largest ethnolinguistic group in the Philippines, are dispersed across Mindanao. One such community is a custodian of Pangasananan, a territory of about 1,500 people who partly rely on resources of the place for food and as sanctuary during crisis, i.e., as a safe space away from COVID-19's reach, violence during World War II, and from armed rebels. The Manobos believe that their continued existence as a people depends on Pangasananan. Thus they have continued to protect the place declaring, "If we abandon the territory, what will become of us? Nothing, we will perish and become nothing."

Pangasananan is 63 per cent forested and has various features such as a sacred lake, a forest half-submerged in clean, cold water, a famous tourist destination, Tinuy-an, a waterfalls that has been dubbed as "the little Niagara of the Philippines" that attracted 160,000 visitors a year pre-pandemic. It forms part of a government-identified Key Biodiversity Area


Photo by Kyaw Kyaw Winn

(KBA), the internationally renowned Bislig Important Bird and Biodiversity Area, and a nesting and feeeding ground of the Critically Endangered Philippine eagle (*Pithecophaga jefferyi*).

The Philippine government officially designated Tinuy-an and its entire watershed as a protected landscape through Republic Act No. 11038 or the Expanded National Integrated Protected Areas System Act of 2018. The Tinuy-an Falls overlaps with 31.63 square kilometres of Pangasananan. However, the Manobo community views this as problematic for the following reasons: there was no prior and informed consent for its establishment; it criminalises the community for continuing with their activities in a protected area; it is undermining traditional governance. This is contrary to the laws on ICCAs and customary laws.[5]

The Nationally Important Agricultural Heritage Systems (NIAHS), as part of the global project on *Conservation and Adaptive Management of Globally Important Agricultural Heritage Systems* (GIAHS), is being implemented in the Philippines. It is aimed at mainstreaming the concept of GIAHS in national agricultural heritage systems by identifying and documenting traditional community agricultural practices that support food security and local livelihoods.

The Ifugao Rice Terraces is a GIAHS while 79 NIAHS sites have been identified as potential candidates. In identifying these sites, five GIAHS criteria were adopted: (a) contributions to food and livelihood security; (b) high agrobiodiversity; (c) supported by local knowledge; (d) sustained by a social system; and (e) presence of remarkable landscapes.

Thailand, on the other hand, documented the different areas in which local knowledge on conservation and sustainable use of biodiversity is recognised. These are on herbal plants, traditional farming and fishery, management of reservoirs, community practices related to conservation and sustainable use of biodiversity, biodiversity conservation through the combining of their

Box 49. Documented occurrence and use of medicinal plants

Research on ethnic botany in Viet Nam focused on indigenous knowledge of mountainous ethnic groups in conservation and use of natural resources. It has collected hundreds of medicinal plants and traditional herbs from 15 ethnic minority groups and documented over a thousand folk medicine remedies. Viet Nam developed a digital map of precious and rare medicinal plants in its central highlands.

Cambodia acknowledged IPLCs as key partners with regard to knowledge on medicinal plants. Their knowledge, innovations, and practices are now considered essential for sustainable biodiversity management.

The Indonesia Ministry of Agriculture documented 66 types of medicinal plants among other horticulture products. Ethnic groups have a diversity of traditional knowledge related to the use and management of biodiversity as food, medicine, and other materials sources.

The Traditional Medicine Center of the Ministry of Health of Lao PDR defined more than 16 areas for medicine plants preservation and management. Some provinces have developed a book collection of medicinal plants.

In Peninsular Malaysia, traditional knowledge documentation among indigenous communities and the Malay people has been undertaken.

Myanmar updated its biodiversity country profile for 1,540 medicinal plants. A recent publication on the medicinal plants of Myanmar by DeFillips and Krupnick (2018) highlighted the importance of plants as traditional medicines.

Thailand has over 1,400 species of medicinal plants used in traditional medicine.

Photo by Bianca Schlegel


Photo by Bantimurung Bulasaraung National Park

own knowledge with technical know-how offered by publications, public agencies, and NGOs.

To protect the knowledge of indigenous peoples and local wisdom, Indonesia issued an environment and forestry regulation and rules on recognition and protection of customary law communities, local wisdom, and the rights of adat law communities related to protection and management of the environment. To support this, the government has compiled indicative Maps of Social Forestry Areas that can easily be accessed by the general public.

Indonesia allocated 127,000 square kilometres of forest land for the community through social forestry programmes. To accelerate the implementation, the government established a Community Forestry Communication Forum which was attended by eight (8) development partners who specifically examined the linkages between communities and sustainable forest management.

In addition to existing protected forests, Cambodia designated more than 42,000 square kilometres of new protected areas and conservation areas including community-based forests. In 2017, Cambodia counted 610 community forests, of which 464 were registered, and 153 community protected areas of over 244.1 square kilometres. Community forests give an opportunity to local communities to take care of forests as their sources of livelihood.

Strengthening local communities through training and capacity building

Two AMS held training workshops and other learning events to build the capacities, empower, and increase the participation of IPLCs in development activities in relation to environment, climate change, and biodiversity conservation.

Malaysia, in particular, used training activities to build the capacities of its indigenous communities in areas such as entrepreneurship and in developing biocultural community protocol which documents their customary laws, traditions, and community resource areas.

A community-based NGO in Sabah, PACOS Trust, has been working to empower indigenous communities through systematic building and strengthening of community organisations. PACOS worked to ensure the active participation of IPLCs in regulating and protecting access to biological diversity and indigenous knowledge, and advocated for IPLCs in development-related issues that they faced.

PACOS established a network of 25 community learning centres in Sabah and three in Sarawak where children and community members take part in education activities for sustainable development and traditional knowledge.

Malaysia implemented an EU-REDD+ Project that engaged almost 500 households in 18 villages in Sabah on community development activities, in particular promoting community forestry through co-management of designated forest compartments and supporting alternative livelihoods for the communities. The project also implemented capacity building and awareness activities in organic farming and homestay through facilitated peer group learning from other established women's groups.

Still in Sabah, Malaysia, training was provided to communities to develop their respective biocultural community protocol, which documents their customary laws, traditions, and community resource areas.

Meanwhile, Thailand, through the Community Organization Development Institution, promoted and mobilised capacity building and strengthening of IPLCs through community mapping. Using the tool, local communities are able to identify the status and trends of traditional knowledge, as well as the vision and priorities for protecting traditional practices.

The Population and Community Development Association in Thailand promotes community participation in forestation by establishing local community networks, facilitating the exchange of experiences, promoting organic farming and soil conservation, and providing training to local communities.

Biodiversity protection in sacred sites

Biodiversity protection in some AMS capitalised on the areas being sacred forests and watersheds of ethnic minority and indigenous people.

In Viet Nam, authorities play a role in the protection of biodiversity through their support for the creation of sacred forests


Photo by John Escandor Jr.


Photo by Wai Phyoe Maung

and sacred waters that are habitats for many species of wild fauna and flora.

In Indonesia, *sasi* as a terrestrial or marine natural resources management practice of Raja Ampat communities based on customary rights, identifies a core zone that is considered sacred. Permanent *sasi* are food security and marine ecotourism zones where extractive activities are not allowed. Temporary marine *sasi* zones, on the other hand, allow fishing by indigenous people, but should be limited to simple gears such as *kalawai* (spear) and *jubi* (fish arrows).

The Philippines is processing the classification of sacred sites and natural features, indigenous territories, cultural landscapes and seascapes that are the repositories of natural wealth and biological resources into ICCAs.

The Phnom Kulen Preah Cheyvarama National Park in Cambodia is also a sacred site which has several community protected areas and a private tourist concession. Also called Phnom Kulen National Park, it is the source of water that flows into Siem Reap River.

Myanmar included sacred forests among the resources that would be better protected partly through the attainment of its NBSAP target that corresponded to Target 18.

Myanmar acknowledged that traditional knowledge and practices contribute to the protection of sacred sites and has adopted conservation tools to strengthen traditional practices such as recognition of customary nature, co-management of protected areas, ICCAs, and community forestry.

Sustainable use through hunting and fishing reduction during breeding season, no-take fishing, and gear restrictions in spawning areas, rotational fallow, indigenous silviculture and agroforestry are some of the traditional practices in these sacred places.

Consultation and involvement of IPLCs in planning and implementation of NBSAPs and other NRM projects

Cambodia trained its IPLCs, resulting in their effective participation in processes for conservation and sustainable management of biodiversity, particularly in creating the framework of the REDD+ programme.

In Malaysia, the Community Conservation Resilience Initiative undertaken by PACOS Trust increased the resilience of IPLC's customary institutions and natural resource stewardship systems through constructive engagements in the decision-making process.

Moreover, community use zones within the Crocker Range Park in Kota Kinabalu, Sabah, managed by Sabah Parks and Sabah Wildlife Department, recruit IPLCs as honorary park/ wildlife rangers to monitor and patrol their areas.

The Philippines updated its PBSAP 2015–2028 through extensive and multi-stakeholder consultations from February 2013 to March 2015. The consultations were participated in by more than 800 individuals some of whom represented IPLCs.

Thailand for its part, committed to cross-sectoral participation of local communities in biodiversity management. This was legitimised by Article 43 of its 2017 constitution. Article 57 of the constitution also obligates the state to protect the environment and biodiversity in a balanced and sustainable manner through participation of local communities, among others.


Photo by Bussayamat Somthep

Photo by Saw Zar Hay

Challenges

The loss of traditional knowledge and customary use may be observed in two AMS, based on the index of linguistic diversity. The Biodiversity Indicators Partnership (BIP) has indicated the direct correlation between linguistic diversity and biodiversity, and has suggested the former as an indicator of biodiversity loss.

Change from the use of geographically restricted languages to cosmopolitan forms threatens the existence of traditional knowledge associated with local languages. The UNESCO Atlas of Endangered Language has identified 298 local languages that are currently endangered in the region, 8 per cent of which are already extinct while 21 per cent are critically endangered, 29 per cent definitely endangered, 19 per cent severely endangered, and 23 per cent vulnerable.

In their 6NR, Thailand reported that a substantial amount of traditional knowledge remains undocumented as their availability is dependent on custodians to make the information available to public agencies. Thailand, likewise, reports on challenges in the documentation of local and traditional knowledge, and the need for a database to enable the curation of such information in digital format.

Programmes to implement local knowledge in Lao PDR are highly dependent on the presence of projects supported by international donors. In the Philippines, ongoing boundary conflicts have made it difficult to implement local community and indigenous people partnership initiatives.

Ways Forward

Much progress has been documented in the achievement of Target 18 as noted at the eleventh meeting of the Ad Hoc Open-Ended Inter-Sessional Working Group on Article 8(j) and Related Provisions of the CBD.

The Conference of the Parties as cited in the same report, however, points out the need to carry out the following actions:

- Increase efforts in the protection of and respect for traditional knowledge.

- Make use of information contained in the Local Biodiversity Outlooks, among other things, on the customary sustainable use by indigenous peoples and local communities, to contribute to updated reporting on progress in the implementation of the Aichi Biodiversity Targets.

The report also pointed out an increase from 27 per cent of national reports that included information about the contributions of IPLCs in the 5NR to 90 per cent in the 6NR. While the AMS have mentioned IPLCs, the extent of their integration must be measurable and go beyond mere mention.

Using the COP 11 headline proxy measures in addition to the current measures is ideal to reflect the continuous progression in which the targets are being reached. These headline proxies are anchored on trends in/of the following: linguistic diversity and numbers of speakers of indigenous languages; land-use change and land tenure in the traditional territories of indigenous and local communities; practice of traditional occupations; traditional knowledge and practices that are respected through their full integration, safeguards, and the full and effective participation of IPLCs in the national implementation of the Strategic Plan.

This would complement and provide a better picture of progress in addition to other measures such as number of capacity-building workshops and trainings; initiatives on co- management of protected areas with IPLCs; establishment of ICCAs and IPAs; consultations with IPLCs and incorporation of traditional knowledge in the consultation process; and development of policies on traditional knowledge, and integration into national legislative and political frameworks.

To sum it up, these two areas for improvement, if considered, could bode well for the users of the National Reports and provide a context given a more complete picture of the situation of each AMS.


Photo by Aung Myint Htwe

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 transferred, and applied.

Most AMS have established their national Clearing-House Mechanisms (CHMs). National CHMs are vital in providing science-based biodiversity data and information. CHMs can potentially drive forward policy, institutional, and financial support towards achieving the biodiversity targets.

Challenges

- Limited interoperability restricts data sharing for regional analysis
- Restrictive security protocols are stumbling blocks to the sharing of and access to information.

Indonesia and Malaysia were recognised by the CBD for their outstanding efforts in developing their national CHMs.

ASEAN makes use of cutting-edge technologies like camera traps and bioacoustics to collect and monitor biodiversity information.

At the regional level, the ASEAN CHM is undergoing several enhancements such as the inclusion of bacteria and fungi databases in collaboration with BIOTEC, Thailand.

The ASEAN Biodiversity Dashboard, which was jointly developed by ACB and NatureServe, is now operational. It provides visual tracking of progress towards Aichi Targets and biodiversity-related SDGs.

The CBD launched the Bioland Tool for CHM development to enable Parties to set up, run, and maintain a basic national CHM.

CHM promotes and facilitates technical and scientific cooperation and information exchange thru the establishment of fully functional network of Parties and partners.

ASEAN Biodiversity Outlook 3

Ways Forward

- Promote strong collaborations on biodiversity information management
- Develop policy and protocols on information sharing in the region
- Increase regional capacity on and optimise the use of national CHMs as knowledge platforms
- Promote the use of the ASEAN Biodiversity Dashboard
- Conduct periodic user satisfaction surveys
- Use globally-accepted formats of recording species information to increase the interoperability of species databases in the region
- Manage, disseminate, and enable access to biodiversity data and knowledge products

Aichi Biodiversity Target 19: Sharing information and knowledge
By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Most AMS have established their national Clearing-House Mechanisms (CHMs). Early on, Indonesia and Malaysia received the gold award under the New CHM Category during COP 13 and COP 14, respectively, for demonstrating the most progress in developing their CHMs. Other AMS are in various stages of organising, updating, and populating their CHMs towards full functionality, accessibility, and usability.

To support the development of CHM websites of member countries and facilitate the effective implementation of NBSAPs, the CBD Secretariat developed the Bioland Tool. In the ASEAN region, the CDB Secretariat, together with ACB, launched the Bioland Tool in March 2020 and conducted an online orientation for Indonesia, Malaysia, the Philippines, Singapore, and Thailand. This tool enables AMS to collate and present national biodiversity information in a coherent manner and support content presentation. The ASEAN CHM is undergoing several enhancements, such as the inclusion of bacteria and fungi databases, in collaboration with Thailand's National Center for Genetic Engineering and Biotechnology (BIOTEC).

The recently launched ASEAN Biodiversity Dashboard will provide a visualisation for tracking the progress of AMS towards the Aichi Targets and biodiversity-related Sustainable Development Goals (SDGs). It is a platform that makes use of accurate and country-validated information, and is supported by available published indicators.

The overall purpose of this target is to increase the amount and quality of information and tools at the disposal of policymakers and the general public. Specifically, Aichi Target 19 strives to provide information that are AMS-validated, complete, relevant, and up-to-date. To ensure optimal use, the information would have to be accessible and widely disseminated and highly relevant to inform policy decisions and formulation.

While the NBSAP provides the framework for mainstreaming biodiversity issues and challenges into national strategies, a vital tool that supports mainstreaming are regional and national CHMs.

Aichi Target 19 focuses on the establishment of functional CHMs among AMS as it contributes to the implementation of the other targets by making available information that will promote understanding of the scientific bases of various biodiversity conservation measures and nature-based solutions.

The ASEAN Clearing-House Mechanism

The ASEAN CHM is the central hub of all biodiversity-related information in the ASEAN region (https://asean.chm-cbd.net/about). It was established to support the implementation of the CBD and its Strategic Plan for Biodiversity 2011–2020 through effective information services and other means. The primary goal is to promote and facilitate scientific and technical cooperation, knowledge sharing and information exchange, and establish a fully operational network of Parties and partners. It provides capacity building guides and tools to aid the AMS in conservation planning, monitoring, and decision-making.

