THE SOCIALIST REPUBLIC OF VIETNAM

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

THE SIXTH NATIONAL REPORT TO THE UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY

Hanoi, 2019

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ABBREVIATION

5MHRP 5 Million Hectare Reforestation Programme

ABS Access and Benefit Sharing

ACB ASEAN Centre for Biodiversity

ADB Asian Development Bank

AHP ASEAN Hertiage Parks

AMD Sustainable Agriculture and Rural Development in the Coastal Mekong Delta Project

ASC Aquaculture Stewardship Council

ASEAN Association of South East Asian Nations

BAP Biodiversity Action Plan to 2010 with vision to 2020

BCA Nature and Biodiversity Conservation Agency

BCI Biodiversity Corridors Initiative

BIOFIN Biodiversity Finance Initiative

CAGR Compound Annual Growth Rate

CBD Convention of Biological Diversity

CDF Community Development Fund

CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora

CORIN Asia Asian Coastal Resources Institute-Foundation

DARD Department of Agriculture and Rural Development

DONRE Department of Natural Resources and Environment

EBA Ecosystem-based Adaptation

EIA Environmental Impact Assessment

FAO Food and Agriculture Organisation of the United Nations

FDI Foreign Direct Investment

FFI Fauna & Flora International

FINIDA Finnish International Development Agency

FSC Forest Stewardship Council

GAP Good Agricultural Practices

GBIF Global Biodiversity Information Fund

GDP Gross Domestic Product

GEF Global Environment Fund

GIS Geographic Information System

GSPC Global Strategy for Plant Conservation

IAS Invasive Alien Species

IFAD International Fund for Agricultural Development

IPA Important Plant Areas

IPM Integrated Pest Management

IUCN International Union for Conservation of Nature

IUCN-WCMC International Union for Conservation of Nature – World Conservation Monitoring Center

JICA Japan International Cooperation Agency

MARD Ministry of Agriculture and Rural Development

MERC Mangrove Ecosystem Research Centre

METT Management Effectiveness Tracking Tool

MOF Ministry of Finance

MOH Ministry of Health

MOIT Ministry of Industry and Trade

MONRE Minstry of Natural Resources and Environment

MOST Ministry of Science and Technology

MPA Marine Protected Area

MRV Monitoring, Reporting and Verification

NBAP National Biodiversity Action Plan

NBDS National Database on Biodiversity

NBSAP National Biodiversity Strategy to 2020, Vision to 2030

NGO Non-Governmental Organization

NTFP Non-timber forest product

NP National Park

NR6 6th National Report

NRAP National REDD+ Action Program

ODA Official Development Assistance

OECD Organization for Economic Co-operation and Development

PA Protected Area

PRAP Provincial REDD+ Action Plan

R & D Research and Development

REDD+ Reducing Emissions form Deforestation an Forest Degradation+

SIDE Sweden International Development Agency

SNA System of National Accounting

SNRM Sustainable Nature Reserve Management

SNV Netherlands Development Organization

SOFRI Southern Fruit Research Institute

SUF Special Use Forest

TFF Trust Fund

TPA Terrestrial Protected Area

TRAFFIC The Wildlife Trade Monitoring Network

TSP Total Suspended Particles

UNDP United Nations Development Programme

UNESCO United Nations Educational, Scientific, Cultural Organization

USD United States Dollar

VACNE Vietnamese Association for Conservation of Nature and Environment

VASEP Viet Nam Association of Seafood Exporters and Producers

VCF Viet Nam Special Use Forest Conservation Fund

VEA Viet Nam Environment Adminstration

VFMB Special Use Forest Management Board

VINFARR Viet Nam Fund for Aquatic Resources Reproduction

VND Vietnamese Dong (currency)

VNEFF Viet Nam Environmental Protection Fund

VNFF Viet Nam Forest Fund

WWF World Wide Fund for Nature

INTRODUCTION OF 6th NATIONAL REPORT

Viet Nam became a party of the United Nations Convention on Biological Diversity (CBD) in 1994. The first National Biodiversity Action Plan of Viet Nam was approved by the Prime Minister in 1995. In 2013, the Prime Minister approved the "National Biodiversity Strategy to 2010, Vision to 2030" as Viet Nam's third biodiversity strategy.

The Ministry of Natural Resources and Environment (MONRE), in cooperation with relevant agencies, has developed the 6th National Report (NR) for the period 2014–2018 to provide an overview of Viet Nam's progress towards implementing the national targets established under the NBSAP and the global Aichi Targets set under the Strategic Plan for Biodiversity 2010–2020 of CBD.

The 6th NR follows the guidelines for national reporting according to Decision XIII/27 of the 13th Conference of the CBD's parties in Cancun, Mexico and is organized into five sections:

Section I. Information on the targets being pursued at the national level;

Section II. NBSAP implementation measures taken, assessment of their effectiveness, associated obstacles and scientific and technical needs;

Section III. Assessment of progress towards each national target;

Section IV. Description of the national contribution to the achievement of each Aichi Biodiversity Target; and

Section V. Description of the national contribution to the achievement of the targets of the Global Strategy for Plant Conservation.

The NBSAP is designed to fulfil commitments under the CBD as well as to identify goals, objectives, and tasks for the conservation and sustainable use of biodiversity in accordance with development during the period. Viet Nam's NBSAP focuses on biodiversity conservation at the levels of ecosystems, species, and genes. To achieve conservation of these three levels, six groups of measures were developed. Specific measures and tasks are consistent with all 20 objectives of the Aichi Biodiversity Targets.

This 6th National Report describes Viet Nam's progress towards these national targets and towards the 20 global Aichi targets. This report captures multiple activities and initiatives taken at the national and local level, including by local government, non-governmental organisations, communities, and businesses. The 6th National Report shows that good progress has been made over the reporting period in several areas, including legislation, policy development, mainstreaming biodiversity, increasing forest cover, and protected areas. However, the 6th National Report makes it clear that more work needs to be done and confirms Viet Nam was unable to reach many targets in NBSAP and remains faced with the huge challenge of conserving biodiversity throughout the country.

Section I. Information on the targets being pursued at the national level

I. Information on the targets being pursued at the national level

☒ My country has adopted national biodiversity targets or equivalent commitments in line with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets

or

☐ My country has not adopted national biodiversity targets and is reporting progress using the Aichi Biodiversity Targets for reference. (Move to section II. In section III, the Aichi Biodiversity Targets should be used for the purpose of this report as the national targets and progress should be assessed towards their achievement in the national context.)

National Target

Overall target to 2020: That naturally important ecosystems, endangered, rare, and precious species, and genetic resources are preserved and used sustainably; to contribute to the development of the green economy; and to adapt to climate change.

Specific targets:

- To improve the quality and increase the area of protected ecosystems, ensuring that the area of terrestrial protected areas (TPAs) accounts for 9% of the total territorial area; marine protected areas (MPAs) account for 0.24% of the sea area; forest coverage reaches 45%; primary forest remains at 0.57 million hectares, and is coupled with effective protection plans; that mangrove forests, seagrass beds, and coral reefs are maintained at the current levels; that 15% of degraded critical ecosystems are restored; and that the number of internationally-recognized protected areas is increased to 10 Ramsar wetlands, 10 biosphere reserves, and 10 ASEAN heritage parks.
- To improve the quality and populations of endangered, rare and precious species, ensuring that no species become newly extinct, and significantly improve the status of endangered, rare, and threatened species.
- To compile an inventory to store and conserve native endangered, rare, and precious genetic resources (including animals, plants, and micro-organisms) to ensure that they are not impaired or eroded.

Rationale for the national target

Viet Nam is endowed with extraordinary biodiversity, with many types of ecosystems, species and genetic resources, including many of which are endemic. In Viet Nam, biodiversity brings direct benefits to humans, contributing substantially to the national economy, especially to sectors such as agriculture, forestry, and fisheries. It also ensures food security for the country; contributes to maintaining genetic resources for farming animals and crops; and provides construction materials, pharmaceutical materials and food, etc.

In the last two decades, recognizing the importance of biodiversity, the Government has issued a relatively complete legal framework related to biodiversity conservation. Many laws relating to natural resource management have been enacted. The Government has issued policies, strategies, and plans in order to promote the conservation of biodiversity. By 2005, the Ministry of Natural

Resources and Environment (MONRE) had submitted the "Biodiversity Action Plan to 2010 with vision to 2020" (BAP 2007) to the Prime Minister for approval. BAP 2007 was issued by the Prime Minister in Decision 79/2007/QD-TTg, dated May 31, 2007. After three years of implementation of BAP 2007, MONRE conducted a review and reported to the Prime Minister on the implementation of Decision 79/2007/QD-TTg. The report pointed out that there had been a number of achievements relating to biodiversity conservation, such as the increase in the area of protected ecosystems, discovery of new species, and the conservation and development of genetic resources valuable in selection and breeding. On the other hand, there were still many challenges, and these required a vision and strategic approach in line with the internationally and domesticaly changing contexts, including climate changes isues..Viet Nam's BAP aims to both fulfil commitments under the CBD, and to identify goals, objectives, and tasks for the conservation and sustainable use of biodiversity, including to:

1. Identify the main causes of biodiversity loss, thereby reducing the pressures directly affecting biodiversity and preventing the decline of biodiversity in protected areas;
2. Properly resolve conflicts between conservation and development, especially in relation to the conversion of land and water use in areas with high biodiversity;
3. Conserve the system of protected areas containing typical ecosystems, and various key biodiversity areas, and promote ecosystem services. Priority is given to strengthening conservation status in several protected areas of ecological importance;
4. Enhance biodiversity conservation and development at the levels of ecosystems, species and genetic resources. Reduce, and then stop, the exploitation, illegal trade, and overexploitation of biological resources, especially endangered, rare, and precious species;
5. At a national scale, genetic resources are conserved and developed through the study and inventory of biodiversity and biological resources, and indigenous knowledge on the use of biological resources is conserved;
6. Promote the management of, and control the risks from, invasive alien species, genetically modified organisms and their products to the environment and human health;
7. Benefits from biodiversity and ecosystem services are shared fairly and equitably with communities. Develop, improve, and apply regimes on access to genetic resources and benefit sharing. Develop payment for ecosystem services models to facilitate valuation of conservation;
8. Evaluate the ability of biodiversity to adapt to climate change and propose appropriate solutions.