The ASEAN Bioland Tool

The Bioland Tool is a customisable online portal that provides templates for uploading various content to a national CHM.[1]

The CBD Secretariat and the ACB organised a virtual training- workshop on the use of the Bioland Tool in March 2020. The training addressed the technical challenges that the AMS faced in creating their national CHM websites. The ultimate objective was to link up the national CHM websites to the global network with the CBD website functioning as a central node.

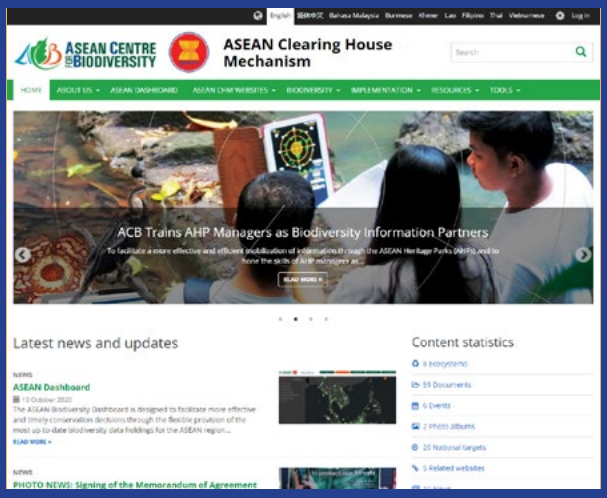
ASEAN Biodiversity Dashboard[2]

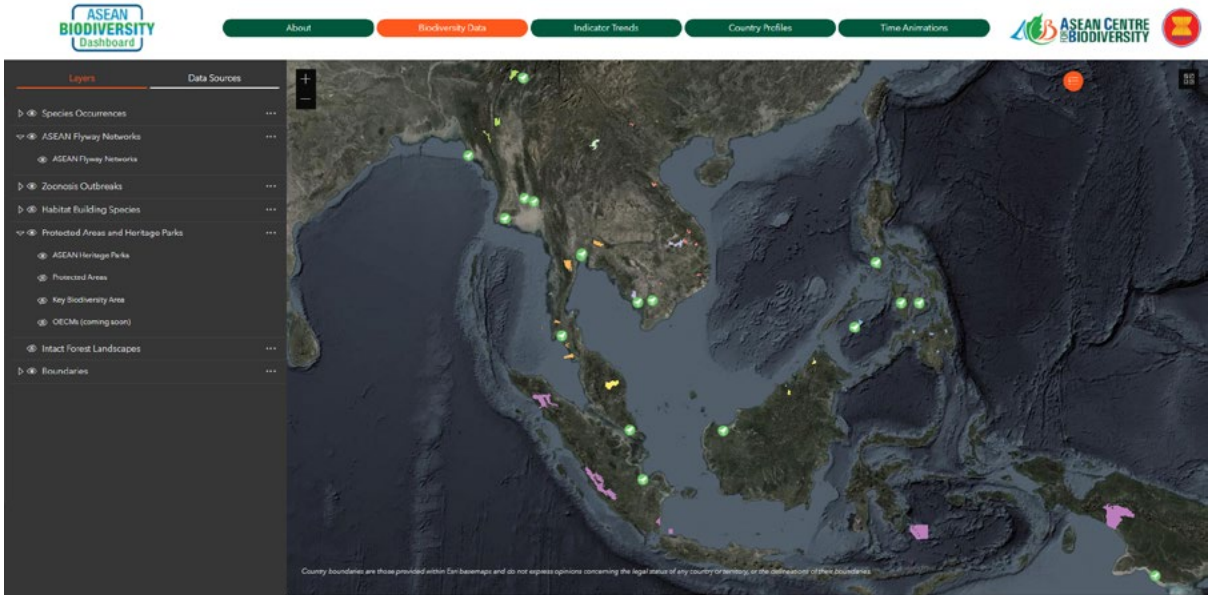
The ASEAN Biodiversity Dashboard is an online platform that offers an interactive and visual presentation of trends and geographic variations in biodiversity indicators used worldwide (dashboard.aseanbiodiversity.org). The dashboard is a collaborative project between the ACB and NatureServe, with support from the European Union,

Box 50. ASEAN Clearing-House Mechanism

Overall, Aichi Target 19, through the Clearing-House Mechanism, aims to increase biodiversity-related knowledge, science, and technology, in quality and quantity by:

- improving the quality of information in terms of completeness and timeliness.
- enhancing information dissemination, exchange, and accessibility; and
- enriching data and information for more effective and better understanding leading to higher applicability and relevance towards better conservation measures and decision-making.





through the *Biodiversity Conservation and Management of Protected Areas in ASEAN* (BCAMP) Project, and experts in the region as members of an Informal Advisory Group.

Biodiversity and Ecosystem Services Assessment and Economic Analysis for Management, Policy, and Innovative Financing Applications

Conservation initiatives require complete and accurate collection of biodiversity data that are presented in formats that suit particular audience types and purposes. Cognisant of the importance of generating these knowledge products, national and site-level stock-taking operations were conducted in five AMS, namely: Cambodia, Lao PDR, Malaysia, the Philippines, and Thailand. This project, initiated by the European Union and the ACB, under the BCAMP project, assessed the ecosystem services produced by biodiverse places that are critical for economic and social growth.

In 2019, the outcomes of the stocktaking activities were presented in a consultation workshop in the presence of government, academic institutions, and NGOs of the five ASEAN countries.

Box 51. ASEAN Biodiversity Dashboard

The ASEAN Biodiversity Dashboard is designed to:

- Streamline national and regional reporting and assessment processes
- Identify critical emerging issues facing biodiversity in the ASEAN region
- Strengthen transboundary conservation actions for the establishment of more contiguous and representative protected areas in the region
- Enable more powerful and near-real time national and regional biodiversity target tracking
- Reveal key gaps in the understanding of biodiversity and the pressures they face
- Facilitate more effective and ongoing evaluations of the success of conservation investments
- Inform on more effective protected area management

The subsequent analyses were packaged into policy briefs—*Biodiversity and Ecosystem Services Assessment and Economic Analysis for Management, Policy and Innovative Financing Applications [BESA++]*—which brought to the fore the value and importance of natural capital conservation.

The AMS continued to explore other means to collect, consolidate, analyse, package and curate, and disseminate biodiversity information and data.

National Clearing-House Mechanisms

Majority of AMS have begun establishing their CHMs while the existing ones are constantly being enhanced in order to better support the implementation of the Biodiversity Strategic Plan 2011–2020 and the achievement of the Aichi Targets.

Some AMS were off to a good start in the development of their CHMs. At COP 13 in Mexico in December 2016, Malaysia was named the Gold Awardee in the New National CHM Category for demonstrating the best progress in developing its national biodiversity CHM. The Malaysia Biodiversity Information System (MyBIS), developed in 2014, serves as a one-stop shop for information and management of the country's biodiversity for both domestic and international users. The online site has four primary modules with sub-modules that provide a wide range of information that can be accessed via desktop, tablet, and mobile devices. At COP 14 in Egypt, Malaysia received a Certificate of Achievement for MyBIS.[3]

Also at COP 14, Indonesia was the recipient of the Gold Award in the New National CHM Category. The Indonesia Biodiversity Information (InaBIF) is the country's main platform for storing, managing, and integrating data and information from the Genetic Resources and Indonesian Traditional Knowledge (SDGPT), Marine Conservations and Biodiversity Directorate, General Directorate of Marine Space Management, and the Ministry of Marine and Fisheries.

Access to already-available knowledge could be increased by further developing the CHM at the national and regional levels. In this, biodiversity-related data, methods and methodologies for biodiversity protection, sustainable use, and benefit sharing, as well as case studies of their application, are all relevant sources of information.

Data gathered through the web portal, messages, and data/information from Indonesia's NR will be used to populate the national CHM. By hosting the common web portal, the CHM will be exchanging and gathering information from the three Rio conventions as a starting point toward interoperability.


Photo by Zaw Zaw Wai

Box 52. Indonesia's CHM

The Indonesia Biodiversity Information Facility (https://www.gbif.org/country/ID/summary) is one of the main information nodes of BKKHI. It facilitates and supports the communication of biodiversity information in the country, especially on genetic resources and traditional knowledge.

Since its introduction in 2016, InaBIF has contributed 167,575 of data occurrences or about 10 per cent of global data registered in GBIF.

As of 2017, 25 data nodes have been entered in InaBIF. The number of biodiversity data records that can be accessed through the portal is 294,083 records.

Table 21. Country initiatives and accomplishments towards Aichi Target 19

AMS	Initiatives and Accomplishments
Brunei Darussalam	• CHM portal: http://www.abci.gov.bn/Theme/Home2_copy(6).aspx • Conducted field expedition to identify flora and fauna to update the biodiversity information and database • Instituted the Tropical Biodiversity Centre in Sungai Liang, Belait District to facilitate the conduct of research and innovation in support of biodiversity conservation and management • Disseminated research outputs and facilitated information exchange and collaborations with government institutions and international organisations via the Institute for Biodiversity and Environmental Research (IBER) of the Universiti Brunei Darussalam.
Cambodia	• CHM portal: http://chm-ncsd.moe.gov.kh/ • Established a web portal in 2018 which contains data and information that synergise CBD, UNCCD, and UNFCCC implementation. Activities include the inventory of information and assessment of the information systems to identify overlaps and gaps in implementation. It also helps identify the strength and weaknesses of the CHMs. • Cambodia's CHM covers sustainable land management, protected area management, and ecosystem restoration for the initial phase. It focuses on the storage, accessibility, sharing, and dissemination of information/data about biodiversity. • Developed the five-year capacity-building plan to support all agreements at the Rio Convention— including the operation and activities of the shared web portal/CHM.
Indonesia	• CHM portal: BKKHI URL: http://balaikliringkehati.menlhk.go.id/en/ • Launched in 2018, the national CHM portal — Balai Kliring Keanekaragaman Hayati Indonesia-BKKHI, was awarded the Gold Award for New National CHM at the 14th COP CBD in Egypt. • Revitalised the BKKHI by building network nodes of ministries, agencies, and non-governmental agencies. Such move was directed at attaining the IBSAP National Target and Aichi Target and at developing the BKKHI as an information media and biodiversity knowledge centre. • Established the Indonesian Biodiversity Information Facility, as part of the Global Biodiversity Information Facility (GBIF), to facilitate the exchange of biodiversity data and information that has interoperability with databases of various government institutions • The Indonesian Plant Red List Authority (IPRLA) has been in place since 2016 under the Indonesian Institute of Sciences (Lembaga Ilmu Pengetahuan Indonesia, or LIPI). It has conducted workshops and training courses on plant conservation status assessments. Trained botanists have been assessing the conservation status of certain taxa, the outputs of which will be submitted to Indonesia's first Red Data Book titled *Indonesian Red List Book Volume 1: 50 Types of Commercial Wood Trees*.[4]

AMS	Initiatives and Accomplishments
Lao PDR	• CHM portal: https://www.phakhaolao.la/en • Developed the website Phakhaolao which contains information on domestic plants that are beneficial to the Lao people. • Organised training programmes relevant to NBSAP actions, although an NBSAP-wide training programme is yet to be held. The MAF trained Nationlal Protected Area officials and the Lao Wildlife Enforcement Network in protected area management. • The planned national research programme has not been established due mainly to scarce funding and constraints in human resource capacity. Access to updated information on biodiversity management is weak. Nonetheless, several programmes are directed at improving its knowledge base. • Developed an Environmental Awards programme
Malaysia	• CHM portal: https://www.mybis.gov.my/one/ • Malaysia's CHM was set up in 2008 and renamed Malaysia Biodiversity Information System (MyBIS) in 2016. The database is a one-stop repository database system that enables access to information on national biodiversity studies and management. • The database now has data on over 39,000 species of flora and wildlife. It contains almost 2,500 images, conservation status of 1,062 plants, profiles of 480 biodiversity experts, and 1,069 publications. • At COP 13 in December 2016, MyBIS won a Gold Award for making the most progress in the development of CHM. • Has other thematic information centres and systems for marine biodiversity such as the Systematic Marine Biodiversity Information System (SyMBioIS), Marine Park Management Information System (MPMIS), and myFRIS database for fish stock assessment data. • The National Policy on Science, Technology, and Information 2013–2020 provided guidance for its R&D direction with biodiversity identified as one of nine priority areas by the National Science Research Council (NSRC).

Photo by Martin Palis

AMS	Initiatives and Accomplishments
Myanmar	• CHM portal: http://www.myanmarchm.gov.mm/en_US/ • Myanmar launched the Myanmar Clearing-House Mechanism in January 2016 with the Nature and Wildlife Conservation Division of the Forest Department as the national focal point. • Activities around key species monitoring, including rare species and migratory birds, has increased. Thus, contribution of listed species to IUCN has also increased. • Has five (5) major national universities offering conservation-related degrees. Data from one university showed a large number of graduates in the past three (3) years (>380 students, including 84 women). A number of universities began offering post-graduate courses in conservation science. MONREC opened scholarship programmes for staff, both in local and foreign universities, to upbuild and expand their pool of biodiversity experts. • The number of species with sufficient information has increased annually. More than 4000 species have been examined, partly as a result of targeted research or monitoring programs for specific taxa.
Philippines	• CHM portal: http://www.philchm.ph/ • Established the Philippine CHM with the Biodiversity Management Bureau (BMB) acting as its national focal point and central coordinating agency of the BIOWEB.PH, an information technology network of Philippine government agencies, non-government agencies, academe, the private sector, and communication conduit at the national and regional levels, and the Secretariat of the CBD. • The Philippine CHM is a repository of data on protected areas and species and the country's biodiversity resources. It serves as a platform for scientific and technical cooperation, knowledge sharing, and information exchange. • Eventually, the BMB will create an Integrated Biodiversity Management Information System Portal which shall contain up-to-date information and databases on protected areas, other conservation areas, and species and genetic level conservation.

AMS	Initiatives and Accomplishments
Singapore	• CHM portal: https://biome.nparks.gov.sg/ • The Biodiversity and Environment Database System (BIOME) is Singapore's national database for biodiversity and environment-related data. It was launched in 2011, and contains research findings and biodiversity-related information from different government agencies, educational institutions, NGOs, and the public. • BIOME has a crowdsourcing facility where users can submit and take part in building up the database of species. In 2015, SGBioAtlas was launched as an extension to BIOME, to allow citizen scientists to contribute biodiversity sightings to this database. To date, BIOME has collated more than 16,000 crowdsourced sightings. It also has spatial function, among others, where species distribution across the country can be gleaned. • BIOME is constantly being updated to improve government decision-making and sharing of biodiversity data. In 2017, the Research Permit application was launched, digitalising a traditional process of handling applications from researchers as well as compiling their research reports. In 2022, the National Parks Board of Singapore launched a survey module which enables the volunteers to submit survey data under the National Parks Board of Singapore's citizen science survey programme, the Community In Nature (CIN) Biodiversity Watches (for example, Heron Watch and Dragonfly Watch) using SGBioAtlas. • All these sources of information support Singapore in policy formulation such as providing guidance for development planners in areas that are important for biodiversity. Singapore will continue to enhance BIOME and SGBioAtlas with more species identification guides and promote the use of SGBioAtlas for other citizen science surveys.

Photo by Porchhay Taing

AMS	Initiatives and Accomplishments
Thailand	• CHM portal: http://chm-thai.onep.go.th/ • The Biodiversity Clearing-House Mechanism and Biosafety Clearing-House are fully operational and linked to one another. • Progress was achieved in the development of the scientific database systems to support policy formulation and biodiversity action plans. The Office of Natural Resources and Environmental Policy and Planning (ONEP) took steps to connect various ministries, educational and research institutions, and the private sector to biodiversity databases across the country. • The National Center for Genetic Engineering and Biotechnology collaborated with various colleges and research organisations on hot chili variety management and enhancement and produced a collection of 752 hot chili species from across the world. • The ONEP assembled, documented, and published the *Biodiversity Series*, a collection of 17 booklets (checklists) containing the names of key taxa in Thailand. • Databases on local wisdom and folklore, Thai medicine, and alternative medicine were compiled and made available in several encyclopaedia. Biodiversity data are being collected by agencies in each region. This initiative lends itself to the development of urban development plans in eight (8) municipalities (Bangkok Metropolis, Chiangmai, Chiangrai, Krabi, Srisaket, Pitsanuloke, Nakhon Sawan, and Sakhon Nakhon) and has significantly helped in uplifting the people's quality of life.
Viet Nam	• CHM portal: http://nbds.vea.gov.vn • Launched in 2015, the National Biodiversity Database System focuses on data on species in protected areas. • Viet Nam's Biosafety Clearing-House (http://antoansinhhoc.vn/en/), developed in 2006, has been valuable in providing, sharing, and exchanging information amongst ministries and sectors regarding GMO biosafety management. Other national biodiversity websites that are currently operational are the Viet Nam National Biodiversity Database System (http://antoansinhhoc.vn/en/), Nature and Biodiversity Conservation Agency (https://tongcucthuysan.gov.vn/en-us/Home), and the Directorate of Fisheries. • Even prior to its membership with GBIF in 2018, Viet Nam has contributed over 100,000 records on 13,000 animals to the organisation. • In 2007, Viet Nam published the Red Book and Red List of endangered, vulnerable, and rare species. Viet Nam reported about 51,400 species of identified organisms. Among them, about 362 species of animals and 219 species of plants are listed in the IUCN Red List (2014). The Vietnamese Academy of Science and Technology, in coordination with other institutes, will revise the said document.


Photo by Myat Zaw Hein

Challenges

Establishing National CHMs and the subsequent uptake of information in the ASEAN CHM and the CBD are key components to mainstreaming biodiversity in the region. Populating these tools will improve the availability of information through interoperable platforms, and in particular, their use in other sectors, thus, aiding in the mainstreaming of biodiversity.

AMS collect biodiversity knowledge for a number of purposes, and document them in variable formats. This variability in information and data formats pose a challenge on interoperability and ease of use for regional and global analyses.

In its 6NR, Thailand detailed issues related to the development and utilisation of databases on natural resources and biodiversity. This hampers information sharing in the region due to the absence of a regional instrument that would define the types of biodiversity data that can be shared, as well as accessed, and the security protocols to regulate the flow of information.

Cambodia faces several challenges, including limited collection and compilation of relevant materials and documents. A significant amount of time and resources are spent collecting, compiling, and scanning these materials for dissemination purposes. Additionally, most documents are written in English, adding another hurdle for the dissemination of information.[4]

Indonesia sees the need to increase both human and science and technology resources to support the sustainable utilisation of biodiversity as a source of economic growth and livelihoods.


Photo by Danny Ocampo

Aside from funding, a challenge to Lao PDR is the systematic collection and dissemination of biodiversity information.

For Malaysia, a research strategy blueprint is vital to consolidating research efforts and resources. Increased technical competence is also necessary through the development of university programmes that would nurture young scientists and expand research possibilities and career chances for scientists and taxonomists in the field.

Myanmar is pursuing the full activation of its CHM as soon as a devoted unit is organised to manage it. Collaboration among related institutions still needs to be strengthened.[5]

Singapore has pointed out challenges related to mapping historical data (non- spatial), documentation of all activities, disparate data format, and sensitivity of data.[6]

Lack of baseline information on biodiversity is what concerns Viet Nam as this affects the supply, exchange, and management of information. It also still needs to establish effective and improved mechanisms for sharing and exchanging information among its various ministries and agencies.[7]

Ways Forward

- User satisfaction surveys on the ASEAN CHM would have to be conducted periodically to ensure that the existing and new features of the website are acceptable to target users in the region.

- To increase regional capacity and optimise the use of National CHMs as knowledge platforms, the AMS should capitalise on partnerships that promote biodiversity information management, and on participation in relevant training courses.

- A regional policy on biodiversity information sharing should be developed to establish workable protocols to facilitate exchange of biodiversity information and generate regional databases and knowledge products that are supported by the AMS. Such an instrument will also ensure that the ASEAN Biodiversity Dashboard will be populated with information from the AMS.

- The ACB can continue working with the CBD on the use of the Bioland Tool through bilateral arrangements and one-on-one mentorship with interested AMS. The Bioland Tool should be optimally utilised to establish the culture of knowledge and resource sharing towards common and mutual benefit in the region.

- The use of globally accepted formats of recording species information, such as Darwin Core and Bhrams, should be continuously encouraged and promoted, particularly in protected areas, and other biodiversity-related organisations to increase the interoperability of biodiversity databases in the region.

Photo by Nataniel Luperte

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 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.

While the ASEAN Member States (AMS), the private sector, and dialogue and development partners invest resources for biodiversity conservation, there remains funding gaps that hinder sustainability and require innovative resource mobilisation strategies.

Challenges

- Limited implementation of NBSAPs due to financing constraints
- Need for financial and technical cooperation to enhance fund-raising capacity of some AMS
- Functioning integrated strategy for resource mobilisation
- Prioritisation of biodiversity in national government public investment

The stocktaking studies on **5 AMS** on Biodiversity and Ecosystem Services Assessment, Economic Analysis, and Conservation Financing (BESA++) showed that 85% of the ecosystem services studies focused mostly on analysis of the qualitative aspects of the state of ecosystems with only a small percentage on valuation and financing.

Ways Forward

- **Assess and analyse biodiversity funding needs**
- **Implement effective efforts and concrete measures to mobilise funds**
- **Prepare compelling and evidence-based business cases**
- **Integrate investments in biodiversity into policy and legislative frameworks**
- **Scrutinise the budgets, investments, and policies that would cause undue harm to biodiversity**
- **Include biodiversity conservation considerations in pandemic response, recovery, and prevention**


Photo by Thant Zin

Aichi Biodiversity Target 20: Mobilising resources from all sources
By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011–2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation, should increase substantially from the current levels.

The global biodiversity financing gap is estimated at USD 598–824 billion per year up to 2030. But current investment in nature-based solutions (NbS) is only USD 133 billion, which is a little over 0.1 per cent of the total global GDP.[1]

The Global Environment Facility (GEF) serves as the financial mechanism of the CBD. AMS have continuously accessed the GEF to support biodiversity initiatives in protected area management and in mainstreaming biodiversity into landscapes and seascapes. However, biodiversity financing must be increased and expanded to sustain biodiversity.

With the year 2020 deadline already gone past, it is vital to have a thorough review of the status and initiatives to achieve Aichi Target 20 and determine the actions and required funding to implement the NBSAPs, pursuant to the post-2020 global biodiversity framework. In their Fourth National Reports, AMS indicated limited capacity, both human and financial, as hampering the implementation of the NBSAPs.

The recognition of the importance of biodiversity conservation has prompted better financial allocations for local and national activities of AMS. However, effective funding mechanisms have yet to be fully and constantly integrated into national plans and programmes and figure prominently in their NBSAPs.

The implementation of the global Biodiversity Finance Initiative (BIOFIN) established a structure to support the conservation activities of six (6) AMS, specifically Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. BIOFIN countries apply the BIOFIN Workbook to ensure that policies, biodiversity expenditures, financial requirements, and the budgeting systems of governments, private sector, NGOs, and other entities are reviewed and aligned to support NBSAP implementation.

The past years have seen greater recognition of the importance of biodiversity conservation in the region and have facilitated positive actions in terms of implementation of innovative financing schemes and green initiatives, financial allocations for various local and national activities, and the involvement of the private sector and NGOs in biodiversity conservation-related initiatives. However, the financial support devoted to conservation initiatives remains wanting.

Globally, the budget needed for biodiversity conservation and sustainable use is estimated at USD 824 billion every year. Currently, however, the estimated fund flows to biodiversity seem to indicate allocations that are three to ten times smaller.[2] While AMS have been allocating funds for biodiversity conservation, financing these efforts is expected to be a major and continuing challenge, especially in the ASEAN region.

To meet this challenge, IPBES has recommended potential fund sources from five areas: payment for ecosystem services (PES), biodiversity offsets, green products, Private-Public Partnership (PPP), international finance, and charities.

In line with this, AMS are adopting global programmes and local measures to augment the financial requirement for biodiversity management and conservation and are leveraging resources to upscale these efforts.

The Biodiversity Finance Initiative

The Biodiversity Finance Initiative or BIOFIN is a global programme under the United Nations Development Programme (UNDP) and the European Commission that was developed in response to the Conference of Parties (COP) 10 and was launched at COP 11. It stemmed from the felt need to shift more funding support to global and national biodiversity conservation programmes.

By implementing BIOFIN, six (6) AMS have established their respective financial structure and management plans to align with their respective NBSAPs.

Box 53. Government-led finance solutions of BIOFIN members in the ASEAN region

- Promotion of ecological fiscal transfers in Malaysia that provides incentives to states with protected areas through a formulation in the distribution of national taxes
- Development of an investment programme for all protected areas in the Philippines with the passing of the Expanded PA law
- Protection and restoration of the Ipo Watershed, an important water source for the over 14 million residents of Manila in the Philippines through a partnership with BIOFIN, WWF, and the fin-tech company, GCash
- Tapping of sovereign green *sukuk* (Islamic bonds) in Indonesia and Malaysia for protected area management and construction of environmentally sustainable infrastructure projects
- Sale of a tiger-themed license plate scheme in Thailand. Funds from sales are channelled into conservation projects in pilot World Heritage sites.
- Introduction of visitation fees for tourists in Thailand for the payment of reef conservation and restoration.

The Ministry of Environment of Cambodia, with support of UNDP, began implementing BIOFIN in 2019. Through this partnership, the country developed its Biodiversity Finance Plan (BFP) with local environmental and economic experts, NGOs, academia, line government agencies, and private sector as key stakeholders.[3]

Indonesia conducted a pioneering Finance Needs Assessment (FNA) through BIOFIN to estimate the funds required to support the Indonesia Biodiversity Strategy and Action Plan (IBSAP).[4] They developed a BFP which outlined some 157 financial instruments, including existing instruments and emerging opportunities such as *sukuk* finance worth around USD 2.7 million, as well as ecological fiscal transfer schemes. *Sukuk*, also referred to as Sharia bond, is a debt instrument under Islamic principles.

In 2018, the Indonesian government issued the Green Bond and Green *Sukuk* Initiative to support the country's emission

reduction targets based on the programme's framework. The issuance is considered the world's first sovereign Green *Sukuk*. Under the scheme, USD 1.25 billion will be granted to green projects like renewable energy, climate change adaptation, sustainable transport, waste management, and sustainable agriculture.[5]

BIOFIN Malaysia has effectively mainstreamed finance for biodiversity and ecosystem in the 11th Malaysia Plan and is continuously exploring means to mobilise funds for conservation efforts.

Thailand reported in its 6NR that financial mechanisms to protect, conserve, restore, and sustainably use biodiversity should be available by 2020.

The Philippines has gained traction on financing its Philippine Biodiversity Strategic Action Plan (PBSAP) via the BIOFIN.

Myanmar has expressed interest to be a BIOFIN country, and discussions towards this end are progressing. The UNDP project on Governance for Resilience and Sustainability in the country includes BIOFIN as a component in its environmental financing strategy.


Photo by Yusuf Madi

Status of biodiversity financing in AMS

At the regional level, Article 8 of the ACB Establishment Agreement stipulates the establishment of the ASEAN Biodiversity Fund (ABF) to promote and strengthen national and regional environmental funds. Through voluntary contributions from AMS and other organisations, the ABF provides long-term financing support for biodiversity conservation and environmental activities in the region.[7]

At the country level, conservation initiatives require adequate and sustained financing. The AMS continue to face scarce and unsteady funding and the shortage of other relevant resources such as personnel support. Thus, the Strategic Plan for Biodiversity 2011–2020 and the Strategy for Resource Mobilisation called on the AMS to increase their funding capacity from current levels to meet the challenges of implementing their strategic plan.

Cambodia's budget for conservation activities exceeded its 2020 target by 20 per cent after it increased the budgetary allocations to the Ministry of Environment (MOE), Ministry of Agriculture, Forestry and Fisheries (MAFF), and the Ministry of Education, Youth and Sport (MOEYS) in 2019 by 3.3, 2.9, and 2.7 per cent, respectively, compared to their 2014 allocation. In addition to domestic financing sources, Cambodia benefited from bilateral and multilateral development partners that contributed funds to projects or programmes.

Indonesia estimated its funding requirements for biodiversity management for 2015-2020 to be at an average of USD 18.62 per hectare or USD 718 million per year. For the management of conservation areas, it needed approximately USD 13.5 per hectare or USD 521.9 million per year. Moreover, in 2017, the investment value for the marine and fisheries sector reached USD 344 billion with


Photo by Gab Mejia

a total credit assistance of USD 804 billion, an increase of USD 22 million from the 2015 budget.

Indonesia's biodiversity financing plan lays out the strategy and process for fund mobilisation from the government, private sector, and public and foreign grants. It obtained funds from the State Revenues and Expenditures Budget (APBN) and the Regional Revenues and Expenditures Budget (APBD). The private sector and national institutions have also been reliable in terms of amount and mechanism of funding.

Indonesia's National Environmental Quality Promotion and Preservation Act B.E. 2535 established the Environment Fund. It offers fiscal incentives in the form of direct funds and low-interest loans to public agencies, local administrations, state enterprises, private organisations and non-government organisations (NGOs) to participate in conservation efforts and in development programmes related to biodiversity management.

Lao PDR reported that it has no integrated strategy in place to secure or coordinate funding for biodiversity. For the most part, funds for NBSAP implementation comes from the annual state budget allocation. Lao PDR has an Environment Protection Fund (EPF) that is supported through the LENS II project, which is financed by the International Development Association (IDA) and GEF, as well as by government contributions. It provides funds for capacity building, environmental management, and biodiversity conservation. Since its inception, the EPF has supported over 150 subprojects from 2000 to 2013 for a total of USD 38.83 million. But despite these initiatives, little progress has been made to mobilise fund support.

Since 2012, Malaysia has been allocating one per cent of its national budget to its Ministry of Natural Resources and Environment. State fund for biodiversity has remained at that percentage of state budget while public sector contribution is increasing. The country has been exploring varied sources of funding in the last decade.

Myanmar indicated that by 2020, its biodiversity fund from all sources would have increased by 50 per cent. According to its 6NR, funding for biodiversity and conservation has significantly increased over the past four years from state funds and external sources. However, a budget has yet to be allocated for natural resources enforcement, especially as wildlife poaching, illegal fishing, illegal timber trade, and other threats to biodiversity and the environment continue to reduce species population.

The Biodiversity Finance Plan of Thailand provides the framework for funding strategy to achieve its biodiversity goals. In its 6NR,

the country reported that by 2020, financial mechanisms are available for mobilising biodiversity management.

The Philippines developed an investment programme for all protected areas in the country with the passing of the Expanded PA Law. Through BIOFIN, the country has reported several accomplishments: (1) USD 10 million for 107 legislated protected areas through policy advocacy; (2) USD 300,000 for reforestation by partnering with Mynt, through the GCash Forest app and the CSR programmes of partner institutions; 3) USD 32,000 (Php 1.6 million) through fund crowdsourcing for the *Together for Tamaraws* campaign for the conservation communities affected by the COVID-19 pandemic.[8]

Singapore obtained financial resources for biodiversity projects from state funds and other fund mobilisation activities like the Garden City Fund (GCF), a registered charity and Institution of Public Character (IPC). Established by the National Parks Board of Singapore in 2002, the GCF is an independent organisation that allows government agencies and the private sector to donate and support the National Parks Board of Singapore's efforts to create a City in A Garden.

In 2018, Thailand allocated a portion of its national budget to implement water management strategy and actions. This increased the budget allocation for biodiversity management by 12.6 per cent from the previous year.

International financial mechanisms like GTZ's project on Enhancing the Economics of Biodiversity and Ecosystems Services in Thailand/South-East Asia (ECO-BEST) have supported biodiversity actions in AMS. The Environment Fund established by the National Environmental Quality Promotion and Preservation Act B.E. 2535 provides fiscal incentives for public agencies, local administrations, state enterprises, private organisations, and NGOs to participate in protection and maintenance of environmental quality and natural resources, by offering both direct funds and low-interest loans.