Level of application

☐ Regional/multilateral – please indicate area concerned

☒ National/federal

☐ Subnational – please indicate area concerned

Relevance of the national targets to the Aichi Biodiversity Targets (Links between national targets and Aichi Biodiversity Targets)

Main related Aichi Biodiversity Targets

☐ 1 ☒ 6 ☒ 11 ☒ 16

☐ 2 ☒ 7 ☒ 12 ☐ 17

☐ 3 ☒ 8 ☒ 13 ☐ 18

☐ 4 ☒ 9 ☒ 14 ☐ 19

☒ 5 ☒ 10 ☒ 15 ☐ 20

Other related Aichi Biodiversity Targets

☒ 1 ☒ 6 ☒ 11 ☒ 16

☒ 2 ☒ 7 ☒ 12 ☒ 17

☒ 3 ☒ 8 ☒ 13 ☒ 18

☒ 4 ☒ 9 ☒ 14 ☒ 19

☒ 5 ☒ 10 ☒ 15 ☒ 20

or

☐ National target has no corresponding Aichi Biodiversity Target or relates to other parts of the Strategic Plan for Biodiversity

The three primary targets of Viet Nam's NBSAP are conservation of biodiverse ecosystems, species, and genes. This is consistent with objectives under Aichi Biodiversity Strategic goals B, C and D. To achieve the three primary targets, six groups of measures were developed to carry out five tasks in Viet Nam. Specific measures and tasks of Viet Nam's NBSAP indirectly relate to all objectives of the Aichi Biodiversity Targets.

Table 1. Comparison of the appropriateness of objectives, tasks and measures between Viet Nam NBSAP and Aichi biodiversity targets by corresponding indicators

Targets, Tasts and solutions of Viet Nam's NBSAP	**Aichi Biodiversity goals/ targets**	**Indicators** (data, measures)
I. Specific Targets		
1) To improve the quality and increase the area of protected ecosystems, ensuring that the area of terrestrial protected areas accounts for 9% of the total territorial area; marine protected areas account for 0.24% of the sea area; forest coverage reaches 45%; primary forest remains at 0.57 million hectares coupled with effective protection plans; mangrove forests, seagrass beds, and coral reefs are maintained at the current levels; 15% of degraded critical ecosystems are restored; and the number of internationally recognized protected areas are increased to 10 Ramsar wetlands, 10 biosphere reserves, and 10 ASEAN heritage parks.	**B, C, D**	- Legal documents and policy mechanisms have been developed and issued; these aim to improve the quality and increase the area of protected natural ecosystems. - The number of protected areas reviewed, added and updated in accordance to Biodiversity Law - Total area (ha) - Number of terrestrial protected areas (including special-use forest (SUF) and interior wetland reserves) - Area of terrestrial protected areas (percentage of territorial area)

		- Number of marine protected areas (for those already established and planned) - Area of marine protected areas (ha) (percentage of marine area) - Total forest area (ha) - Area of primary forest (ha) - Area of natural forest (ha) - Area of plantation forest (ha) - Forest coverage rate (%) (those forests qualified for calculating coverage) - The percentage of the area of degraded, important, natural ecosystems that is restored - The number of Viet Nam's protected areas that are internationally recognized. - Area of coral reef (ha) - Area of seagrass bed (ha) - Changing trends in statistics for the above indicators measured possibly from 2010 or from the previous reporting-period
2) To improve the quality and populations of endangered, rare and precious species, ensuring that no new case of species extinction is reported, and significantly improve the status of endangered, rare, and threatened species.	**B, C, D**	- Legal documents and policies have been developed and issued. These aim to prevent from further extinctions and improve the status of endangered species. - Number of records on new extinctions accounted from the previous reporting period -Status of those threatened species which are listed in Decree 160/2013/ ND-CP (abundance, dectection/ distribution of species, especially those already set for monitoring programs) - Changing trends in populations of threatened species (including migratory ones) in forests, wetlands and seas (possibly accounted from 2010 or from the previous reporting-period).
3) To compile an inventory, store and conserve native, endangered, rare, and precious genetic resources (including animals, plants and micro-organisms) to ensure that they are not impaired or eroded.	**B, C, D**	- Legal documents and policies have been developed and issued. These aim to decrease the loss of genetic diversity of animal and plant species. - Number of facilities/stations involving to genetic resources storage and conservation. - Number of cultivated plants and animals being conserved on farms - Number of species and genetic resources

		collected, stored, evaluated, documented (including with geographical information)
II. Major tasks		
1) Conservation of natural ecosystems	**B5; B10, C11, C12; D14,15**	
a) Consolidate and complete a system of natural protected areas: - Identify critical ecosystems and prepare plans for expanding the system of protected areas; continue to implement the plan to establish marine and wetland protected areas; establish biodiversity corridors connecting natural habitats of threatened species prioritized for protection; - Conduct a comprehensive review of biodiversity–related provisions in the current legal documents, and make proposals for revision to ensure consistency; conduct research on institutional structures in order to propose a model for one mangement authority for protected areas (highlighting the involvement of, and benefits to, communities living in the buffer zones); - Improve the management system for protected areas, ensuring they are all established with a Management Board; review the functions, and enhance capacity of Management Boards; implement policies for incentives for staff working in protected areas; upgrade infrastructure to support activities; provide field equipment for all protected areas, including biodiversity monitoring and reporting systems; - Develop and improve regulations on the decentralization, ranking and classification of protected areas, and the procedure for establishing new protected areas; prepare and implement management and financial plans, monitoring and regulations for protected areas, with the target to have these in place for all protected areas by 2015; - Conduct investigations and assess the values and ecosystem services of natural protected areas; - Develop long-term plans for investment in the buffer zones of protected areas and implement a sustainable economic model for households in these zones.	**B5, C11, C12, D14, D15**	- Legal documents and policies related to protected area management developed and issued. - The current status of protected area management and/or management effectiveness (including the establishment of management board, development and implementation of management plans and regulations for protected areas, etc.). - Number of effective conservation and livelihood models for communities in buffer zones - Levels of linking protected areas with connected-landscape based approaches - Number of publications on the economic valuation of ecosystem services. - The number of protected areas associated with economic valuation of to their ecosystem services.

b) Conservation of ecosystems that are of national and international importance: - Investigate and map ecological regions, identifying areas of high biodiversity value, degraded areas, and sensitive areas; - Conduct research and develop a data bank and maps of natural wetlands, seagrass beds, coral reefs and other natural ecosystems; - Strengthen protection activities in primary forests and take measures to prevent deforestation and illegal logging in natural forests, special-use forests, and protected forests; - Continue to implement forest regeneration and afforestation programs, enrich forests with native plants, prevent forest fires and increase fire response capacity for all types of forests; - Continue to implement the targets and tasks in the mangrove forest restoration program under Decision 405/TTg-KTN dated 16 March 2009; - Prepare and implement a national plan for conservation and sustainable use of wetlands, with priority given to critical river basins; - Implement measures to protect and restore coral reefs and sea grass ecosystems of appropriate scale and scope; - Prepare and implement a plan to nominate protected areas for international recognition, including wetlands of international importance, biosphere reserves, and ASEAN heritage parks. Develop and issue guidelines for the management of internationally-recognized protected areas and implement policies to support capacity-building for effective management of these areas.	**B5, B10, C11, D14, D15**	- New sets of maps with updated biodiversity data: of ecological regions (land and sea); forest vegetation; national forest cover, and current status of protected areas; - Statistis and maps for wetlands - Number of cases of forestry law violations (relevant to biodiversity) - Volume of confiscated forest products (timber, wild animals) - Area of deforestation (for special-use forest, protection forest, production forest) - Number of cases of fishery Law violations (relevant to biodiversity) - Area of afforestation and regeneration, including mangroves - Number of effective models and measures for protection, and restoration of coral reefs and seagrass beds - The area of wetlands under conservation and sustainable use. - Networking and management capacity for for internationally-recognized protected areas
2) Conservation of wild species and endangered, precious and rare breeding species	**C12,13**	
a) Preventing the decline of threatened wildlife species, particularly endangered, rare and	**C12**	- Legal documents, programs, and projects for conservation of **endangered precious and**

precious species prioritized for protection[1]: - Continue to implement the targets of the program to protect threatened aquatic species until 2015, with a vision to 2020, as per Decision 485/QD-TTg dated 2 May 2008 of the Prime Minister; - Investigate, monitor, periodically update and publish the list of endangered, rare and precious species prioritized for protection; - Implement conservation programs for endangered, rare and precious wild species prioritized for protection, with priority given to threatened large mammals: eg. elephants, tigers, saola and primates; - Investigate and assess the status of endangered, rare and precious fauna and flora; periodically update and publish the Viet Nam Red Book.		**rare species**[2] and livestock breeds and plants prioritized for conservation - Number of endangered precious and rare aquatic species that have been protected. - Number of protected areas have monitoring program for endangered precious and rare species - Progress of updating the Viet Nam Red Book
b) Conservation of native varieties of domestized plants and animals and wild relatives of such plant and animal varieties, and of rare micro-organism strains: - Take measures to conserve agricultural crop varieties, livestock and their wild relatives; increase the number of samples of crop varieties that are stored and preserved in gene banks; - Assess and improve the effectiveness of programs for on-farm conservation of rare crop varieties and livestock breeds; - Continue to implement the national *ex situ* and *in situ* gene bank conservation program for conservation of rare plant varieties, livestock and micro-organisms.	**C13**	- Status of conservation programs for endangered, precious, and rare plant varieties and animal breeds on farms. - Status of livestock breeds, crop plants and wild relatives of plant varieties and livestock that are prioritized for conservation in gene banks. - Status of the program to conserve and store animal and plant genetic resources and micro-organisms. - Status in developing a new set of maps with updated data; maps of the distribution of precious and rare domestic native plant varieties and livestock.
c) Develop and enhance effectiviness of ex-situ biodiversity conservation facilities: - Assess the status of *ex situ* conservation facilities (zoos, botanic gardens, medicinal plant gardens, gene banks, wildlife rescue centers…); take measures to improve the	**C12, C13**	- Trends of planning and development of conservation facilities and their management perspectives; - The status of Viet Nam's Natural Museum operation. - The status of the Centre of Plant Genetic

[1] ***Endangered, rare and precious species prioritized for protection:*** According to the Law on Biodiversity, Endangered precious and rare species prioritized for protection means wild species, crops or domestic animals, microorganisms or fungi which are endemic and of special scientific, medical, economic, ecological, scenic, environmental or cultural-historical values, exist in few numbers or are in danger of extinction.