From the private sector, the Tree Bank project was a valuable initiative to promote reforestation in privately owned or public lands by allowing trees of significant economic value to be used as alternative business collateral for some types of loans. The Bank for Agriculture and Agricultural Cooperatives in Thailand accepts high-value trees like teak and Burmese rosewood as collaterals in loans with low interest rates. Members can apply for loan amounts of as much as 80 per cent of the trees' monetary value. For the loan period, the high-value trees are not allowed to be cut down. In 2018, around 6,000 communities with 150,000 farmers growing over 11 million trees had joined the programme.

Viet Nam's total biodiversity expenditure accounted for 0.16 per cent of its GDP and 0.58 per cent of the total state budget expenditures. In recent years, financing for biodiversity increased in the country. Between 2011 and 2015, over USD 1 million was spent on biodiversity-related activities, in support of the major targets of the country's National Biodiversity Strategy.

Fiscal measures and fund mobilisation initiatives

The UNEP mid-term assessment on progress towards Aichi Targets reported no significant progress in Aichi Target 20.[8] To augment the limited fund to support biodiversity conservation initiatives, the AMS has identified a range of options like Ecological Fiscal Transfer, PES, carbon finance, REDD+, biodiversity offsets, contributions from the private sector, among others.

Ecological Fiscal Transfers (EFT) are instruments to redistribute government tax revenues to protect sites of ecological importance, thus, compensating regional or local governments for their environmental conservation efforts. EFTs are considered incentives for decentralised conservation efforts by compensating municipalities for foregone revenue and other opportunity costs of protected areas.

Indonesia has been applying EFT since 2019 to recover and manage conservation areas. It promoted forest protection while compensating districts for 'supposedly foregone' revenues from forest conversion to industrial activities (otherwise known as PBB). EFTs have been integrated into Provincial Ecological Fiscal Transfer (TAPE) for financial transfers from the provincial to the district level and District Ecological Fiscal Transfer (TAKE) for financial transfer from district to village level projects in North Kalimantan and Jayapura.

For the restoration and improvement of marine protected areas, Indonesia has the Debt for Nature Swap and Corporate Social Responsibility, which are potential funding mechanisms for recovery and management of conservation areas.

Malaysia has been promoting EFT as incentives to states with protected area through a formulation in the distribution of national taxes.

Lao PDR has put in place an EPF, supported through the LENS II project, for capacity building activities on environmental management and biodiversity conservation. The EPF was established so that government departments or agencies, and local non-profit associations are encouraged to formulate their own environmental 'subprojects' and apply for funding from the EPF.

When it comes to tax measures, Cambodia implemented the green tax policy measure which incorporates the value of natural and ecosystem servicing into policy, accounting, and ecosystem valuing. This can potentially generate the necessary revenues to cover nature conservation.

Indonesia, though its Ministry of Marine Affairs and Fisheries, issued Minister of Marine Affairs and Fisheries Regulation (PermenKP) No. 17/2015 on Criteria and/or Requirement for Grant of Income Tax Facility for Investment in Particular Business Areas and/or in Particular Regions Within the Marine and Fisheries Sector. In 2017, the investment value within the sector reached USD 344,164,144.45 (2017), with a total credit assistance for the sector amounting to USD 804,032,226.95, an increase of 22,821,630.71 trillion from 2015.

Since 2017, the Malaysia Tourism Tax has been allowing operators of accommodation facilities to collect taxes from foreign tourists. Returns are used to develop the tourism industry, and to preserve and conserve the country's natural and cultural heritage.

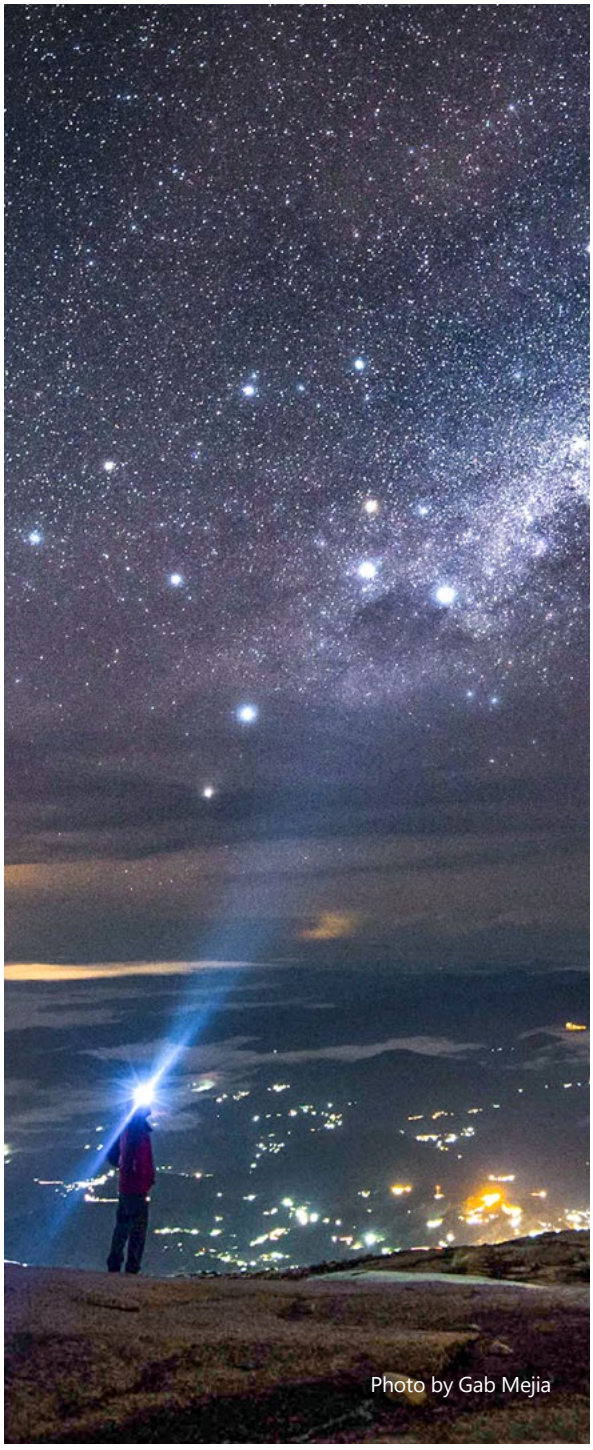


Photo by Gab Mejia

The village fund of Indonesia prioritised activities around adaptation to and mitigation of climate change through capacity building and community-based fire brigades on fire mitigation, as well as advocating implementation of "no slash and burn" farming. Regarding REDD+, the fund can be used for activities such as ensuring sustainable forest management, rewetting degraded peat, contructing canal blocking, establising nursery and agroforestry sites, and implementing ecotourism programmes.

Community-Based Natural Resources Management (CBNRM) Grants are instruments that address biodiversity financing through contributions from the private sector or development partners like Kehati Foundation in Indonesia.

PES is a mechanism to ensure environmental compensation by having users and other beneficiaries of biodiversity components and ecosystems pay those undertaking the protection, restoration, and maintenance of the components. By ensuring that the payment adequately reflects the benefits, the PES can provide economic incentives for the custodians of biodiversity and natural resources.

Malaysia implemented pilot PES programmes to preserve water catchment for water supply in the states of Perak and Sabah. 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 271 households in 10 villages in Gana, Kota Marudu, 152 households in five (5) villages in Kinabatangan, and 70 households in 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.

Lao PDR's Ministry of Agriculture and Forestry (MAF) has developed the Provincial REDD+ Action Plan and REDD+ readiness activities in six (6) northern provinces. The F-REDD, supported by JICA, focuses on the shifting mosaic forest areas and protection forest in Luang Prabang Province. The pilot REDD+ project Climate Protection through Avoided Deforestation (ClipAD), supported by the German Development Bank (KfW), is being undertaken in Nam Et-Phou Louey Protected Area in Huaphan Province.

Box 54. Mobilising funds through PES in Thailand

Thailand implemented an ecotourism at Ban Ko Klang Village in Khlong Prasong Sub-district of Muang District in Krabi Province with a PES group comprising tourist operators and other beneficiaries. The local mangrove conservation association was identified as a recipient of the PES programme while the local administration supervised the programme's implementation.

At Railay Bay and Phra Nang Cape of Krabi Province, the Railay Bay Tourist Association provided payments to local populations for treatment of wastewater. The PES arrangement in the areas also stipulates that the tourist association is responsible for ensuring safety of tourists and maintenance of tourist sites.

In Chum Kho Sub-district in Pathiu District, Chumphon Province, the Charoen Pokphand Foods PCL. provided support to locals in replanting, maintaining and conserving mangrove forests. The PES program was supervised by the local mangrove development office.

In Ban Hua Lao Village of Pa Pae Sub-district in Mae Taeng District, Chiang Mai Province, payments were made by the 9th Regional Waterworks Office and the Chiang Mai Waterworks Office to a local ethnic group, Karen, to build weirs, maintain dikes, create firebreaks, organise forest fire patrols, as well as to replant and protect forestlands.

The Biodiversity-Based Economy Development Office (BEDO) carried out a study on Natural Capital Accounting (NCA) to provide a framework for identifying, measuring, and assessing the direct and indirect impacts of businesses on natural capital. The resulting framework is expected to inform decisions on investments or planning in both public and private sectors.

Table 22. Fund mobilisation programmes and initiatives in AMS

Brunei Darussalam	• Majority of biodiversity conservation programmes and activities are supported through the state fund with a small portion coming from external sources.
Cambodia	• Cambodia's state fund for conservation activities exceeded the 2020 target by 20 per cent via ministries that deal directly with biodiversity, hence, making it better able to implement the NBSAP. • Its National Green Growth Roadmap and the National Strategic Plan on Green Growth 2013–2030 has identified investment schemes (e.g., PES, green tax, budget reform and debt swap schemes) as priority interventions in biodiversity management.
Indonesia	• Indonesia has a Biodiversity Financing Plan which lays out the strategy and comprehensive process to mobilise funds from the public and private sectors toward achieving the national targets. • An Environment Fund was established via the National Environmental Quality Promotion and Preservation Act B.E. 2535. It offers fiscal incentives in the form of direct funds and low-interest loans to public agencies, local administrations, state enterprises, private organisations, and NGOs to participate in conservation efforts. • In 2017, the investment value within the marine and fisheries sector reached USD 344,164,144.45, with a total credit assistance for the sector amounting to USD 804,032,226.95, an increase of 22,821,630.71 from 2015.
Lao PDR	• Lao PDR's EPF, supported through the LENS II project, provides a fund source for capacity building, environmental management, and biodiversity conservation. • The EPF aims to establish a fund and provide funding to government departments or agencies, and local non-profit associations that formulate and apply funding support for their own environmental 'subprojects'. • Since its inception, the EPF has supported 150 subprojects from the years 2000 to 2013 for a total of USD 38.83 million.
Malaysia	• In 2017, the government passed the Tourism Tax Act to allow the accommodation facitilites to collect tax from foreign tourists. Returns are used to develop the tourism industry and hold activities to preserve and conserve natural and cultural heritage. • KATS set up the National Conservation Trust Fund for Natural Resources (NCTF) in 2015. • For scientific research and ideation, fund support may be availed from the Indonesian Science Fund. • Other financing schemes for biodiversity management include PES, the Taman Tugu Heritage Fund (site level), and the Green *sukuk* which has strong potential to support biodiversity conservation.
Myanmar	• Myanmar indicated that by 2020, the funding available for biodiversity from all sources will increase by 50 percent. By all available measures, funding for biodiversity and conservation has increased substantially in Myanmar over the past 4 years, including government in-house budgets, with the unfortunate exception of budgets for natural resources enforcement. • The Wildlife Conservation Department budget has increased by over 50 per cent, GEF funding has increased by 30 per cent, and NGO budgets for the country have also increased based on the escalation of the number of programmes over the past 4 years.
Philippines	• The Philippines has developed an investment program for all protected areas in the country with the passing of the Expanded PA law. • With the help of the BIOFIN project, the Philippines reported on its baseline on financing and the progress of its PBSAP activities. • Through a partnership with BIOFIN, World Wide Fund for Nature and fintech company GCash, funds are being mobilised to protect and restore the Ipo Watershed, an important water source for residents of its capital, Metro Manila
Singapore	• Under the Garden City Fund, activities on park enhancement and conservation, and restoration programmes like the Plant-A-Tree are being implemented. For instance, the Starhub, a local telecommunications company, funded the planting of native species of trees on Pulau Ubin under the Plant-A-Tree programme. • The Hongkong and Shanghai Banking Corporation Limited initiated the Young Naturalists Programme where children between seven (7) and twelve years old are able to learn more about the mangrove ecosystem and a range of conservation issues at the Sungei Buloh Wetland Reserve.


Photo from Hoang Lien National Park

Thailand	• The tiger-themed license plate scheme in Thailand has been generating sales income which is channeled into conservation projects in pilot World Heritage Sites. • Visitation fees for tourists are used to fund biodiversity conservation and restoration projects. • The National Committee on Conservation and Sustainable Use of Biodiversity supervises actions on and develops policies for biodiversity conservation. Business networks under its Sub- committee on Promotion of Conservation and Sustainable Use of Biodiversity in Business Sector offered contributions for biodiversity conservation. • State enterprises like the Forest Industry Organization set aside ten (10) per cent of forest parks for biodiversity conservation and preservation of plants and animals in their natural environments. It also allowed the inventory and data collection on plants and animal diversity with the participation of local communities.
Viet Nam	• According to a draft report (2018) of the Viet Nam Government on the results of implementing the *Target Program for Sustainable Forestry Development in 2016–2020*, VND 21,527 billion was used for the programne. In particular, VND 5,323 billion was sourced from payments for forest environmental services. • Between 2011 and 2015, the Genetic Resources Conservation Programme was financed from the state budget (MOST, 2014). Of the amount allocated, 40 per cent was spent on genetic resources conservation activities implemented by different ministries. • The budget for regular costs relating to protected areas in the period of 2003–2010 was 410.6 billion VND, with a 13 per cent annual increase. Of this, the cost for central level activities was twice that of the provincial-level activities.

Photo by Abdelnasser K. Aming

Challenges

Although AMS have been exerting significant efforts to increase funding for biodiversity conservation, it is projected that financing will continue to be their major obstacle. Biodiversity financing must be increased and expanded. The world needs USD 824 billion every year to sustain biodiversity. However, only USD 143 billion is currently being spent on biodiversity conservation which is just a little over 0.1 per cent of the total global GDP.

The financial needs assessments in NBSAP implementation undertaken in the BIOFIN member countries in the region showed financial gaps ranging from USD 394.19 million (Philippines) to USD 924 million (Thailand) to support the implementation of NBSAPs in 2020 and 2021, respectively.

Initial results of the stocktaking studies on five AMS on Biodiversity and Ecosystem Services Assessment Economic Analysis and Conservation Financing (BESA++) that was presented in 2019 during the Sixth AHP Conference in Lao PDR showed that most (85%) studies focused on the analysis on the state of ecosystems. Very few were on valuation and financing. The assessments were more qualitative rather than quantitative, hence, they could not be used as economic instruments for conservation financing. There is also a need to enhance the skills of protected area staff in conducting ecosystem services valuation studies. Together with experts from academic institutions, they can translate results into long term conservation and financing plans.

The review commissioned by GIZ and KfW[12] presented experiences in sustainable financing for biodiversity conservation. The analysis yielded insightful findings.

- There is a chronic financial shortage for biodiversity conservation and the financing gap is likely to widen.
- Financial and technical cooperation are both needed to enhance the financial sustainability of conservation efforts.
- In many case study countries, fundraising capacity is low.
- Establishing new financial mechanisms in many instances will require new institutions, skills, and new partnerships.
- Conservation trust funds are a principal financing mechanism with multiple benefits for financial sustainability.

While the 6NRs have shown concrete efforts by AMS to fulfill Aichi Target 20, they also indicate that efforts have yet to lead to substantial increases in current levels of funding for NBSAP implementation.

Additionally, the tendency for funding streams to shift direction toward prioritising COVID-19 pandemic response and recovery poses a huge challenge in the implementation of NBSAPs and global conservation efforts.

Ways Forward

- AMS need to make more comprehensive and systematic efforts to mobilise and substantially increase financial resources from all sources for a more effective implementation of their NBSAPS. Membership or inclusion in the BIOFIN project has been showing significant benefits to members states in leveraging capacities and mobilising funds for biodiversity conservation. But AMS need to take more concrete and pragmatic measures to mainstream biodiversity in national programmes and provide the needed financial support and resources.

- For instance, as a first step, AMS could ensure that biodiversity conservation is among, if not, the key, priority budgetary items that may be decided upon, pursuant to the exercise of national sovereignty by AMS. Once this key prioritisation is achieved, other measures, such as those laid out in BIOFIN methodology can be easily applied by AMS by adjusting it according to their respective conditions, contexts, and needs.

- Capacity building activities on ecosystem services assessments should equally focus on valuation and financing to generate ecosystem services research assessments that are useful economic instruments for conservation financing (e.g., bonds, PES, administrative fees, grants, donations, crowd financing, etc.).

- Finally, a virtual conference on Biodiversity Finance conducted by the OECD Biodiversity Land Use and Ecosystems Programme and the UNDP-BIOFIN in May 2020 urged countries to include safeguards for nature to reduce risks of future pandemics such as COVID-19. The Conference recommended a radical rethink of budgets, investments, and destructive policies that harm biodiversity for long term recovery.


Photo by Kyaw Kyaw Winn

- In the review on sustainable financing for biodiversity conservation, it was proposed that before considering new financial mechanisms, which would require new institutions, skills, and partnerships, it is better to focus analysis on options for improving existing instruments. Financing mechanisms like the GEF, REDD+, and PES need to be reviewed in terms of actual benefits to target beneficiaries and whether they are easily understood by the stakeholders. This will promote more effective implementation and ease of adoption of these financial mechanisms.

- It is also important to improve the analytic capacity for examining constraints to financial sustainability when planning a new financial mechanism and to ensure the inclusion of financial sustainability aspects in project/proposal evaluations.

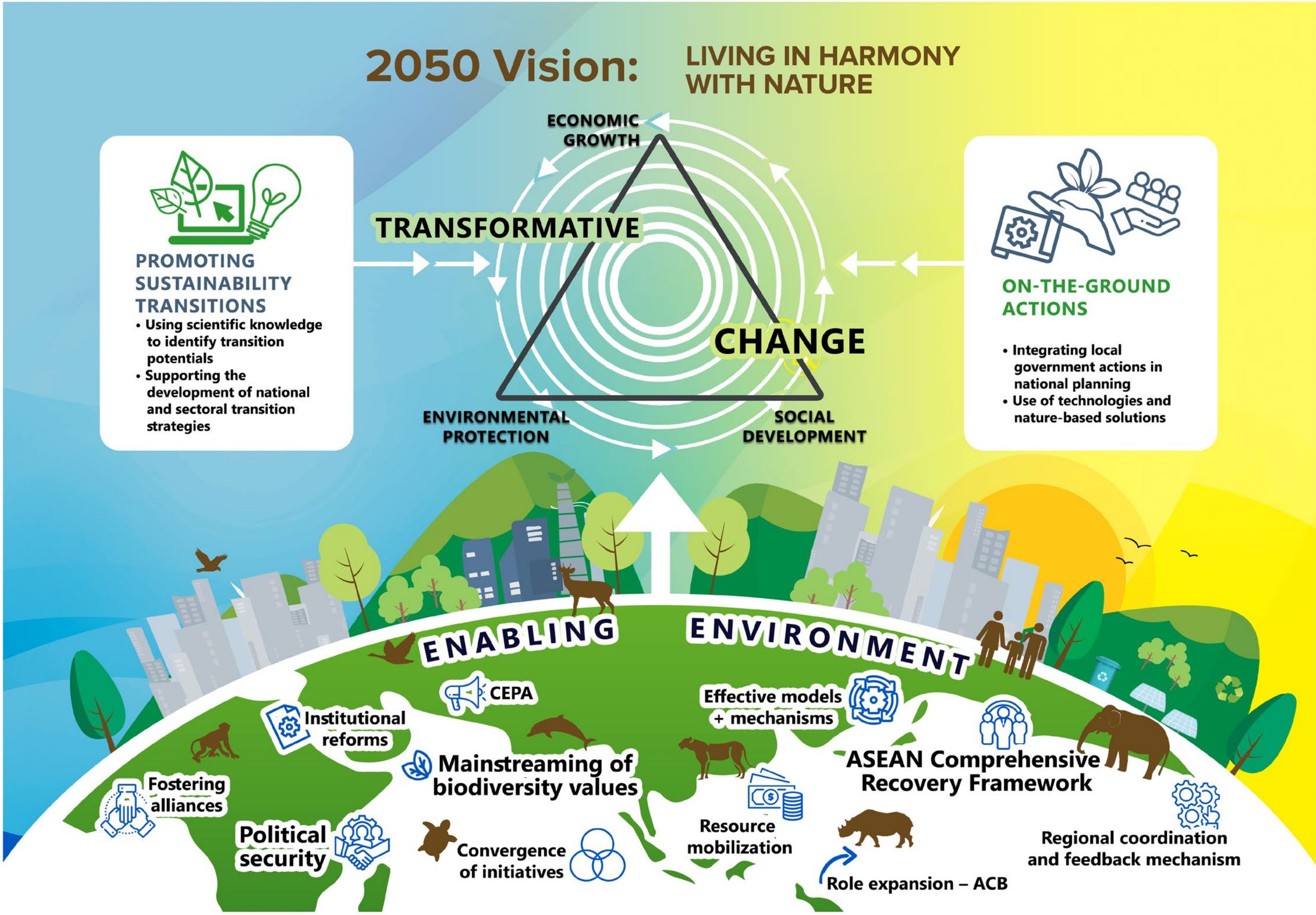

Photo by Myat Soe Thar

CHAPTER 3

The ASEAN Biodiversity Outlook Post-2020

Photo by Hnin Wutyi

2050 Vision: LIVING IN HARMONY WITH NATURE



The Prospects for Transformative Change in the ASEAN Region

The post-2020 global biodiversity framework sets an opportunity to shift the narrative from a state of excessive consumption of and serious inattention to biodiversity to collective, science-based, responsible, and pragmatic actions towards biodiversity conservation at massive scales across sectors. To enable this shift, transformative change has to be realised throughout the region.

The ASEAN region is well-positioned to espouse transformative change as it proceeds to implement significant conservation measures in key sectors and stakeholders such as the academia, business, youth, women, indigenous people and local communities (IPLCs), and civil society organisations (CSOs).

The ASEAN cross-sectoral mechanism for collective action among AMS is crucial in making transformative change come into fruition. Instrumental to these efforts is the role of the ASEAN Secretariat in coordinating cooperation among AMS, partners, and other stakeholders, mobilising resources, and providing technical and political guidance for timely and responsive decision-making in the region. Also of considerable significance are the contributions of the ASEAN Centre for Biodiversity (ACB) in scaling up the concerted efforts of AMS, and mainstreaming biodiversity considerations into development plans and processes through awareness raising, capacity enhancement initiatives, and partnerships, as part of the region's whole-of-community approach towards fulfilling the objectives of the Convention on Biological Diversity (CBD) through transformative change.

Photo by Than Aye

As the global community seeks to realise sustainable development as an overarching goal in biodiversity conservation, it must embrace transformative change as a paradigm to enable the effective integration of and bring about structural change in all of its three dimensions: economic growth, social development, and environmental protection.

- *Economic growth*. Structural change has to usher steady and inclusive economic growth that creates opportunities for all sectors of society. It should facilitate business expansion across sectors and industries and enable the country to capture export markets.

- *Social development*. Shifts must lead to greater increases in the share of labour in national income and make the distribution of labour income more favourable for marginalised groups.

- *Environmental protection*. The inextricable link between environment and economy can never be over-emphasised. It is not possible to set aside concerns for the environment simply by choosing more agriculture- or service-oriented structural change. Attention to environmental impact has to be a concern regardless of the kind of structural change a country follows.

The 2030 Agenda for Sustainable Development aiming at transformative change includes structural change as an important component. However, this structural change has to be one that promotes sustainable development.[1]

To build the foundation for a transformative post-2020 global biodiversity framework, a process approach was emphasised during the *Seminar on Transformational Change for the Biodiversity Agenda* organised by the Convention on Biological Diversity (CBD) Secretariat in November 2018.

The approach suggested the organisation of transition teams to build connections between entrepreneurial policymakers, transition experts, and local knowledge-holders. The transition teams are tasked to analyse and map local risks and dynamics that could foster transitions. These analyses would set the basis for charting transformative directions for biodiversity-relevant sectors and for mapping the pathways and intermediate goals necessary to achieve those transformations.

Finally, transition should involve collaborative interventions to accelerate the process and foster social learning and empowerment.[2]

Promoting an enabling environment for Transformative Change in ASEAN

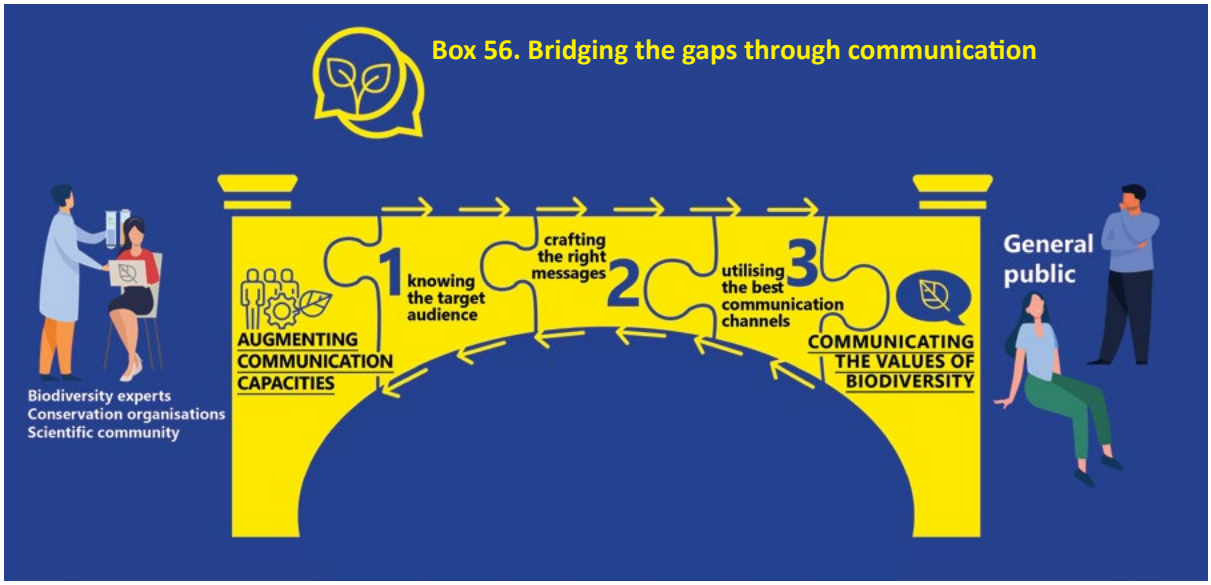
The foregoing sections show the extent of ASEAN's efforts to fulfill the Aichi Targets. From their experiences in implementing the Targets, the ASEAN Member States (AMS) recommend undertaking the following urgent, proactive, cohesive, and science-based actions to significantly curb, if not halt, the fast-declining biodiversity in the region.


Photo by Ysabel M. Victoriano

Box 55. Key areas of transformative change[3]

Transformative change is introduced through five key areas that could leveraged for a synergistic effect towards the attainment of the SDGs:

- Accelerated renewable energy growth to halve carbon emissions every decade
- Accelerated sustainable food productivity
- Roll-out of new development models in poor countries
- Unprecedented action for inequality reduction
- Step changes in education, gender equality, and family planning



A. Bridging the gap through communication

Aichi Biodiversity Target 1 underscores that by 2020, people should be aware of the values of biodiversity and the steps that they can take to conserve and use it sustainably. There is growing evidence of a deeper understanding of the concept of biodiversity, most especially among the youth in biodiverse countries.[4] However, there is no globally consistent information showing trends in awareness and willingness to act on biodiversity. Thus, Aichi Biodiversity Target 1 has not been completely achieved.

Raising awareness among millions of citizens across the region and engaging them to take necessary actions to curb biodiversity loss calls for comprehensive, holistic, and strategic communication approaches. The Communication, Engagement, and Public Awareness (CEPA) programme of the ASEAN is a means to this end.

Communication is more than an initial step in incorporating biodiversity into development—it plays an integral role throughout the mainstreaming process. Effective communication requires knowing the target audience, crafting the right messages, and utilising the best communication channels to get the message across the identified sectors.

The ASEAN Communication Master Plan II (ACMP II) provides the framework to communicate messages about the ASEAN and the ASEAN Community, its vision, actions, and the developments in the region to key audiences, including local communities of the AMS, government, businesses, CSOs, media, influencers, women and children, youth, and the global audiences.

1. Communicating the values of biodiversity

In communicating biodiversity information and knowledge, connecting with cultural sensitivity and responsiveness may be beneficial in taking biodiversity concepts to a relatable and experiential level.[5] A narrative change, one that utilises powerful stories, is needed to give more prominence to the link between the values of biodiversity and formulating concrete solutions towards transformative change.

Communicating the value of biodiversity calls for the application of a whole-of-community approach, which necessitates connecting with various target audiences to reverse the biodiversity loss trajectory. The approach requires clear, concise, understandable, and targeted messaging. Framing biodiversity issues using the lens of target audiences could result in a deeper and broader understanding of its importance.

Table 23. Framing messages for specific target audiences

Target Audience	Strategy
Political decision-makers: sectoral bodies, legislators, and national and local government units	Utilise science-based and pragmatic approaches towards building advocacy that leverages organised actions with partners and other sectors
Media: local, national, and regional outfits	Develop compelling narratives to substantiate environmental issues and the interdependence of human lives and biodiversity to make them more relevant and relatable
Private sector (businesses in support of nature)	Magnify the risks, costs, and impacts of biodiversity loss to their bottom line
Relevant social segments: youth, women, IPLCs	Present in-depth exploration of how sectoral experiences contribute to scientific narratives and economic activities

Regional dialogues among key sectors have been organised to identify entry points for collaboration and emphasise the important role of every sector in conserving the region's biodiversity. Information gathered from these knowledge-sharing sessions is then translated into CEPA materials that are openly shared with various audiences.

Increased visibility can effectively put the issue of biodiversity in the consciousness of key sectors and global audiences. Thus, a strong presence in both regional and global exhibitions like the 2018 Biodiversity Innovation and Solutions Fair held during the 14th Meeting of the Conference of the Parties (COP) to the CBD could help boost awareness raising and mainstreaming efforts.

Regional programmes like the ASEAN Heritage Parks (AHP) provide opportunities to focus on networking strategies to further elevate the stature of the programme and create a brand for better promotion of the AHP sites.