[2] **Endangered precious and rare species:** According to national Laws, there are lists of forest and aquatic endangered precious and rare species adopted by Government

effectiveness of *ex situ* conservation; - Accelerate the construction of the Viet Nam Natural Museum in accordance with the Decision 86/QD-TTg dated 20 April 2006 of the Prime Minister; - Establish a network of rescue centers across the country to ensure the needs of rescued wildlife species by region and taxonomic group; prioritize investment in upgrading established rescue centers; - Upgrade the Center of Plant Genetic Resources to become a national lpant gene bank that meets international standards.		Resources operation. - The status of biodiversity maps and their new development with updated distribution of *ex situ* conservation facilities;
3) Sustainable use and fair sharing of benefits from ecosystem and biodiversity services	**A3, A4, B7, C11, C12, C13, D14, 16**	
a) Sustainable use of ecosystems: - Conduct research, develop guidelines and pilot the valuation of biodiversity and ecosystem services; incorporate the values of biodiversity and ecosystem services into the national accounting system. - Improve policies of payments for ecosystem services for forests at a national scale; pilot a policy for payment for ecosystem services for marine ecosystems and wetlands; - Instate a model for the management of protected areas that involves community participation, and implement mechanisms to share benefits in an equitable way amongst involved parties; - Develop and enforce regulations on ecological tourism in Viet Nam; - Develop and implement policies to support production of agricultural, forestry, and fisheries products that meet international standards for conservation and sustainable use.	**A3, A4, B7, C11, D14, D16, E18**	- Trends in appropriate valuation of ecosystem services, and in developing community-based conservation models and equitable benefit sharing from ecosystem services in protected areas - Trends in implementing payment mechanisms for forest ecosystem services and in developing mechanisms and policies for environmental services payment for wetland and marine ecosystems - Review legal documents, mechanisms and policies for use of agricultural, forestry and fishery products according to international standards on conservation and sustainable use - Production trends/ output fluctuations in fishing outputs (intense) - Trends in fishing and seafood outputs - Trends in implementation of aquatic and marine areas that have restrictions on exploitation - Trends in implementing international standards of exploiting and conserving agricultural, forestry and fishery products according - Status of applications for biosafety certificates - Review legal documents on ecotourism
b) Sustainable use of species and genetic resources: - Investigate, record, protect and develop	**B7, C12, C13**	- Legal documents, mechanisms and policies to control illegal exploitation and trade of wild populations of animals and plants

valuable non-timber forest products (NTFP), especially medicinal and ornamental plants; effectively control the exploitation and cross-border trafficking of wild species; - Promulgate policies and guidelines on management of breeding, farming and trading of wild species;		- Review legal documents and mechanisms, policies and develping guidelines on management of breeding, farming and trading of common wild species and endangered species in the priority list of protection.
c) Develop management mechanisms for access to, benefit sharing and conservation of genetic resources and associated traditional knowledge: - Conduct research for, and develop regulations on a mechanism for access to and benefit sharing from genetic resources; pilot models for access and benefit sharing (ABS) that is focused on the interests of communities; - Collect, document, and develop a geographical directory and conserve traditional knowledge of genetic resources; - Develop and implement an action plan for capacity-building in order to implement the Nagoya Protocol.	**D16, E18**	- Progress towards establishing effective legal documents and management mechanisms for access, benefit sharing and protection of genetic resources and their associated traditional knowledge; - Options to development of guidelines and implementation of ABS models.
4) Control activities that have negative impacts on biodiversity	**A2, A3, A4; B6,7,8,9, C12**	
a) Control activities considered unsustainable or that cause environmental pollution, such as conversion of land and water and agricultural practices: - Control the conversion of natural forest land and water resources that are of conservational value, to minimize negative impacts on biodiversity; - Limit overexploitation, and change methods of agriculture, forestry and fisheries that are unsustainable; implement measures to stop destructive fishing and exploitation; - Control environmental pollution that causes adverse impacts on biodiversity.	**A2, A3, A4, B6, B7, B8**	- Legal documents, mechanisms and policies for land use management and control established - Legal documents, mechanisms and policies on environmental protection, biological resources and biodiversity conservation established. - Track changes in proportion of land and water of protected areas of different categories (special use forests, wetland protected areas and marine protected areas) that have been converted - Track fluctations in areas of land / waters for lease, especially forest land. - Trends in the proportion of agricultural, forestry and fishery products produced from sustainable sources. - Number of production facilities granted sustainable production certificates (forest certificates, legal aquatic product certificates, Vietnamese Good Agricultural Practices (VietGAP), etc.). - Trends in the proportion of water bodies

		with oxygen deficiency and algal blooms (accounting for seasonal variability) - Trends in discharging pollutants that affect biodiversity into the environment - Trends in the proportion of wastewater to be treated before being discharged into the environment.
b) Control illegal hunting, trade and consumption of wild animals and plants: - Encourage the broad participation of communities and mass media in the detection and prevention of illegal acts of exploitation, trafficking and consumption of wildlife; - Improve and implement inter-sectoral coordination mechanisms between the environmental police, customs, rangers, and fisheries authorities in the detection and enforcement of illegal exploitation, trafficking, and consumption of wildlife; - Advocate and conduct awareness programs to prevent the use and consumption of wildlife products nationwide; - Strengthen cooperation with regional and international law enforcement networks (ASEAN WEN, Interpol…) in trafficking and illegal transportation of wild plants and animals.	**A1, A4, C12**	- Legal documents, mechanisms and policies to control and prevent illegal exploitation, trading and consumption of wild plants and animals. - Enforcement of existing measures for control and conservation of threatened wild animals and plants - Effective inter-agency coordination in law implementation and enforcement towards environmental and biodiversity protection - Television, radio and educational /awareness programs on illegal exploitation, trade and consumption of wild plants and animals - Cooperation between national law enforcement bodies with international institutions (ASEAN-WEN, Interpol, ICCWC) to address environmental and biodiversity crimes
c) Control, halt and prevent damage of invasive alien species; enhance biosafety management of genetically modified organisms: - Investigate the status of invasive and potentially invasive alien species at a national scale, with emphasis on species in protected areas, agricultural areas, and forest ecosystems; - Implement the project to prevent and control invasive alien species to 2020, under Decision 1896/QD-TTg, dated 17 Decmber 2012 of the Prime Minister; - Enhance cooperation and learn from other countries' experiences on the management of genetically modified organisms, to improve the technical and professional expertise of relevant agencies and units; - Increase investment in infrastructure and resources to monitor and control the risks of genetically modified organisms to biodiversity; - Develop and promulgate legal documents on	**B9,**	- Legal documents, mechanisms and policies for effective control and prevention of invasive alien species; - Trends in strategies for management of genetically modified organisms. - Number of activities to prevent and control invasive alien organisms in Viet Nam - Number of television, radio and educational / awareness programs on invasive alien species in Viet Nam - Number of activities conducted that aim to raise awareness and share information on management of genetically modified organisms

redress and liability in biosafety management activities of GMOs.		
5) Biodiversity conservation in the context of climate change	**B10, C11, D15**	
a) Identification of climate change impacts on biodiversity and promote biodiversity conservation as a means to respond to climate change: - Conduct research to assess and predict impacts of climate change on biodiversity in Viet Nam; - Conduct research on the role of biodiversity in the migitation of, and adaptation to, climate change in vulnerable areas such as river basins, coastal areas of the Red River and Mekong River Deltas; take measures to increase resilience of biodiversity in these regions.	**B10,**	- Legal documents and policies related to climate change - Trends in research focused on pressure from climate change to biodiversity (rising temperatures, sea level rise, coral reefs, species populations - habitats etc.) - Research on roles of biodiversity in climate change adaptation and mitigation
b) Development of biological corridors to increase connectivity among forest ecosystems and critical biodiversity areas to adapt to climage change: - Develop policies for the management of biodiversity corridors, including defining management objectives, the use of land in biodiversity corridors, and linking to land use planning at the local level; - Establish biodiversity corridors that connect protected areas, and implement pilot projects in the northern mountainous areas, central, and western highland regions.	**C11**	- Legal documents and policy mechanisms for building and managing biodiversity corridors. - Trends in establishment of biodiversity corridors - Status and progress in developing a set of maps with updated data on biodiversity corridors.
c) ***Implementation of forest restoration programs with relevant approaches targeting to biodiversity conservation, carbon sequenstration,climate change adaptation and mitigation:*** - Integrate biodiversity conservation targets into the implementation of the national program on 'Reducing greenhouse gas emissions through efforts to limit deforestation and forest degradation, sustainable management of forest resources, and conserving and enhancing forest carbon stocks' (REDD+); - Map areas of high biodiversity value in the REDD+ program; promote the use of native species for forest restoration in the framework of REDD+; - Reduce risks to biodiversity from implementation of the REDD+ program by applying stringent social and environmental	**C11, D15**	- Legal documents and policies on new plantations and forest restoration in the context of climate change. - Status and progress of REDD+ program implementation - Integratation of indicators with reference to biodiversity conservation into REDD+ implementation - Creation and review of maps outlining areas of high biodiversity value under the REDD+ programs.