2. Augmenting communication capacities

Decision 14/34 on the comprehensive and participatory process for the framework preparation highlights that the process should be accompanied by an inspirational

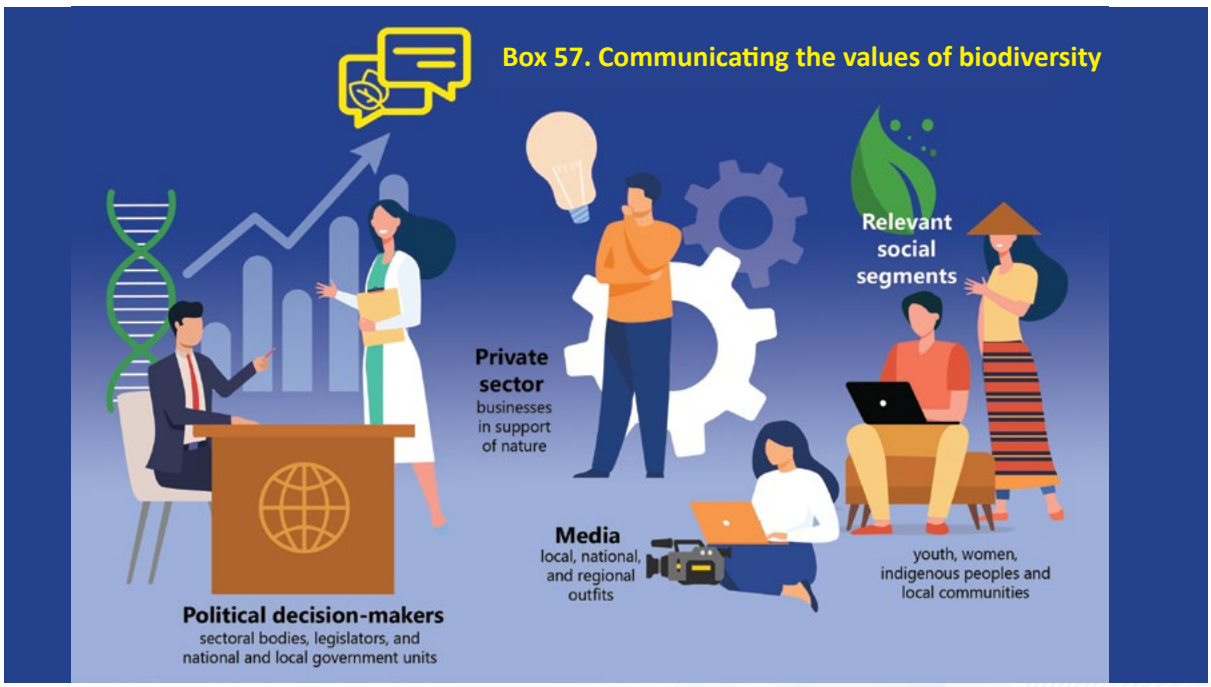



Photo by ACB

Box 58. Communication Support to the AHP Programme

In September 2019, the Ministry of Environment of Japan and Biodiversity Conservation Agency of the Viet Nam Environment Administration facilitated a regional learning workshop on CEPA for AHP.

The workshop, supported by the Japan-ASEAN Integration Fund (JAIF), produced recommendations and networking strategies to promote AHP as models of protected area management. The attending AHP managers and officers co-developed strategies to further elevate the stature of the AHP programmes and create a brand for their respective AHP.

and motivating 2030 mission as a stepping stone towards the *2050 Vision of Living in Harmony with Nature*. As such, the framework's adoption is set to be supported by a coherent, comprehensive, and innovative communication strategy.

For the ASEAN, the adoption of the post-2020 global biodiversity framework entails programmatic short-, medium-, and long-term approaches in developing and implementing a regional communication strategy towards concrete impacts. A communication strategy should involve key stakeholders across different sectors, and incorporate mechanisms, tools, and opportunities that support awareness building and elicit advocacy for biodiversity causes.

In policymaking, high-level discourse, where significant policies are crafted and crucial decisions are adopted, is a strategic platform to highlight the urgency and extreme importance of addressing biodiversity issues.

Constant follow-throughs on the National Biodiversity Strategies and Action Plans (NBSAPs) in terms of actions and achievements related to Aichi Target 1 would help gauge progress, determine gaps, and provide guideposts for planning and implementing timely remedial action.

Harnessing support from and providing support to biodiversity communicators and champions can elevate awareness of crucial issues on biodiversity to broader audiences and sectoral groups. Communicators working in other fields could be drawn into this circle of communicating about biodiversity conservation for the simple reason that it is interrelated with other development themes. Awareness-raising and learning events such as conferences, workshops, meetings, exhibits, and site visits, among others, remain to be useful activities and must be sustained.

Outputs from these activities should be effectively packaged into substantive and compelling communication and learning materials for specific target audiences.

B. Mainstreaming of biodiversity into various sectors

In 2016, the CBD COP Decision XIII/3 on mainstreaming noted that the attainment of most of the Aichi Biodiversity Targets requires the implementation of a portfolio of actions that integrates biodiversity considerations into sectoral and cross-sectoral policies, plans, and programmes. This is one of the reasons for highlighting the mainstreaming of biodiversity as a key priority of the CBD.

To understand how various mainstreaming activities are being implemented in the region, a preliminary review of the NBSAPs submitted by the AMS to the Secretariat of CBD was undertaken by the ACB, which generated the following observations:

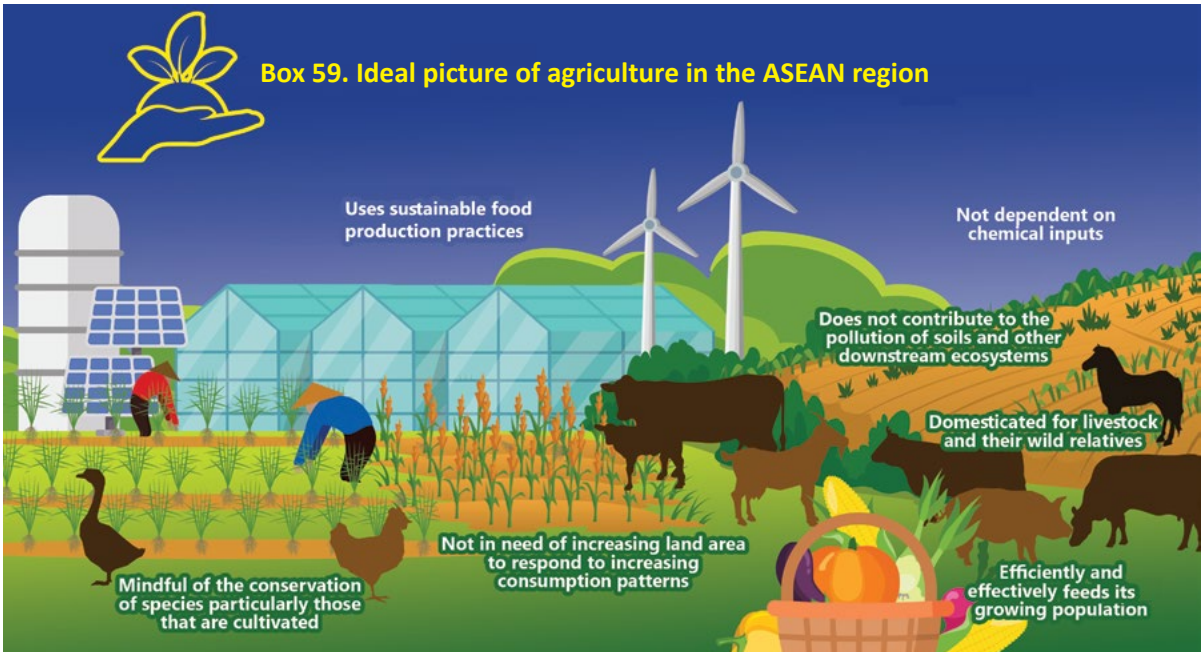
- The primary sectors identified for biodiversity mainstreaming are agriculture, fisheries, forestry, tourism, and mining,

with climate change as a cross-cutting issue. Some sectors such as health, infrastructure, and finance, and banking are not articulated in the NBSAPs.

- Specific stand-alone sectors identified for biodiversity mainstreaming are biotechnology and related industries, as well as, traditional and herbal plant use (Brunei Darussalam), green procurement (Malaysia), urban biodiversity and energy mentioned together with mining (the Philippines); communication in the context of biosafety (Viet Nam); water (Lao PDR).
- Some AMS did not discuss primary sectors which have been traditionally associated with them as a leading global producer, like mining for Indonesia, forestry for Myanmar, and tourism for Thailand. These sectors are of extreme economic importance and the need to address their impacts on biodiversity must be fully appreciated and addressed.
- The AMS have demonstrated mainstreaming efforts in key sectors but they have yet to clarify these efforts as either part of the mission, objective, output, or target of their NBSAPs.
- Common approaches to mainstreaming are evident in the use of economic instruments, education, localised conservation approaches, and inter-ministerial mechanisms. Other notable approaches such as linkage to national development and sectoral planning, land use planning and budget instruments, and earmarking may be further integrated in some NBSAPs.

Apart from the NBSAP review, the AMS will organise sectoral workshops to consider ways to mainstream biodiversity in various sectors. These activities will be the foundation upon which transformative change should develop, enabling the realisation of the *2050 Vision of the CBD of Living in Harmony with Nature*. In 2019, the ASEAN leaders agreed to continue promoting biodiversity conservation and management and mainstreaming biodiversity into the various development processes in the region. What follows are indications of how mainstreaming of biodiversity can be carried out in identified sectors.

Photo by Yusuf Madi



1. Agriculture

A picture of ideal practice of agriculture in the ASEAN region:

- employs sustainable food production practices throughout the region.
- is efficient and effective in feeding its growing population;
- increases efficiency of the land by using biodiversity-friendly technology to respond to increasing consumption patterns;
- mindful of the conservation of species particularly those that are cultivated and their wild relatives, as well as those that contribute to pollination;
- domesticates livestock and their wild relatives;
- not dependent on chemical inputs; and
- not a contributor to the pollution of soils and other downstream ecosystems.

Achieving or approximating this state of food production in the region requires the effective and strategic mainstreaming of biodiversity in agriculture towards food security. Fostering partnerships with relevant agricultural networks propel and sustain the discourse and initiatives on the biodiversity-agriculture nexus. For instance, AMS collaborations, with support from the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) and the European Union, through the *Biodiversity Conservation and Management of Protected Areas in ASEAN* (BCAMP) project, has enabled cross-pillar and multi-sectoral discussions and further expansion of the network in the agriculture sector.

The dialogues of various actors from both the biodiversity and agriculture sectors have brought to the fore the importance of facilitating changes in the governance, institutional mechanisms, and to some extent on behaviours, such as how these different sectors act on issues impacting biodiversity conservation and agricultural development. The multi-sectoral dialogues have shown that policies, strategies, frameworks, and various mainstreaming measures as regards biodiversity and agriculture remain fragmented in the ASEAN region.

The regional discourse also emphasises the significance of having a holistic and inclusive approach in the governance and management responses that relate to the biodiversity-agriculture nexus because of its multifaceted characteristics. It means focusing not only on one element but rather on the crucial interlinkages of various concerns, such as agrobiodiversity, food systems, nutrition, ecosystem services, sustainable production and consumption, landscape/spatial planning, benefit sharing, and farmers' incentives, access to information and genetic

materials, improving current conditions for pollinators, and protected areas.

Several best practices at the local and national levels are already known, and are already being done, facilitated, and amplified at the local, regional, and national levels. Nonetheless, more concerted efforts in upscaling regional strategic plans and cross cooperation are essential.

The interdisciplinary and inter-sectoral approaches to capacity-building are also necessary to address any disconnect. This includes taking into consideration gender concerns, local and/or indigenous knowledge systems and practices, and engagement of multiple stakeholders (i.e., farmers-scientists exchange).

The importance of learning from and scaling successful initiatives and making the public aware of the importance of agrobiodiversity has also been highlighted in the regional discussions. Mainstreaming goals can be attained as human relations with nature are also transformed.

As a way forward, the ASEAN community had identified five priority areas towards mainstreaming biodiversity in the agriculture sector:

- multi-sectoral and cross-pillar collaboration;
- regional and national collaboration plans;
- education and training programmes;
- raising public awareness; and
- presentation of case studies and consolidation of best practices for upscaling and adoption.

2. Sustainable Fisheries

The ASEAN region has 173,000 kilometres of coastline and over 25,000 islands, where more than 50 per cent of the population lives. Fish is an important primary sources of protein for the majority of this population. They account for at least 15 per cent of animal protein for more than 100 million people and up to 50 per cent for some communities. Fisheries, including inland aquaculture, are not only important contributors to food supply but also to livelihoods. Aquatic products are also

Box 60. Nexus approach in biodiversity conservation

The nexus approach highlights the need for and potential benefits of taking a broad, multi-sector, multi-scale, and multi-regional perspective to solve global challenges, such as those related to the SDGs. Nexus approaches can help uncover synergies and detect harmful trade-offs among different sectors, scales, and regions, reveal unexpected consequences, and promote integrated planning, decision-making, governance, and management.

As a result, they can help enhance cooperation and reduce conflicts among sectors, scales, and regions, increase resource use efficiency, and reduce wastes and pollutants. Management of cross-sectoral, cross-scale, and cross-regional integration is a major issue in both nexus approaches and SDGs.

Once this is done, the benefits of biodiversity and ecosystem services to marginalised sectors are already taken into account, and this is reinforced through such means as additional monitoring and reporting of policies and programmes that contribute to safeguarding or enhancing access to ecosystem services.


Photo by Wai Yan

one of the most widely traded and exported food products for many AMS. This sector employs an estimated 80 million people in the AMS; and the processing, marketing, distribution, and supply industries associated with fishing and aquaculture employ up to another 10 million people.

The FAO's State of Fisheries and Aquaculture 2018[6] reported that of the top 25 countries leading in marine capture fisheries production in 2016, six—Indonesia, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam—were from the ASEAN region, contributing 23.08 per cent of the entire global production.

The study by Friedman, Garcia, and Rice[7] stated that efforts on sustainable fisheries have continually increased in comprehensiveness and coherence of policy, and intensity and cooperation in practical implementation. Despite the challenges of inadequate resources and cooperation among sectoral ministries, there was increasing collaboration in implementing both the fishery- and environment-sector policies and practices.

The same report offered avenues and sustainable management approaches and tools to hasten the mainstreaming of biodiversity in the fisheries sector:

a. Ecosystem approach to fisheries and ecosystem approach to aquaculture
b. Spatial management approaches
c. Area-based fishery management measures
d. Effective management of aquatic genetic resources
e. Monitoring and control of the negative impacts of aquaculture
f. Strengthening and promoting sustainable aquaculture practices.

What could be the indications that mainstreaming is effectively taking place in the fisheries sector? Friedman, *et al.*[8] sets out two major considerations:

a. the fishery sector formally accepts accountability for the full footprint of its activities on biodiversity, taking such impacts into account in the design of its strategic policy and planning, management measures, and practices; and
b. all the components of Aichi Target 6 of the CBD, are part of standard guidance from FAO to national and regional fisheries management authorities and are being implemented.

3. Human Health and Biodiversity

In light of the recent crisis brought about by the COVID-19 pandemic, the ASEAN Comprehensive Recovery Framework (ACRF) was formulated to highlight the importance of biodiversity in the overall approach to the region's recovery pathway. As the region's economy is projected to drop by 3.8 per cent in 2020, addressing the crisis requires coordinated actions not only within the region but as well as cooperation with its partners.

The ACRF will serve as the consolidated exit strategy from the COVID-19 crisis. It articulates ASEAN response through the different stages of recovery, by focusing on key sectors and segments of society that are most affected by the pandemic, setting broad strategies, and identifying measures for recovery in line with sectoral and regional priorities.[9]

However, there is a need for wider recognition of the role of biodiversity conservation in ensuring human health. With much of the region focusing on public health, there should be more discussions on the link between the current outbreak and future pandemics and biodiversity loss.

The 2018 Health and Biodiversity workshop supported by the CBD Secretariat identified some 'low-hanging fruits' on which ASEAN collaboration on. These are traditional medicine and nutrition, healthy lifestyles and aging, and zoonotic and emerging diseases. A scoping study on the nexus between biodiversity and health highlights the means by which AMS carry out policies and actions around these thematic areas.

Box 61. Connecting biodiversity and human health

Traditional Medicine: Traditional medicine practices are dependent on the availability of natural medicinal resources and members of IPLCs who possess the knowledge of sourcing and processing such. Thus, it is crucial to ensure the sustainable use and conservation of these resources, proper documentation of their taxonomy, production systems, trade, and protection and promotion, transgenerational transfer of traditional knowledge, and equitable benefit sharing.

Food and Nutrition and Health: The conservation of germplasm and productive resources such as soil, water, landscapes, and the livelihoods of indigenous and local communities and urban dwellers have to be linked to health outcomes like food and nutritional security through dietary diversity. While these concerns are under the remit of different sectors, it is pertinent to synergise the efforts toward integrated policy design and implementation.