conditions.		
III. Solutions for implementation		
1) Change in behavior and awareness of communities and state management organizations towards biodiversity conservation and sustainable use	**A1,2,3,4**	
Increase the awareness of agencies that are responsible for biodiversity management; diversify sources of support for, and mechanisms to share information with, authorities at all levels;	**A1**	- Level of awareness of biodiversity conservation by relevant management agencies - Number of ongoing or previously completed awareness-raising activities for agencies managing biodiversity conservation
Promote education of, and regular communication with, organizations, individuals, and communities about the importance of conservation and sustainable use of biodiversity; enhance the social responsibility of the business sector in conservation and sustainable use of biodiversity;	**A1, A4**	Information dissemination, education and communication activities
Integrate biodiversity conservation content into teaching programs, especially into extracurricular programs, for appropriate education grades;	**A1, A2**	Progress towards integrating the principles of biodiversity conservation into school and university curricula
Promote and recognise organizations and individuals that are outstanding role-models for conservation and sustainable use of biodiversity;	**A3**	Activities to recognize relevant people and organizations.
Develop and implement strategies for dissemination of information on conservation and sustainable use of biodiversity in mass media.	**A1**	Trends in communication on conservation and sustainable use of biodiversity
2) Improve the legislative and institutional system and strengthen law enforcement for biodiversity issues	**A4; E17, E19**	
Amend, supplement, and promulgate legal documents on biodiversity to ensure consistency and efficiency	**A4, E17**	Trends in amending, supplementing and issuing legal documents on biodiversity
Strengthen the biodiversity management system; Develop and implement mechanisms for coordination between biodiversity management authorities;	**A4**	Effectiveness of the management agencies in biodiversity conservation; Degree of coordination among biodiversity management agencies
Improve the capacity of law enforcement staff who are involved in biodiversity conservation, from the central to local levels;	**A4**	The capacity and law enforcement skills of staff involved in biodiversity management from the central to local levels;

Improve resources and training methods for staff involved in biodiversity conservation at all levels		Effectiveness of resources and methods of training individuals engaged in biodiversity conservation at all levels.
Conduct research to establish a biodiversity monitoring network; Implement mechanisms for monitoring biodiversity in protected areas; Set up databases and establish mechanisms for reporting and information sharing between central authorities and local managers of protected areas.	**A2, E19**	- Legal documents, policies, and data on monitoring biodiversity in protected areas; - Successful establishment and operation of a biodiversity monitoring network; - Successful establishment and operation of databases, reporting regimes, and mechanisms for sharing information on biodiversity.
3) Strengthen integration of biodiversity conservation in policy development	**A2; A4**	
Develop criteria and guidelines to integrate biodiversity conservation into strategies, master plans, and planning documents at national, sectoral and local levels;	**A2**	- Establishment of indicators for biodiversity conservation at national and provincial levels, and for protected areas and ecological systems. - Integration of biodiversity issues into strategies, plans, programs, and socio-economic development policies at the national, sectoral, and local levels
Improve the quality of environmental impact assessments for biodiversity.	**A2, A4**	Quality of assessments of biodiversity and ecosystem services in environmental impact assessments
4) Promote scientific research, and modern technology into conservation and sustainable use of biodiversity	**A2, A4, B5, D16, E19**	
Promote scientific research on the conservation and sustainable use of biodiversity; Focus research on the breeding and reintroduction of species into nature, the sustainable use of species and genetic resources, and on sustainable eco-tourism activities;	**B5, E19**	- Number, and quality of legal documents and mechanisms for scientific research on biodiversity conservation and sustainable use - Extent of impact of scientific research on conservation and sustainable use of biodiversity, with a focus on research of breeding and releasing species into the wild,the sustainable use of species and genetic resources, and effective ecotourism models
Development, acquisition and use of new technology relevant to biodiversity conservation and sustainable use	**A4, E19**	Trend in R&D of new technology relevant to biodiversity conservation and sustainable use
Participate in the World Bank's program to develop an inventory and valueing system for ecosystem services, and promote the accounting of national natural resources	**A2**	Status and trends of ecosystem services
Detection of genetic material that may have value to economic and social development.	**D16**	Extent of exploration and research activities on genetic materials and derivatives

5) Increase of financial resources for biodiversity conservation	**E20**	
The State shall ensure resources and budgets in accordance with the level delegated to implement the Strategy;	**E20**	- Legal documents, mechanisms and policies on securing resources for implementing the Strategy - Trends in activities to ensure resources and budget under the current decentralization to carry out the duties of the Strategy
Encourage and mobilize community participation and private-sector investment in biodiversity conservation; conduct research on the establishment of a biodiversity conservation fund; develop mechanisms to diversify investment sources for biodiversity conservation, particularly in payments for environmental services, biodiversity offsets, and other financial mechanisms through carbon markets and private sector investment;	**E20**	- Legal documents and mechanisms and policies on diversification of investment sources for biodiversity conservation, especially in payment for environmental services, biodiversity offsets and carbon market and investment encouragement from the private sector - Trends in activities to encourage and mobilize participation of community and enterprises to invest financially for biodiversity; research and implement the biodiversity conservation fund etc.
Mobilize support by foreign organizations and individuals in biodiversity conservation activities.	**E20**	Number of foreign organizations and individuals who have partnered or invested in biodiversity conversation activities
6) Promote international integration and cooperation in conservation and sustainable use of biodiversity	**B5, E17, E20**	
Implement international treaties related to conservation and sustainable use of biodiversity;	**E17**	Effective participation in and implementation of international treaties on biodiversity conservation and sustainable use.
Promote and attract foreign investments for the conservation and sustainable use of biodiversity;	**E20**	Establishment of partnerships with foreign investors for conservation and sustainable use of biodiversity
Strengthen learning and exchange of resources and experiences with other countries and international organizations.	**B5, E17**	Trends in capacity-building and educational activities, exchange of resources and experiences with countries and international organizations on biodiversity conservation

The drafting process of the Strategy

In response to the request by CBD Secretariat to develop/update the National Strategic Plan for Biodiversity for the period of 2011-2020, the Government, in cooperation with national and international experts and together with the United Nations Development Program (UNDP),

developed the project 'Developing Viet Nam National Biodiversity Strategy and Action Plan and Integrating Biodiversity Conservation into Local Land Use Planning'. One objective of the project was to support the development of the 'National Biodiversity Strategy to 2020, vision to 2030'.

Pursuant to Decision No. 1426/QD-BTNMT dated July 9, 2011, a drafting team (28 members) and an editorial team (19 members) were called on. Team members were from MONRE, the Ministry of Agriculture and Rural Development (MARD), the Ministry of Science and Technology (MOST), the Ministry of Industry and Trade (MOIT), the Ministry of Foreign Affairs, Ministry of Health, the Ministry of Public Security, the Ministry of Education and Training, the Ministry of Transportation, the Ministry of Planning and Investment, the Ministry of Information and Communications, the Ministry of Defense, the Ministry of Construction, the Government Office, the Institute of Ecology and Biological Resources belonging to the Viet Nam Academy of Science and Technology, and the National Assembly Office.

Some milestones remarked the drafting process of the Strategy were:

August 2015: Selected and identified an international expert, who provided technical assistance for the development of the NBSAP. This was Mr. Scott Perkin, who is the regional head of biodiversity at IUCN in Bangkok.

October 2012 – April 2013: Established three groups to assess the current process and prepare reports on the following topics: (i) policies and institutions; (ii) ecosystems; and (iii) genetic species and sources.

October 2012 - March 2013: Organized consultations with stakeholders through face-to-face interviews and workshops, including i identifying key issues of the Strategy:

May 2013, MONRE submitted the draft to the Prime Minister at the Proposal No. 47/TTr-BTNMT dated May 28 2013. As a result, the Prime Minister then issued Decision No.1250/QD-TTG dated July 31 2013 on approving the National Biodiversity Strategy to 2020, vision to 2030.

In addition, the Aichi Biodiversity Targets are also reflected in other relevant Government strategies and plans, such as:

- Decision No. 1216/2012/QD-TTg dated September 5 2012 of the Prime Minister, on approving the *National Strategy for Environmental Protection to 2010, Orientation to 2020;*
- Decision No. 57/QD-TTg. dated January 9 2012 of the Prime Minister on approving the *National Plan for Forest Protection and Development in the period of 2011-2020;*
- Decision No. 126/QD-TTg dated February 2 2012 of the Prime Minister, on *Piloting benefit-sharing in management, protection and sustainable development of special-use forests*;
- Decision No. 940 / QD-TTg dated July 19 2012 of the Prime Minister, on *Approving an urgent action plan to 2020 for the conservation of elephants in Viet Nam;*
- Decision No. 799/QD-TTg dated June 27, 2012, of the Prime Minister on *Approving the National Action Plan for REDD+ in the period of 2011-2020;*

- Decision No. 1896/2012/QD-TTg dated December 27, 2012 of the Prime Minister *on approving the project "Prevention and control of invasive alien species in Viet Nam to 2020";*
- Decision No. 11/2013/QD-TTg dated January 24, 2013 of the Prime Minister, on *Prohibiting export, import, sale, transportation of specimens of certain animal species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora;*
- Decision No. 188/QD-TTg dated February 13, 2013 of the Prime Minister, on *Approving the program for protection and development of aquatic resources to 2020;*
- Decision No. 763/QD-TTg dated May 21, 2013 of the Prime Minister, on approving *the Viet Nam Elephant Conservation Project in the period of 2013-2020;*
- Decision No. 539/QD-TTg dated April 16, 2014 of the Prime Minister, on approving *the National Program for Tiger Conservation in the period 2014-2022;*
- Decision No. 45/QD-TTg dated January 08, 2014, on approving *the National Master Plan for Biodiversity Conservation to 2020, Orientation to 2030;*
- Decision No. 1976/QĐ-TTg dated October 30, 2014, on approving the *Planning of national special-use forest system to 2020, vision to 2030;*
- Decision No. 218/QD-TTg dated February 7, 2014, on *Approving the Strategy for Management of Special-use Forest System, Marine Conservation Zones and Inland Water Conservation Zones of Viet Nam to 2020, vision to 2030;*
- Decision No. 120/QD-TTg dated January 22, 2015, on approving *the Coastal Protection and Development Plan to Cope with Climate Change in the period 2015-2020;*
- Decision No. 1671/QD-TTg dated September 28, 2015 of the Prime Minister, on *the Program for Conservation and Sustainable Use of Genetic Resources to 2025, Orientation to 2030*;
- Decision No. 1141/QĐ-TTg dated June 27, 2016, on approving *the Plan on Capacity-building for management of access to genetic resources and fair and reasonable sharing of benefits arising from the use of genetic resources in the period of 2016 - 2025;*
- Decision No. 419/QD-TTg dated April 5, 2017, on approving *the National Program on Reducing Greenhouse Gas Emissions through Controlled Forest Loss and Degradation; Preserving and Improvimg Carbon Content and Sustainable Management of Forest Resources to 2030;*
- Decision No. 628 /QD-TTg dated May 10, 2017 of the Prime Minister, on approving *the Urgent Action Plan for Conservation of Viet Nam's Primate Species to 2025, Vision to 2030;*
- Decision No. 626/QĐ-TTg dated May 10, 2017 of the Prime Minister, on approving *the Plan to Strengthen Management Capacity of the Protected Area System to 2025, Vision to 2030;*
- Decision No. 886/QD-TTg dated June 16, 2017, on approving *the National Target Program for Sustainable Forest Development in the Period of 2016-2020;*
- Decision No. 78/2018/QD-TTg dated on January 16, 2018 of the Prime Minister on approving *the National Action Plan to Prevent, Reduce and Eliminate Illegal, Unreported and Unregulated fishing to 2025;*
- Decree 59/2017/NĐ-CP dated May 12, 2017 of the Government regulating *Management of*

Access to Genetic Resources and Sharing of Benefits from the Use of Genetic Resources.

The process of developing the 6th national report on biodiversity

The MONRE acts as the national focal point for the CBD and was in charge of preparing the 6th National Report. The process is summarized as follows:

- In May 2018, Nature and Biodiversity Conservation Agency started working with UNDP on NR6 preparation plan and technical support for the report developmet
- In June 2018, the drafting team was established
- July and August 2018, the drafting team collected, analised data and draft the first version of the report
- In August 2018, MONRE sent an official letter to provinces and cities under central authority requesting they prepare reports for the NBSAP.
  UNDP collaborated with BCA to organize three workshops with stakeholders in the north, central and south of Viet Nam.
  The NR6 preparation group analyzed the comments from provinces and cities under central authority.
- From October – November 2018, based on information collected thus far, including official comments from relevant ministries, central agencies and NGOs, a draft of the NR6 was written in collaboration with the BCA.
- In December 2018, a fourth draft was prepared and sent for comments to the UNDP, UN Environment and CBD.
- In January and February 2019, the expert group held a technical workshop and subsequently wrote the sixth draft.
- In March and April 2019, MONRE continued consulation with stakeholders and worked with experts to finalise the report.

Relevant websites, web links, and files

Draft report of National Biodiversity Strategy;

Decision No. 1250/QD-TTg dated on 31 July 20143 about national biodiversity stratety to 2020 forward to 2030;

Ministry of Natural Resources and Environment;

Ministry of Science and Technology;

Ministry of Agriculture and Rural Development;

Vietnam Environment Administration;

Acess and Benefit Sharing in Vietnam;

Section II. Implementation measures taken, assessment of their effectiveness, associated obstacles and scientific and technical needs to achieve national targets

NBSAP of Viet Nam has included six general measures as follows:

1. Promoting critical changes in awareness and attitudes of state agencies and communities with references of their responsibilities on conservation and sustainable use of biodiversity;

2. Improving the legislative and institutional system and strengthening the capacity of law enforcement for the implementation of laws on biodiversity***;***

3. Strengthening integration of biodiversity conservation into policy development;

4. Promoting scientific research; and development, application of advancing technology in conservation and sustainable use of biodiversity;

5. Increasing financial resources for biodiversity conservation; and

6. Promoting integration and international cooperation in conservation and sustainable use of biodiversity

Description of the seconnd measure

Improving the legislative and institutional system and strengthening the capacity of law enforcement for the implementation of laws on biodiversity

- Amend, supplement and promulgate legal documents on biodiversity to ensure consistency and efficiency; review sanctions for violations of biodiversity provisions and their effectiveness; mainstream biodiversity conservation into land use planning and into the planning of a number of key sectors (agriculture, forestry, and fisheries) and of provincial people's committees.Strengthen the biodiversity management system; develop and implement mechanisms for better coordination between biodiversity management authorities; review functions, tasks and the organization of state agencies involved in biodiversity management, including law enforcement on biodiversity conservation, information sharing mechanisms, skills, and coordination.Improve the capacity of law enforcement staff at the central and local levels; diversify training resources and methods for staff; assess the need of state management agencies for capacity-building regarding biodiversity conversation (especially the agencies and units under the MONRE, MARD and Protected Area Management Boards); Consolidate and strengthen local biodiversity management agencies; establish biodiversity management units under the Department of Environmental Protection and assign specialized staff for biodiversity conservation; Strengthen law enforcement on biodiversity conservation, including the implementation of training for the enforcement of legislation to forest and aquatic rangers, environmental police, market management staff and custom staff;Perform regular professional training on biodiversity conservation for staff at provincial departments, units, and biodiversity facilities focusing on issues such as: management, business planning, investigation and monitoring of biodiversity; building and managing databases; collection, processing, and preservation of fauna and flora specimens; identification and rescue of species; geographic information systems (GIS); and reporting;Establish and implement a biodiversity monitoring network, especially within protected areas; set up databases and establish a mechanism for reporting and information sharing between central authorities and protected

areas; develop a set of biodiversity indicators and technical guidelines on biodiversity monitoring that conform with international standards; and implement pilot projects for biodiversity monitoring in the three major ecosystems (forest, wetland and marine).

For the implementation measure, please indicate to which national or Aichi Biodiversity Target(s) it contributes.

Measure 1 of the Strategy contributes towards national objectives 1, 2 and 3; tasks 1, 2, 3 and 4 of NBSAP; and Aichi targets 1, 2, 3 and 4.

Measure 2 of the Strategy contributes towards national objectives 1, 2 and 3;tasks 1, 2 and 3 of NBSAP; and Aichi Targets 2, 6, 7, 8, 17 and 19.

Measure 3 of the Strategy contributes towards national objectives 1, 2 and 3; task 5 of NBSAP; and Aichi targets 2, 4 and 5.

Measure 4 of the Strategy contributes towards national objectives 1, 2 and 3; tasks 1, 2, 3, 4 and 5 of NBSAP; and Aichi targets 4, 5, 16 and 19.

Measure 5 of the Strategy contributes towards national objectives 1, 2 and 3; tasks 1, 2, 3, 4 and 5 of NBSAP; and Aichi target 20.

Measure 6 of the Strategy contributes to national objectives 1, 2 and 3; tasks 1, 2, 3, 4 and 5 of NBSAP; and Aichi targets 5, 17 and 20.

Assessment of the effectiveness of the implementation measure taken in achieving desired outcomes:

☐ Measure taken has been effective

☒ Measure taken has been partially effective

☐ Measure taken has been ineffective

☐ Unknown

Measure for evaluating the effectiveness of implementation measures:

- Promoting critical changes in awareness and attitudes of state agencies and communities with references of their responsibilities on conservation and sustainable use of biodiversity
- Strengthening integration of biodiversity conservation into policy development
- Strengthening integration of biodiversity conservation into policy development
- Promoting scientific research, development and application of advancingtechnology in conservation and sustainable use of biodiversity
- Increasing financial resources for biodiversity conservation
- Promoting integration and international cooperation in conservation and sustainable use of biodiversity

Other relevant information, including case studies to illustrate how the measure taken has resulted in (or is expected to result in) outcomes that contribute to the implementation of the NBSAP

Case studies illustrate the measures presented in the table below:

Table 2. Measures and results achieved

Measures	Activities and results
1) Promoting critical changes in awareness and attitudes of state agencies and communities with references of their responsibilities on conservation and sustainable use of biodiversity	
Education and awareness	- Since the Biodiversity Law was enacted in 2008, MONRE has disseminated the Biodiversity Law and related documents. This has fulfilled its basic objectives. - Every year, MONRE coordinates with related parties to celebrate International Wetlands Day and the International Day of Biodiversity. - Many television programs have been created to introduce Viet Nam's biodiversity and conservation areas, as well as biodiversity conservation management. These programs have been shown on national television channels and local channels in all regions. - Various training materials on biodiversity have been compiled, including those with contents on basic issues of biodiversity and biosafety; state management of biodiversity and biosafety; protection and use of biodiversity resources. Training courses on biodiversity conservation have also been organized for central and local managers, especially for technical staff and managers of protected areas. - MONRE issued Official Letter No. 683 / BTNMT-TCMT dated February 9, 2018 to localities - this primarily focused on promoting law enforcement for, and dissemination of information on, biodiversity conservation.
Integrating biodiversity conservation concepts into the curriculum	- A network of education and training for biodiversity conservation in Viet Nam has been developed. Approximately 20 universities have undergraduate majors related to biodiversity, including biology, environmental management, forestry, agriculture and fisheries, geography, and natural resources. - Many universities have graduate and postgraduate training programs related to biodiversity conservation, including the University of Natural Sciences (Viet Nam National University, Hanoi), Hanoi National University of Education, Hanoi Agricultural University, Forestry University, Vinh University, Nha Trang University, Viet Nam National University, Ho Chi Minh City and the Agriculture-Forestry University Ho Chi Minh. Some private universities also have environmental science,

	agriculture and forestry subjects. Furthermore, in 2016, the Ministry of Education and Training mandated a number of universities to compile teaching materials related to biodiversity conservation.
2) Improving legislative and institutional systems and strengthening th capacity of law enforcement and implementation of laws on biodiversity	
A legal framework on biodiversity has been developed	- At the highest level, the need for biodiversity conservation in Viet Nam has been defined in the Constitution (adopted by the National Assembly on November 21, 2013) as follows: *The State has policies for environment protection, nature and biodiversity conservation; for measures for strict handling, remedy and compensation for damage by organizations and individuals causing environmental pollution, depletion of natural resources and reduction of biodiversity* (Article 63). - A number of laws regarding natural resource management have been passed by the National Assembly, including but not limited to, the *Law on Forest Protection and Development* (1991; amended in 2004 and amended to the *Forestry Law* in 2017); *Law on Land Use* (1993; amended in 1998 and 2003); *Law on Environmental Protection* (1993; amended in 2005; amended in 2014); *Law on Water Resources* (1998, amended in 2012); and the *Fisheries Law* (2003, amended in 2017). The Biodiversity Law was passed by the National Assembly in 2008 and came into effect in 2009, marking a turning point for biodiversity conservation. Another important law is the *Law on Planning*, which took effect in January 2019. - Since 2008, the Government has developed and issued more than 140 legal documents on biodiversity conservation and as guidance for the implementation of the above laws.
A system of state management on biodiversity conservation have been enhanced implemented	- Article 6 of the Biodiversity Law 2008 stipulates that the Government is responsible for unified state management of biodiversity; MONRE is to take responsibility for performing state management of biodiversity; Ministries and ministerial-level agencies are to, within the ambit of their tasks and powers, perform state management of biodiversity as assigned by the Government; and People's Committees at all levels are to, within the ambit of their tasks and powers, perform state management of biodiversity when decentralized or assigned by the Government. - MARD is responsible for the management of special-use forests and marine protected areas. MONRE is responsible for the management of protected wetland ecosystems, including Ramsar wetlands, and those listed under Decision 1093/2016/QD-TCMT.- MONRE has been working with the Ministry of Home Affairs to establish a structure of specialized agencies that will assist provincial People's Committees with management of natural resources and environmental issues by assigning a focal point to advise on local implementation of the Biodiversity Law.

Technical capacity bulding on law enforcement for biodiversity managing institutions, both central and local levels, has been implemented	- Many training courses regarding biodiversity conservation that have been organized for central and local staff, especially for technical and management staff of protected areas. - Decision No. 626/QD-TTg dated May 10, 2017 of the Prime Minister, approved the project "Strengthening management capacity of the protected area system, to 2025 with a vision to 2030". This has an overall goal of improving management of protected areas from central to local levels throughout Viet Nam. - From 2011 onwards, MONRE has organized training courses in three regions of Viet Nam for managers of protected areas and for local biodiversity conservation managers (DONREs, DARDs) regarding: creation of biodiversity indicators; biodiversity monitoring processes; developing a report on the status of biodiversity; provincial biodiversity conservation planning; developing a management plan for protected areas, etc.
Biodiversity monitoring and biodiversity database have been developed	From 2011 onwards, MONRE has completed the following activities: - Drafted, published and distributed technical documents, specifically, "Guidelines for monitoring and evaluating biodiversity of coastal wetlands" and "Guidelines for development and use of biodiversity indicators". - Conducted monitoring on biodiversity in some protected areas, including Xuan Thuy National Park, and Nam Dinh (2013-2015). The development of biodiversity indicators and monitoring of the coastal wetland at Thai Thuy, Thai Binh (2017-2018). - Developed a national database on biodiversity (NBDS), and included within it, the threatened species identified within the Viet Nam Red Book (2007), as well as species surveys collected from the Xuan Thuy National Park. In addition to the work done by MONRE, MARD is currently developing a forest information management system (FORMIS). MOST and MARD have also developed a database on seeds and genetic resources for plants and animals. In addition, the Viet Nam Academy of Science and Technology has built a database on Vietnamese sea areas which includes information on marine biodiversity. Viet Nam became an associated member of the Global Biodiversity Information Fund (GBIF) in 2017.
3) Strengthening integration of biodiversity conservation into policy development	
Integrate	The following concepts of biodiversity conservation have been integrated into Viet Nam's national plans, programs, and policies:

biodiversity conservation into sectoral and interdisciplinary policies and programs	- Viet Nam's '*Sustainable development strategy for the period 2011-2020: Rational use and sustainable development of natural resources, including biological resources and biodiversity*'. - Viet Nam's green growth strategy, which promotes restructuring and improving economic institutions to more efficiently use natural resources, thus improving the competitiveness of the economy. - Hunger eradication and poverty reduction strategy: a program of planting 5 million hectares of forests, increasing the forest cover area from 33% in 2000 to 41.45% in 2017; - National strategy to respond to climate change, including improving forest quality, afforestation, greening bare land and hills, ensuring effective exploitation of forests to maintain and improve their ability to prevent disaster, desertification, and land degradation; - Strengthen the protection, management and development of mangrove forests, wetland ecosystems, etc. - Strategies for forestry, fisheries, and tourism development in relation to biodiversity conservation. - Territorial development plan: creating green corridors (biodiversity corridors) that connect protected areas. - Land use planning: The NBSAP project was piloted in Son La and Lang Son provinces in 2015. - Environmental protection and biodiversity conservation issues have been integrated in action plans and programs to implement international treaties that the Viet Namese Government has signed.
Improving the quality of assessing biodiversity conservation requirements in EIA and SEA	In 2015, MONRE, with the support of the Asian Development Bank, undertook the project 'Strengthening and use of country safeguards system - Mainstreaming biodiversity considerations into the national environmental safeguards system'. From this project, the 'Technical Guidance: Assessing biodiversity impacts in Environmental Impact Assessments' guidelines were developed.
4) Promoting scientific research, development and application of advancingtechnology in conservation and sustainable use of biodiversity	
Enhancing scientific research and application of technology into conservation and sustainable use of biodiversity	- Many research projects relating to biodiversity have been conducted, including: surverys on the status and changes of biological resources in coastal and marine ecosystems; surveys on flora and fauna in both terrestrial ecosystems and aquatic organisms in inland waters; surveys on threatened species, animals and plants, that should be prioritized in the amendement of Viet Nam's Red Data Book; research on techniques and technology related to the conservation of threatened species, specifically with high economic value and ecosystem restoration.

	- After a project to develop the fauna and flora books of Viet Nam was undertaken, the results were complied and published in the Red Data Book, listing the threatened species in Viet Nam. From 1985, 52 books of the flora and fauna of Viet Nam and the Viet Nam Red Data Book have been published. Thanks to an increase in equipment and improved research capacity, Viet Nam has announced 1,023 new species of plants and animals (as per the Institute of Ecology & Biological Resources of Viet Nam Academy of Science and Technology and Viet Nam National University). From 2014 to September 2018, 344 species of organisms – 208 species of animals, 136 species of plants - have been published in scientific journals, including in the Journal of Biology of Viet Nam. - The Viet Nam Academy of Science and Technology and other specialized institutes under the Ministry of Health, etc. have undertaken projects to study high-value biological components from marine animals and inland native plants. Many technological processes for extracting products with high medicinal values from organisms have been developed. - Projects to build and apply tourism models relating to biodiversity conservation have been applied to protected areas and a biosphere reserve.
Viet Nam has instated the application of green criteria into the system of national socio-economic indicators	Research projets on economiv evaluation of ecosystems have been developed and implemented. The results are then provided to central and local management levels, to be considered when economic development activites are undertaken. The aim of this is to ensure that the value and conservation of biodiversity is taken into account. However, to date, economic values from ecosystem services have not been included into the national accounting system.
5) Increase of financial resources for biodiversity conservation	
Budget for biodiversity conservation	According to the Biodiversity Law (2008), the Government of Viet Nam is committed to allocating the state budget for biodiversity conservation and sustainable development. The budget for biodiversity conservation at the central level (about 60-80%) is concentrated between the MONRE, MARD and MOST.
Encouraging the participation of communities and enterprises in financial investment for biodiversity	- Policies, mechanisms, and approaches for payment of forest environmental services have been developed by MARD. - There have been businesses which are willing to contribute financially to biodiversity conservation. - Funds to support biodiversity conservation and environmental protection have been developed and include the Viet Nam Special Use Forest

	Conservation Fund (VCF); Trust Fund (TFF); Viet Nam Fund for Aquatic Resources Reproduction (VIFARR); Viet Nam Environment Protection Fund (VNEPF); and the Community Development Fund (CDF).
Support of foreign organizations and individuals for biodiversity	From the first cycle to the seventh cycle, the Global Environment Fund (GEF) has provided Viet Nam $70,161,420 USD. In addition to funding from the GEF, Viet Nam has also attracted Official Development Assistance (ODA) from other development donors.
6) Promote integration and international cooperation in conservation and sustainable use of biodiversity	
Participate in, and implement international treaties on biodiversity	Viet Nam has signed and ratified five conventions and two international protocols related to biodiversity. Accordingly, the Biodiversity Law has codified some basic contents of the United Nations Convention on Biodiversity and the Ramsar Convention.
Exchange resources and experiences with countries and international organizations on biodiversity	MONRE and MARD, along with other ministries, and localities, have promoted international cooperation to implement the Biodiversity Law. In addition, there have been a number ofinvestment projects funded by foreign aid, which often focus on scientific research, community development, education and awareness activities, etc.