One Health and Ecohealth: In light of new and emerging infectious diseases, mainly zoonotic, it is important to have a framework like the One Health and Ecohealth approach which could be adopted into the sub- national, national, and regional planning. One Health and Ecohealth are entrenched in ensuring ecosystem integrity and species interactions. This requires more research to establish causality of environment-health linkages and develop capacities of different stakeholders towards understanding the pertinence of the approaches.

Non-communicable Diseases (NCDs): Non-communicable diseases are an outcome of loss of access to various ecosystem services—cultural, provisioning, and regulating. The food and nutritional security-related diseases are linked to loss of diversity and access to landscapes that encourage active lifestyles and avenues to nurture mental well-being. While addressing the issue of NCDs has been the top priority of the World Health Organization in the national level, interventions need to be made by urban planners and environmental agencies. Synergising their efforts with the ministries of health, transportation and urban planning, and rural livelihoods and development will help capitalise on independent efforts and resources.

Applying the Health in All Policies approach systematically across sectors and planning processes needs to be prioritised. The environment sector has specific connections as it relates to food and nutritional security, equitable access to a safe environment, and to an active lifestyle.

Biodiversity planning and health: The links between biodiversity and health are insufficiently explored in national and regional policy documents. Thus, ABO 3, post-2020 biodiversity regional planning, and the ASEAN health cluster post-2020 planning need to have a stronger focus on the explicit intersectoral linkages to ensure effective mainstreaming of biodiversity in the health sector, and vice versa.


Photo by John Samuel P. Nuñez


Photo by Pamela Reblora

4. Other relevant development sectors - tourism, infrastructure, and finance and banking

Regional discussions on how biodiversity may be mainstreamed across equally important development sectors identified regional-level actions particularly in tourism, infrastructure, banking and finance.

Sustainable tourism

- Identify entry points for mainstreaming
- Disaggregate data to reveal ecotourism (social, economic, and others), and clarify the elements in the tourism supply chain
- Facilitate the identification of carrying capacity in AHPs and ecotourism sites
- Facilitate community involvement in areas, such as cultural conservation
- Identify best practices and useful social media or marketing approaches for regional scaling-up
- Find workable self-financing or sustainability schemes, including alternative approaches

Sustainable infrastructure

- Mainstream sustainable design principles through a regional-level green building certification scheme given that such certifications are private sector-led
- Apply monitoring tools for urban biodiversity conservation efforts such as the Singapore Index on Cities' Biodiversity (SI).
- Facilitate and scale-up community education by identifying best practices or successful models
- Identify workable supporting policies, such as stormwater management, environmental impact assessment (EIA), or other measures ensuring linkages or connectivity of green areas

Sustainable banking and finance

- Conduct basic awareness-raising activities for biodiversity on areas such as green finance
- Explore ways to integrate or aggregate information on sustainable finance from the global, regional, national, and local levels in ASEAN and disseminate it to AMS to use for their own needs, i.e., as a one-stop-shop for green finance in the ASEAN region
- Do more work in the technical valuation of biodiversity and environmental services so that this can be accounted for in financial instruments or products. This technical work can also facilitate compliance with loan requirements

All these mainstreaming initiatives are consistent with the position of the Informal Advisory Group on Mainstreaming Biodiversity

(IAG) of the CBD at the First Meeting of the Open-Ended Working Group (OEWG) on the post-2020 global biodiversity framework in 2019 in Kenya: Mainstreaming is a pathway to achieving transformative changes in the new global agreement to safeguard all life on earth.[10]

C. Developing effective models on multi- and cross-sectoral mechanisms

Efforts to mainstream biodiversity must be anchored on establishing multi- and cross-sectoral mechanisms like projects that support climate change mitigation targets and avoid biodiversity loss in tropical countries.

A project under SwedBio sought to identify ways to integrate biodiversity conservation initiatives into the Nationally Determined Contributions (NDC) of Parties to the Paris Agreement on Climate Change. Lessons from such project validate that sectoral thinking is inadequate in addressing linked socio-ecological challenges.

To better engage stakeholders in the decision-making processes, key constraints and opportunities need to be determined. Lessons drawn from consultation workshops, advances in research, and collective experience articulate the key challenges and how they were addressed:

1. Navigating complexity- this is approached by framing biodiversity issues as a "wicked problem" where proposed solutions are neither perfect nor imperfect. Wicked problems invariably mean a satisfactory conclusion is unattainable for all as any given "solution" will generate new challenges.
2. Co-creating knowledge that integrates lessons and actions. This approach is poised to have significant potential to effectively confront the complex problems presented by social-ecological systems.
3. Incentivising behavioural change by effectively engaging stakeholders to integrate climate, conservation, and development goals with the appropriate incentive structures designed to reduce the overexploitation of natural resources.[11]

D. Possibilities for cross-sectoral collaboration in ASEAN

ASEAN is currently promoting enhanced cross-sectoral collaboration that will contribute to the realisation of transformative change in the region. This can be seen in the Chairman's Statement in the 36th ASEAN Summit in 2020 (Cohesive and Responsive ASEAN) which reaffirmed the importance of advancing cooperation on environmental protection and conservation with greater efforts to address cross-cutting issues for sustainable development, such as climate change, marine debris, biodiversity conservation, and transboundary haze pollution.

At the 37th ASEAN Summit held in 2020 in Ha Noi, Viet Nam, the ASEAN Leaders reiterated the importance of promoting cross-pillar, cross-sectoral cooperation and coordination in ASEAN community-building and the importance of a holistic approach, coordinated and coherent response in addressing the increasingly multi-dimensional challenges of issues facing the region.

At the transformative change session of the 2020 ASEAN Conference on Biodiversity,[12] discussions on transformative change were narrowed down into three key points based on these directives:

- It is important to articulate transformative change in various actions to make significant changes.
- Collaboration and knowledge exchange in effecting innovative ways of achieving transformative change are vital among the AMS.
- Key sectors play important roles in ensuring the ASEAN's sustainability transition towards the 2050 vision.

How these directives may be carried out is through the various sectoral working groups under the auspices of ASEAN and other relevant sectoral groups and bodies, under the coordination of the ASEAN Secretariat.

Photo by Tich Karim

The facilitative actions may be reflected as updates in National Biodiversity Strategy and Action Plan (NBSAP) implementation, and inputs to the Biodiversity Strategy and Action Plan at the regional level (ACB Strategic Action Plan). This can also be added as a new agenda item in subsequent meetings of relevant ASEAN working groups after the adoption of the post-2020 global biodiversity framework.

The AMS will provide updates annually on the challenges faced in NBSAP implementation, especially on what they are doing to achieve the agreed targets. The AMS will also identify further collaborative actions, especially in mainstreaming biodiversity to other sectors to facilitate the achievement of targets.[13]

E. Conservation cooperation and partnership in ASEAN

In line with the UN Decade on Ecosystem Restoration, the AMS seek to promote concerted efforts in restoration, regeneration of degraded areas and sustainable use of ecosystem services throughout the region.

Regional cooperation offers opportunities in achieving progressive results with broad impacts. The ASEAN has established close collaboration with countries and organisations outside the region in different fields such as trade, investment, human resource development, science and technology, education, and environment, among others. Engaging relevant sectors and stakeholders in high-level policy dialogues, joint programme planning and implementation, collective research, and resource sharing can exert considerable leverage towards effective biodiversity conservation and restoration interventions.

The ASEAN's development cooperation focuses on larger programmes with greater impact and mutual benefit on the dialogue relations. The development cooperation also serves as an effective tool to narrow the development gaps among AMS and to strengthen the economic and political relationship with the dialogue partners.

Environmental cooperation with China, Germany, Japan, and the Republic of Korea supported efforts in mainstreaming biodiversity, improving awareness and capacity in biodiversity conservation, and promoting the protection and sustainable utilisation of biological resources.

The programme on the Norway-ASEAN Regional Integration (NARIP) supported the implementation of the Bangkok Declaration on Combating Marine Debris in the region and the ASEAN Framework of Action on Marine Debris. These programmes are carried out through knowledge exchange, capacity building, and the establishment of integrated solutions for waste management and the promotion of the circular economy.

The long-standing partnership with the European Union, specifically through the BCAMP Project, resulted in the effective management of protected areas. Additionally, the E-READI Natural Capital Project has assisted in the assessment of natural capital policy and practice in ASEAN public and private sectors to identify areas for improvement.

Currently, the region is struggling to manage the encumbering impacts of the COVID-19 pandemic. The pandemic has taken a toll on the economy, public health system, livelihoods, and provision of basic services of countries in the region. Cognisant of the importance of collective and long-term socio-economic recovery strategy, the ASEAN has developed and adopted the ACRF at the 37th ASEAN Summit. The ACRF outlines the broad strategies and measures to recover in line with sectoral and regional priorities. It offers appropriate responses among key sectors and segments of the society which are most affected by the pandemic.

The ACRF emphasised the promotion of nature-based solutions to increasing the region's resilience during future pandemics and expanding the role of the ASEAN Centres in ensuring the impactful implementation of the framework. ACRF strategies that have direct implications on biodiversity goals are Strategy 5, which underpins the priority towards a more sustainable and resilient future and Strategy 5e.6, which focuses on developing measures to address wildlife trafficking from the viewpoint of biodiversity conservation. The ASEAN Senior Officials on Environment, (ASOEN), ASEAN Working Group on Nature Conservation and Biodiversity (AWGNCB), and the ACB have the mandate to plan around and implement these strategies, more specifically to:

- Enhance cross-sectoral coordination, particularly with the ASEAN Working Group on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on efforts to enforce wildlife protection laws and improve wildlife habitats, including through the implementation of the ASEAN Heritage Parks (AHP) Programme.
- Engage relevant sectors and actors (including youth) to highlight the importance of nature-based solutions to prevent future pandemics through cross-sectoral collaboration and multi-stakeholder engagement as part of ASEAN's agenda on mainstreaming biodiversity across relevant sectors, and to encourage individuals and community to become 'bio-literate' to address future pandemic.

F. Applying incentives/penalty schemes

Incentives are erasing the tax base in the ASEAN region and the effectiveness of incentives to attract investment is uncertain, particularly tax holidays. More targeted approaches, with cost-based schemes,


Photo by Pyae Phyo Thet Paing

have the potential to promote specific development objectives and this can be enhanced within AMS and through regional coordination.[14]

An example of this targeted approach is the decree of the Royal Thai Government to provide tax exemptions to any company, or registered ordinary partnership, for donations that support contributions of community forests to climate change mitigation, provided that such payments do not exceed two per cent of the net profit. Such incentives were envisaged to enable communities to take action in protecting their community forests and to enhance civil cooperation on the issue.

Other lesser-known financial mechanisms for conservation and sustainable use of biodiversity include tax deductions for privately funded studies, research, actions on the conservation and sustainable use of biodiversity, and monetary measures such as the Forest Bond.[15]

Advancing Transformative Change

A. Promoting sustainability transitions

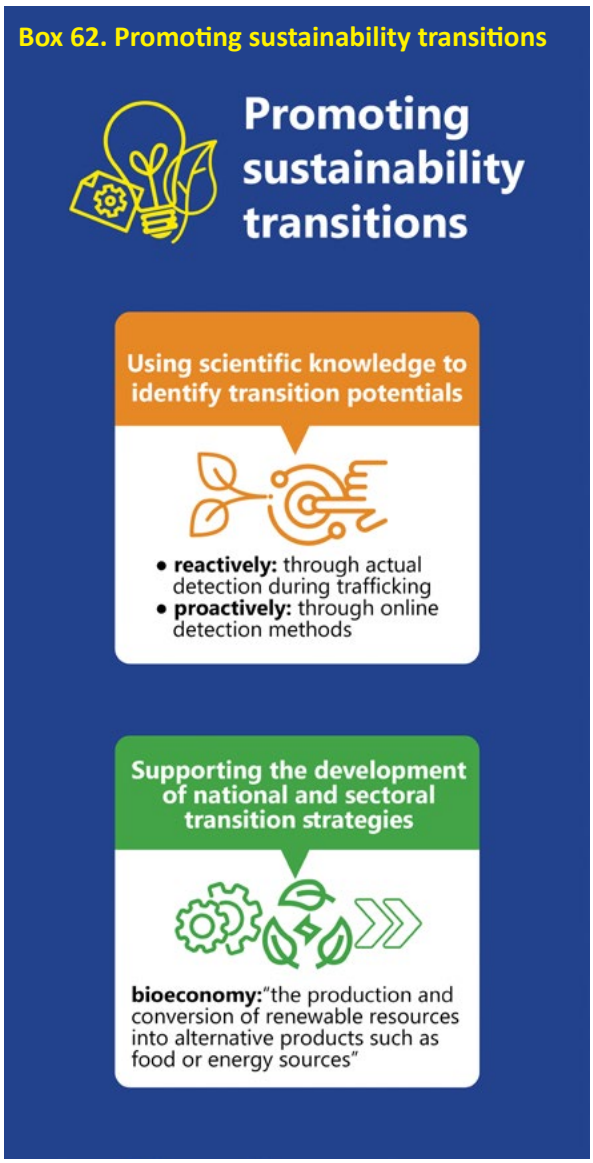
1. Using scientific knowledge to identify transition potentials (knowledge management)

Recent technological advances have increased the tools available for monitoring wildlife tracking across borders. Broadly, there are two main ways in which technological advances can help decrease the illegal wildlife trade: (1) reactively: through actual detection during trafficking and (2) proactively: through online detection methods to halt the sale, and in some cases, collection of species listed in CITES. Sophisticated methods of analysis, such as the use of scripts to break down and analyse patterns of trafficking can even catch perpetrators before they harvest or collect the threatened species. The use of scripts can be as specific and targeted as needed and deal with all aspects of the trade, yet such analysis has not yet been employed in Asia despite the massive volume of trade and very low rates of detection.[16]

For some rare, large-bodied species (i.e., large carnivores, elephants, rhinos), the use of real-time anti-poaching tags has been suggested, yet such means are only viable for organisms that are already virtually on the brink of extinction, and methods that do not require such high quantities of data on the individual level need to be developed.[17]

In doing species monitoring and inventory, digital technology that could help bring in conservation awareness and make available tools and biodiversity information to wide audiences is of the essence. The ASEAN Biodiversity Dashboard (http://dashboard.aseanbiodiversity.org/) is an online platform that enables the visualisation of information such as species distribution, the coverage

Box 62. Promoting sustainability transitions



of protected areas, and where it is best to implement future conservation action. Data layers are added as these become available from data contributors and partners.

2. Using the Idea of Framing to Realise Sustainability

Framing explains how different types of people perceive, understand, and interpret a particular topic or event based on the assumptions, social norms, and values that they have experienced in their daily lives. Sustainability science starts with the premise that sustainable development is a trajectory-based concept. Thus, it is extremely important to possess an attitude that is flexible and accepting of others' framings to elicit collaborative actions for sustainability.

Framing defines what situations are relevant to people, who should be responsible for them,

Box 63. Framing sustainable development: Synergies and trade-offs

In considering whether convergence in conservation initiatives in the ASEAN has already occurred, the first step in the analysis is the identification of synergies and trade-offs between healthy ecosystems delivering ecosystem goods and services, biodiversity conservation, and delivery of the SDGs. It should be considered how these elements will change considering the projected increase in the context of a growing population and a changing climate.

This can be seen in how SDG 15 – Life on land is implemented, which will have potentially large negative trade-offs when seen against competing demands for land. For instance, converting forests to agriculture could mean that SDG 2 – Zero hunger competes with SDG 15. However, if SDG 2 is achieved through increased agricultural efficiency and more food is produced on less land, then there is potential for a positive synergy.