Relevant websites, web links and files

Please indicate any relevant websites, web links or documents to additional related information.

The article on intergrating biodiversity into sustainable tourism;

Biodiverisy in Bac Kan province;

Obstacles and scientific and technical needs related to the measure taken:

A number of obstacles have been encountered while implementing Viet Nam's NBSAP. They are as follows:

1) Lack of financial resources for implement NBSAP.

Recommendation: Need to mobilise financial resources, including from the state budget and other kinds of support from dornors, GEF and other resources.

2) Viet Nam has not had adequate resources to assess the extent and impacts of invasive species as well as solutions of control, prevention and mitigation of negative impacts of invasive species in Vietnam.

Recommendation: Greater international cooperation and resources support (eg. funding, experts) are required for research on invasive species, specifically for the Vietnamese

Academy of Science and Technology, MONRE and MARD.

3)Viet Nam has experienced limitations on the resources and tools available to carry out species conservation, use DNA to identify the distribution of threatened species needed to be prioritized for protection.

Recommendation: Greater cooperation and support (eg. funding, experts, and equipment) from the international community are required.

4) There is a lack of capacity and resources available to carry out servey, monitoring and evaluate status of biodiversity and ecosystem services, develop spatial tools related to biodiversity management (eg. GIS) at the national and regional levels.

Recommendation: Greater international cooperation, technical and finalcial and support for building capacity and techology transfer.

5) There are limitations on methodology available to research the impacts of climate change on biodiversity in Viet Nam, as well as measures regarding mitigation and adaptation.

Recommendation: Greater cooperation and support (eg. funding, experts and equipment) from the international community are required for increased research on the impacts of climate change on biodiversity and measures for impact mitigation and adaptation.

Section III. Assessment of progress towards each national target

III. Assessment of progress towards each national target

Specific Target 1: To improve the quality and increase the area of protected ecosystems, ensuring that the area of terrestrial protected areas accounts for 9% of the total territorial area; marine protected areas account for 0.24% of the sea area; forest coverage reaches 45%; primary forest remains at 0.57 million hectares, coupled with effective protection plans; that mangrove forests, seagrass beds, and coral reefs are maintained at the current levels; that 15% of degraded critical ecosystems are restored; and the number of internationally-recognized protected areas is increased to 10 Ramsar wetlands, 10 biosphere reserves, and 10 ASEAN heritage parks.

Category of progress towards the implementation of the selected target

☐ On track to exceed target

☐ On track to achieve target

☒ Progress towards target but at an insufficient rate

☐ No significant change

☐ Moving away from target

☐ Unknown

Date the assessment was done

August 28, 2018

Additional information

The quantitative results of specific objectives of NBSAP are presented in the table below

Table 3: Quantitative results of implementing specific targets of Viet Nam NBSAP

Quantitative targets	Results achieved by 2014	Results achieved by 2017	Possibility to 2020	Reasons
Target 1				
The area of terrestrial protected areas to reach 9% of the total territorial area	The area of terrestrial protected areas as special use forests accounted for 2.2 million ha as indicated by the Decision 1976/QD-TTg dated October 30, 2014 of the Prime Minister approving the master plan for the national special use forest system to 2020 and a vision to 2030 Data unavailable	The area of terrestrial protected areas has reached 2,269,426 ha, accounting for 6.84% of the territorial area throughout the country (data as of 2018).	The area of terrestrial protected areas as special use forest will increase to 2.4 million ha by 2020 as stated at the Decision 1976/QD-TTg dated October 30, 2014 of the Prime Minister approving the master plan for the national special use forest system to 2020 and a vision to 2030. This is added 270,271 ha planned for marine Pas system as indicated by Decision 742/QD-TTg dated May 26, 2015 of the Prime Minister approving the planning for marine PA system by 2020; and planned 45 inland water PAs (without determination of area) as indicated	The target was too ambitious and the total area of special use forest also altered, targeting 2,358,870 ha by 2020 in accordance to land use adjustment decided by the National Assembly at Resolution 134/2016/QH13 dated April 9, 2016.

			by Decision 1749/QD-TTg dated October 13, 2008 of the Prime Minister approving the planning for inland water Pas system by 2020	
The area of marine protected areas (MPAs) to reach 0.24% of the sea area	Nine of 16 planned marine protected areas have been established	As of 2017, ten of 16 planned marine protected areas had been established, with a total area of 187,810 ha (of which 131,647 ha as sea area), equating to 0.19% of Viet Nam's sea area.	The total area of planned marine PAs by 2020 is 270,271 ha (of which 169,617 ha as sea area) as indicated by Decision 742/QD-TTg dated May 26, 2015 of the Prime Minister approving the planning for marine PA system by 2020	The remaining 6 marine PAs have not been officially established as planned due to shortage of technical support and financial source.
Forest cover to reach 45%	40.43% (as of 2014, consisting of 13,796,506 ha of forest that is made up of 10,100,186 ha of natural forest and 3,696,320 ha of plantation forest). Forest cover is 13,382,444 ha nation-wide.	41.45% (as of 2017, consisting of 14,415,381 ha of forest that is made up of 10,236,415 ha of natural forest and 4,178,966 ha of plantation forest). Forest cover is 13,717,981 ha nation-wide	The Target Program on Sustainable Forestry Development of Vietnam for the period 2016-2020 , as indicated by Decision 886/QD-TTg dated June 16, 2017 by the Prime Minister, has re-set the target of national forest cover by 2020 that is 42% or 14.4 million ha of forests at all types	The target was too ambitious and has been decided to change from 45% to 42% by the National Assembly at the Resolution 134/2016/QH13 dated April 9, 2016,
Primary forest to be	Data is not	Approximately 0.5 million	No official target found, but	- Lack of implementing

kept at 0.57 million ha and have an effective protection plan	available	hectares (exact data not available)	commitment on effective protection of natural forest already set out in the National Action Program on REDD+ in accordance to Decision 419/QD-TTg dated April 5, 2017 of the Prime Minister	programe for the target - Besides, "Primary forest" is not legally set as an indicator for annual forest monitoring and/or annual forest state by MARD
The area of mangroves to be kept at current levels (190,000 ha)	166,502 ha	213,142 ha	The National program on protection and development coastal forests in response to climate changes for the period 2014-2020" as indicated by the Decision 120/QD-TTg dated January 20, 2015 of the Prime Minister, has set the following targets: (i) increases of the coastal forests area to 2020 by 356.753 ha (including mangroves), securing its cover by 19.5% by 2020; and (ii) development of a new plantation of 29,500 ha of mangroves by 2020	- Successful programs and projects on afforestation of coastal forestsmangrove coverage has increased; as well as local effective prevention of aquaculture farming expansion from mangrove deforestation, particularly in the Mekong Delta
Seagrass area to be kept at	17,000 ha (Cao Van Luong et al.,	No data reference	Progress towards target but	- No data found sufficient or updated because no

current levels (12,380 ha)	2012)			seagrass monitoring and/or inventory nation-wide set and/or operated by MONRE or MARD - Lack of implementing programe for the target. - Lack of financial resourse
Coral reefs to be kept at at current levels (14,131 ha)	13,335 ha (Nguyen Van Long and Vo Si Tuan, 2014)	No data reference	Progress towards target but at an insufficient rate	- Local institutions, technical capacity and inter-agency collaboration for managing and protecting coral reefs at the ground that are not adequate, - Coral reef protection was taken priority over neither environmental agenda nor socio-economic activities.
15% of critical ecosystem area that has been degraded is to be restored and conserved	Lack of baseline data as well as monitoring system	Data not available	Specified by the Target Program on Sustainable Forestry Development of Vietnam for the period 2016-2020 as indicated by Decision 886/QD-TTg dated June 16, 2007 of the Prime Minister, targeting 15% area	- No data found sufficient or updated because no "critical ecosystem" monitoring and/or inventory nation-wide set and/or operated by MONRE or MARD - inadequate

			of the degraded forest ecosystems to be restored and conserved with a focus on special use forests, which is followed up by: (i) by 2020, an area of 100.000 ha to be added to special use forest system; (ii) securing 75.000 ha to be newly planted or replanted in special use forests and protection forest; plus forest enrichment and regeneration	implementation programs and resource for the target.
Ten Ramsar Sites	Five sites established	Nine sites established	On track to achieve target	One more site to be profiled for Ramsar submission by 2020
Ten biosphere reserves	Eight	Nine reserves with an area of 4,104,446 ha	On track to achieve target	One more to be recognized as a Biosphere reserve; a document for this is being prepared.
10 ASEAN Heritage Parks	Four	Six	On track to achieve target	There are five protected areas that have had documents prepared in order to submit them to the ASEAN Secretariat by 2020 for consideration: Bidoup-Nui Ba National Park; Vu