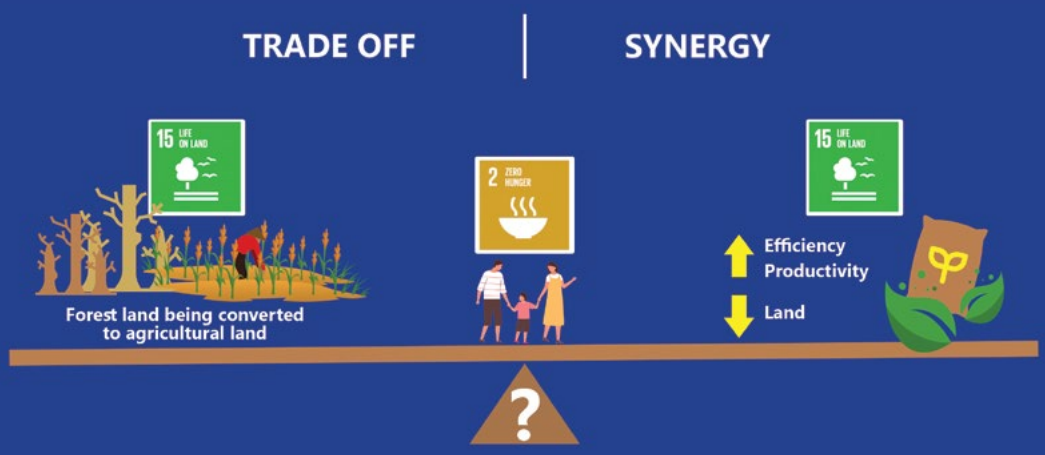
A major potential synergy exists between the attainment of SDG 15 and Target 16.6, the development of effective institutions. There is an urgent need in many countries to reform the institutions responsible for forests so that they can better deal with the multiple values of forests and the diverse stakeholders concerned by these values. Many other potential synergies with forests and forest biodiversity have an impact on people's lives.

In another review, where the scope for analysis of trade-offs was broadened, it was found that 91 SDG targets (54%) call for action about urban ecosystems. This includes a variety of actions such as:

- Protecting ecosystems (e.g. targets 14.2, 15.1, 15.5 and 15.7);
- Providing equal rights to different types of services (e.g. targets 2.1, 7.1 and 11.1); and
- Improving governance and cooperation (e.g. targets 13.3, 16.6, 16.7, and 17.9).

This review summarises the diverse range of actions that may be undertaken in urban ecosystems, among which are that:

- urban ecosystems must be conserved and maintained;
- their management must be compatible with equal rights to basic services for all and pursuit of sustainable economic growth; and
- urban ecosystems must be managed through multilevel governance frameworks, with capacity building and international cooperation.



and who should take measures to improve the situation or avoid possible undesirable situations. Hence, acknowledging the multiplicity in framing is critically important in sustainability research. Sustainability experts are expected to facilitate communication among multiple framings posed by different groups of people and lead the discussion that results in concrete actions for sustainability.[18]

Understanding how other sectors integrate biodiversity considerations into their plans and activities is key to implementing the notion of framing, which in turn helps facilitate the realisation of sustainability, a key ingredient of transformative change.

3. Supporting the development of national and sectoral transition strategies

Bioclusters specialise in the various fields of the bioeconomy and are expected to play a key role in its development. Bioclusters operate with the explicit goal of sustainable development by fostering the transition to a bioeconomy. The added goal of sustainable development makes it important to study the function of bioclusters beyond the traditional focus on competitiveness and employment.

A successful shift from a fossil-based economy to a bioeconomy requires a radical reorientation of production and consumption processes. These profound societal changes are called transitions, and the relatively new scientific field of sustainability transitions or transition theory has emerged to study them. [19]

In Thailand, bioeconomy is defined as "the production and conversion of renewable resources into alternative products such as food or energy sources", also known as the industrial bioeconomy. In the past five years, the industrial bioeconomy in Thailand has become a flagship development under Thailand's 20-year National Strategic Plan (2017–2036) which states that the bioeconomy will lead to "quality of life enhancement, social fairness improvement, environmental risk reduction, and environmental scarcity [reduction]".[20]

B. On-the-ground actions

ASEAN actions on the ground are demonstrated through initiatives like the ASEAN Youth Biodiversity Programme (AYBP), the ASEAN Flyway Network (AFN), and its flagship ASEAN Heritage Parks Programme (AHP).

The AHPs are selected protected areas in the region that are known for their unique biodiversity ecosystems, wilderness, and outstanding values. AHPs were given the highest recognition because of their importance as conservation areas. Through the ASEAN Declaration on Heritage Parks and Reserves, the AMS agreed to manage these AHPs to maintain ecological processes and life support systems; preserve genetic diversity; ensure sustainable utilisation of species and ecosystems; and maintain wilderness that has scenic, cultural, educational, research, recreational and tourism values. As of 2022, a total of 50 AHPs have been established across AMS.

The AFN, on the other hand, is a network of flyway network sites, managers, and other key stakeholders in the region that facilitates the regional cooperation needed to ensure the conservation of migratory waterbirds and the wetlands that support them.

Youth empowerment through programme participation can build up advocacy base for environmental protection and conservation. The AYBP is an initiative that banks on youth's huge potential to contribute to the formulation and implementation of biodiversity policies.

The AYBP—developed in collaboration with the Global Youth Biodiversity Network, the official youth constituency to the CBD—aims to recognise the youth and involve them in biodiversity strategies and action plans at the local, national, and regional levels. The programme is funded by the European Union through the ASEAN BCAMP Project. The AYBP also provides ASEAN youth with capacity building programmes, mentorship, and resources through two signature

activities: Youth Biodiversity Leaders and Youth Internships in AHPs.[21]

In line with the UN Decade of Ecosystem Restoration, the ASEAN launched the *ASEAN Green Initiative* (AGI) in August 2021, a wide-scale tree planting project which aims to plant 10 million trees in a span of 10 years. The AGI is spearheaded by AMS with the ASEAN Secretariat and the ACB playing enabling and supporting functions.

1. Integrating local government actions in national planning

A global action agenda for biodiversity, as envisaged in the *Action Agenda for Nature and People*, is a feasible way forward for increasing the ambition level of global biodiversity policy while at the same time focusing on rapid and scalable implementation. Thus far, there are more than 50 active biodiversity-related global governance initiatives that have been identified beyond existing international institutions, involving more than 10,000 organisations.[22]

In the ASEAN region, the EUR 5 million (USD 5.9 million) Smart Green ASEAN Cities initiative was launched in 2020 to support sustainable urbanisation in the region, reduce the environmental impacts of urban areas, and improve the quality of life of citizens. The initiative will combine city-level solutions with national capacity building and regional approaches, such as the ASEAN Smart City Network, which supports green and smart city solutions in selected ASEAN cities.[23]

Under the ASEAN-India Cooperation Project, engagement with the local governments in the ASEAN region was initiated in 2019 through a workshop. The activity enabled the cross-learning between Indian and ASEAN cities on their application of the Singpaore Index.

The Singapore Index is an assessment tool in monitoring and evaluating the progress of cities in conserving biodiversity and raising awareness on the contribution of urban biodiversity to human health and well- being. It was updated in 2019 to keep up with the current developments in the greening of cities through urban biodiversity- related initiatives.

Similarly, the region participates in symposiums organised by the ASEAN and China on ecologically friendly urban development that serves as a platform in promoting best practices, innovations, and development trends in urban biodiversity conservation, and in strengthening cooperation between China and the AMS.

In Malaysia, Putrajaya has successfully implemented an eco-hydrological approach to managing surface runoff and drainage systems by constructing man-made lakes and wetlands through the Integrated Catchment Management of Putrajaya Lake and Wetland.

The *Greenery and Health* research programme in Singapore aims to understand the optimal use of parks and the health outcomes of nature-based activities, such as park prescriptions and horticulture therapy.[24]


Photo by Chadie C. Bareje

In the Philippines, the local government of Quezon City plans to create a Green Lung Network that will feature green corridors linking the La Mesa Nature Reserve to all open spaces and parks in the city.

The Universitas Indonesia (UI) developed in 2010 the UI Green Metric World University Rankings, a ranking system that gives recognition to universities based on their environmental and sustainability performance.

2. Use of technologies and nature-based solutions

More recently, the options for conserving biodiversity have become varied, with the greater acceptance of agroecology, the application of technologies like precision agriculture and ecosystem restoration, as well as the growing prominence of nature-based solutions.

a. Agroecology

The various scales of integration afforded by agroecological approaches that interact with one another are as follows:

- At the field scale, specific agroecological practices that may improve agricultural performance concerning climate change include shade trees buffering rising temperatures to stabilise the yield of crops like coffee, and increasing the yield of food staples through lowering daytime temperatures and reducing heat stress. These practices promote diversity as well as increase the resilience of crops to climate-induced pest and disease pressures.
- At the farm (or livelihood) scale, the integration of agroecological practices within farms may improve the Total Factor Productivity (TFP) and resilience of livelihoods.
- At landscape (or community) scale, integration of agroecological practices across landscapes enables the management of the provision of a range of ecosystem services that confer resilience, as measured by the plot to landscape-scale metric for multifunctional land use, the Land Equivalent Ratio Metric.[25]

As applied in Cambodia and to a lesser extent in Lao PDR, key operators were able to preserve, produce, and share a diversity of cover/relay crops and underutilised

species while strengthening a genetic bank to produce, store seeds, and help with seed supply. This allowed seed sharing of cover crops with smallholder farmers, development operators, and the private sector, and the dissemination of knowledge and know-how on the use of underutilised species and cover/relay crops (e.g., training, seed swap, field days, on-farm demonstrations).[26]

Another approach to integrating these efforts is by assessing the elements as parts of a bigger food system. However, the many independent initiatives of governments, the private sector, and civil society that have emerged in support of more sustainable food systems lack a common framing of the complex interactions, dependencies, and trade-offs intrinsic to these systems. This has constrained the ability of societies with different priorities, observing different trends, and having different agro-ecological and institutional potentials to identify and implement pathways towards more sustainable food systems.

The COVID-19 pandemic has further alerted societies to the significant weaknesses in many contemporary food systems while bringing into stark contrast what is working, what needs improvement, and what needs radical reform. The pandemic has also demonstrated that significant transformative change to how societies' core systems operate is possible.[27]

For these reasons, the idea of focusing on food systems cannot be avoided, to realise transformative change in agriculture where agroecology and biodiversity are well-integrated.

b. Precision Agriculture

Precision agriculture techniques can be applied to address technical issues in the agriculture sector, such as reducing uncertainties, managing variabilities in farm management, and allowing efficient use of resources. Its application in the palm oil industry in Malaysia enables temporal and spatially distributed data on trees, soil, and environmental conditions of large plantation areas which are collected remotely. This aids in the efficient management of plantation areas, disease detection, and affirmative actions, as well as yield estimation. In the rice industry, precision agriculture allows farmers to reduce input costs and increase planting efficiency.[28]

Precision agriculture can be aligned to the needs of the palm oil industry to increase productivity and overcome its negative market image. In the rice industry, precision agriculture technology has shown promising results. However, it is plagued by high costs and an industry that is recalcitrant to new technologies.[29]

c. Technology in ecosystem restoration (reforestation and coral restoration)

Knowledge and cognitive type solutions are preferred in Southeast Asia at a rate of 2.5 times that of East Asia. In Southeast Asia, knowledge and cognitive type solutions make up 23 per cent of the proportion of solutions, compared with just 14 per cent in South Asia and 9 per cent in East Asia. In Southeast Asia, local communities in Socio-ecological Production Landscapes and Seascapes (SEPLS) invest more often in all sub-types of knowledge and cognitive type solutions at nearly double the rate of the other sub-regions. These include capacity building (knowledge capacities), monitoring and evaluation systems (knowledge systems), and bridging knowledge forms from communities and science (knowledge integration).

For instance, in the Philippines, local ecological knowledge of ethnic groups is included in practical learning experiences in farmer field schools and helps bridge local knowledge systems with new technical developments. The exception is for assessments and research (knowledge gaps), which are selected in a slightly higher proportion in East Asia.[30]

Biogeographic modeling Infrastructure for Large-scale Biodiversity Indicators (BILBI) developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a global biodiversity modeling prediction

tool for biodiversity. It predicts how human activities and environmental change may impact the overall diversity of plants, invertebrates, and vertebrates across the entire global land surface, at one kilometre grid resolution.[31]

BILBI is unique in that it combines the best available environmental and biological data, high-performance computing, and macro-ecological modelling to assess biodiversity change at fine spatial resolution across the global land surface.

d. New methods, processes, and expertise

Understanding the factors that influence species occurrence and persistence is important for numerous tools used in conservation science. For example, in recent years, species distribution modeling became an integral component of conservation planning. To date, the field of species distribution modeling has largely focused on the use of ecological variables to predict distribution, with less emphasis on the inclusion of anthropogenic covariates that reflect spatial variation in hunting pressure.

In areas characterised by hunting-driven declines, spatial prioritisation built upon species distribution models that only use ecological variables may poorly represent actual biodiversity patterns, which can in turn lead conservation stakeholders to misallocate limited conservation resources. However, recent advances in statistical modeling and earth observation science will provide new opportunities for the development of increasingly sophisticated anthropogenic covariates for use in species distribution models.[32]

Determining the 'space race' between co-occurring species is crucial to understand the effects of interspecific interactions (and their interactions with changing habitats) on the extinction risk of species threatened by poachers and predators. Dynamic two-species occupancy models provide a flexible framework to decompose complex species


Photo by Angela Metin

interaction patterns while accounting for imperfect detection. These models can describe poachers–wildlife interactions, as they allow estimating occupancy, extinction, and colonisation probabilities of wildlife conditional on the occurrence of poachers and vice versa.[33]

e. Nature-based solutions as applied in ASEAN cities

The ASEAN-China Cooperation is seeking to collaborate with the ASEAN Smart City Network for sustainable cities through green and blue infrastructures and efficient service delivery (with urban planners and the private sector). It will also consider integrated and holistic approaches and policies in urban development, considering balance in economic and social investments (climate change adaptation, biodiversity conservation, combatting marine plastic pollution) and promote best practices in sound urban green space development, including incentive award (e.g., ASEAN Environmentally Sustainable Cities Award) so that these actions will be further replicated and up-scaled in other cities in the ASEAN region.

To further replicate and upscale in other ASEAN cities the actions on green and blue infrastructures in cities, the ASEAN-China Cooperation is keen on collaborating with the ASEAN Smart City Network through the

Ecologically Friendly Urban Development programme. Sustainable cities cover integrated and holistic approaches and policies in urban development. It considers balance in economic and social investments, climate change adaptation, biodiversity conservation, and combatting marine plastic pollution. It also promotes best practices in sound urban green space development, including incentives awards like the ASEAN Environmentally Sustainable Cities Award.

Conclusion

Effectively mainstreaming, harmonizing biodiversity conservation activities, and communicating the key results of these activities to target audiences may facilitate the achievement of Transformative Change in the ASEAN region. An important criterion for success is a high ambition aligned with the post-2020 global biodiversity framework.

This has direct implications on how the NBSAPs are designed, implemented, and reported. Inter-sectoral implementation of conservation interventions is crucial towards achieving multiple objectives in health, agriculture, environment, climate, and urban planning.

Transformative change implies a reorientation of regional-level coordination that is coherent, inclusive, and holistic.

In 2019, the IPBES stated that addressing biodiversity loss requires a transformative change that should permeate in four priority areas to inform the post-2020 agenda:

1. creating an enabling regulatory environment;
2. redirecting incentives for sustainability;
3. increasing funding for conservation; and
4. reforming metrics to assess biodiversity impacts and progress toward sustainable and just goals.

The COVID-19 pandemic has exposed many countries to a host of economic and social vulnerabilities and unanticipated negative consequences of this environment-borne human tragedy. While that may be the case, it is also an opportunity to ensure that future planning is cognisant of the impact of biodiversity on the health and well-being of the earth and its people.

Photo by Pitchayawat Proongsak

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The **ASEAN Biodiversity Outlook (ABO)** is the flagship publication of the ASEAN Centre for Biodiversity (ACB) that showcases developments in biodiversity conservation in the ASEAN region.

The Third Edition of the ASEAN Biodiversity Outlook (ABO 3) is based on the Sixth National Reports of the ASEAN Member States and other relevant sources. The ABO 3 presents how the ASEAN region fared in conserving biodiversity in the context of the implementing the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets.

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Implemented by giz

This publication was printed with the support of the Federal Government of Germany, through the *Institutional Strengthening of the Biodiversity Sector in ASEAN* (ISB II) Project jointly implemented by the *Deutsche Gesellschaft fur Internationale Zusammenarbeit* (GIZ) GmbH and the ASEAN Centre for Biodiversity (ACB).

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