				Quang National Park; Ngoc Linh Nature Reserve; Lo Go Xa Mat National Park; and Bach Ma National Park.
Target 2				
No increase in the number of extinct species	No species recorded extincted	No species recorded extincted	No species recorded extincted	Conservation programs/action plans for critical endangered species have been conducted: the Urgent Action Plan on Elephant Conservation to 2020 (Decision 940/QD-TTg dated July 19, 2012); the Overall Project on Elephant Conservation for the period 2013-2020 (Decision 763/QD-TTg dated May 21, 2013); the National Program on Tiger Conservation for the period 2014-2022 (Decision 539/QD-TTg dated April 16, 2014); and the urgent action plan to conserve primate species in Vietnam to 2025 and a vision to 2030 (Decision 628/QD-TTg

				dated May 10, 2017)
Significantly improve the situation of species threatened	Data not available	A record by FFI (2016), more than 500 individuals of red-shanked douc langur (*Pygathrix nemaeus cinerea*) were discovered in Kon Tum and over 200 individuals of barbea's langur (*Trachypithecus barbei)* in Thanh Hoa.	No indicative target available, but sound commitments presented in several core policies issued by the Prime Minister, such as the Urgent Action Plan on Elephant Conservation to 2020 (Decision 940/QD-TTg dated July 19, 2012); the Overall Project on Elephant Conservation for the period 2013-2020 (Decision 763/QD-TTg dated May 21, 2013); the National Program on Tiger Conservation for the period 2014-2022 (Decision 539/QD-TTg dated April 16, 2014); and the urgent action plan to conserve primate species in Vietnam to 2025 and a vision to 2030 (Decision 628/QD-TTg dated May 10, 2017)	Still lacking of a comprehensive and effective site-based monitoring of being-threatened to extinction species at prioritized habitats
Target 3				

The number of stored and preserved cultivar specimets in seed banks, gene banks and on farms. By 2020, 80,000 - 120,000 samples preserved.	No data available	Stored about 60,000 samples, including genetic material of 30,000 agricultural seeds/genes; over 2,000 species of forest trees; 2,998 species of medicinal plants; the genes of approximately 70 domestic animals; 2,999 aquatic species; and about 22,000 strains of micro-organisms.	On track to achieve target	In 2015, the Prime Minister issued Decision 1671 / QD-TTg dated September 28, 2015, approving the program on conservation and sustainable use of genetic resources up to 2025, orientation to 2030. According to this decision, the goal by 2020 is to collect, import and safely store at least 70,000 biological genetic samples.

Indicators used in this assessment

Indicators used to evaluate the effectiveness of implementing specific objectives in the Viet Nam NBSAP are presented in Table 1 in section I.

Please describe any other tools or means used for assessing progress

- Desk study: Developed guidelines for the implementation of NBSAP at a local level; developed a set of indicators for evaluating the implementation of NBSAP at national and provincial levels as well as in protected areas; developed frameworks for assessing the effectiveness of the implementation of NBSAP;
- Local case study of one site for the implementation of NBSAP;
- Developed a set of performance indicators for NBSAP;
- Developed a measures/achievements/Obstacles matrix;
- Creation of data tracking tool, in addition to Excel spreadsheets and online CBD reporting tool;
- Delphi method; and
- Stakeholder consultation

Relevant websites, web links and files

Guildline on biodiversity monitoring;

Level of confidence of the above assessment

☐ Based on comprehensive evidence

☒ Based on partial evidence

☐ Based on limited evidence

Please provide an explanation for the level of confidence indicated above.

- Based on annual official reports provided by MONRE, MARD, MOST and other related Ministries
- Based on reports provided by provinces and protected areas. However, not all provinces and protected areas completed and submitted their reports on the implementation of NBSAP to MONRE.

Adequacy of monitoring information to support assessment

☐ Monitoring related to this target is adequate

☒ Monitoring related to this target is partial (e.g. only covering part of the area or issue)

☐ No monitoring system in place

☐ Monitoring is not needed

Please describe how the target is monitored and indicate whether there is a monitoring system in place.

Viet Nam's national environmental monitoring system is now in operation, which collects data on air, land and water in major river basins and coastal waters. It also require to monitor indicators on animals, specifically, plankton/algae, benthic animals and fish, but the operaton is not in place.

There is no monitoring indicators specific to biodiversity, despite MONRE publishing technical guidelines. These guidelines include information regarding the development of biodiversity indicators, the monitoring of wetlands, and technical information on reporting the status of biodiversity in protected areas. In addition, MARD has also developed monitoring guidance on forest biodiversity with references to selected ecosystems and populations.

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 to monitor coral reefs and seagrass beds. There are only a few sites within Viet Nam that regularly monitored bird activity. These included Thai Thuy in Thai Binh province, Xuan Thuy in Nam Dinh province, Tram Chim in Dong Thap province, and Phu My in Kien Giang province.

Relevant websites, web links and files

BirdLife International in Vietnam;

Participatory biodiversity monitoring for REDD+ in Vietnam;

Environment monitoring website;

Section IV. Description of the national contribution to the achievement of each global Aichi Biodiversity Target

IV. Description of national contribution to the achievement of each Aichi Biodiversity Target

Aichi Biodiversity Target 1: Awareness of biodiversity increased

Legal documents on communication activities to improve biodiversity awareness

In 2015, MONRE issued Decision No. 200/QD-BTNMT approving an awareness raising program on the prevention and control of invasive alien species in Viet Nam in the period of 2015-2020

Communication and awareness-raising activities:

a) Celebration of international dates relating to biodiversity and events

- Annually, under the guidance of international conventions and treaties on biodiversity, the MONRE issues a document to guide the implementation of internationally-recognised days, such as Biodiversity Day (May 25th), Wetlands Day (February 2nd), and Migratory Birds Day (May 11th-12th) etc. Associated activities have included hanging banners on streets and at the headquarter of the MONRE and meetings held in some provinces and cities across the country. Such activities have increased public attention on biodiversity.

b) Coordinate with relevant agencies and local authorities to raise awareness on biodiversity

- At the central level, MONRE and relevant ministries and agencies have developed and deployed educational bulletins on conservation and sustainable use of biodiversity. These have been in the form of reports, as well as information distributed through mass media (radio, television, newspapers).
- At the local level, communication activities have been well deployed. Provinces utilize local protected area management boards to focus educational activities to communities living in and around protected area buffer zones. These activites include leaflets, banners, posters, and radio. Additionally, management boards of protected areas have conducted various communication activities to raise awareness on the importance of biodiversity for tourists visiting protected areas.
- Some coastal regions in which national parks and marine protected areas are located, such as Cat Ba, Con Dao and Phu Quoc, have, in coordination with local authorities and schools, regularly celebrated International Biodiversity Day. In 2017, MONRE received 23 provincial reports on their implementation of activities for International Biodiversity Day.

c) Integrate biodiversity into national and international sectors, organizations, universities, programs and projects

- An educational and training network for individuals working at managerial and technical

levels in biodiversity conservation has been developed. Nearly 20 universities provide undergraduate programs consisting biodiversity-related subjects, including biology, environmental management, forestry, agriculture, fisheries, geography, and natural resources. Many universities also provide postgraduate programs, both Master and PhD levels with specialization on biodiversity conservation, sustainable wetland management and use. In 2016, the Ministry of Education and Training assigned several universities the task of compiling teaching documents related to conservation and biodiversity.

- Viet Nam and other ASEAN countries have honored ASEAN heroes on biodiversity. In 2017, Dr. SS. Dang Huy Huynh, who is involved in environmental protection and biodiversity conservation in Viet Nam, was honoured.

Level of awareness about biodiversity

a) Awareness of central government agencies

- At the highest level, the need for biodiversity conservation in Viet Nam has been defined in the Constitution (adopted by the National Assembly on November 21, 2013). The Vietnamese Constitution regulates the State has to develop policies for environmental protection, nature and biodiversity conservation. In 2008, the National Assembly approved the Law on Biodiversity, which has been formally enforced since 2009. Since then, the Government and Ministries have issued many other legal documents directly related to biodiversity conservation, as well as integrating conservation activities into specific sectors.There has also been some awareness-raising activities focused on the prevention and control of invasive alien species.

b) Awareness of local authorities

- Local authorities tend to focus on economic development and put less priority on environmental protection. Decisions at the provincial level, where most land and water-use decisions are made, have been made with a primary emphasis on economic growth criteria, and environmental protection has not been encouraged. The value and role of biodiversity has been underestimated.

c) Awareness of enterprises

- Until now, many enterprises have paid only for forest environmental services. According to a preliminary report on eight years of payments for forest environmental services, the total revenues collected by June 30, 2016 were VND 5,744,792 billion. However, enterprises' awareness of biodiversity conservation has gradually improved.For example, the internation cement company Holcim, located in Kien Giang, has committed to donate 1 million USD to conserve limestone landscapes and threatened species, including cacti species and the sarus crane. Staff of Holcim and the local community have been trained on the importance of environment protection.

d) Awareness of the community

- The project "*Assessment of awareness, attitudes and participation of local communities in conservation and management of natural resources in Mu Cang Chai, Lao Cai province*" was implemented in 2012. Results show that generally, local people have a basic understanding of the importance of local forests and forest resources – including timber, firewood, cultivated land, and animals – especially in relation to their daily lives.

However, local people's knowledge in the study area is still limited about risks and potential impacts to forests, understanding about the value of biodiversity, and information on existing protected areas remains insufficient. Furthermore, public attitudes regarding forest protection is unclear.

- As part of the project to establish the wetland reserve in Thai Thuy, Thai Binh (to be implemented in 2016-2018), a survey was conducted. Results show that most of the local people (e.g. fishermen exploiting the mangrove canopies and mud flats, aquaculturists, etc) are aware of the role of mangroves in protection of coastal environments.
- In 2017, the Women's Union of Thua Thien-Hue province organized communication events on the topic of enhancing flood tolerance and ecosystem-based adaptation. This attracted nearly 700 women. Members of the Women's Union have also been involved in running training courses on management of small-scale community-based ecotourism models, to generate economic benefits directly from mangroves. In addition, micro-credit funds linked to both women's livelihoods and mangrove conservation have been established. As a result, the flood resilience of 4,800 coastal residents has gradually improved.

As reported from several proteted areas regarding annunal management activities, there is a low level of awareness relating to biodiversity conservation in local communities, especially in their understanding and observance of current laws on the exploitation of natural resources. This has resulted in the illegal harvesting of timber and non-timber forest products, even in strictly protected areas.*Some limitations:*

- Communication and awareness raising for biodiversity conservation has currently only been done at the community level and by some related management officials. Education and awareness-raising in high-level agencies, such as at the National Assembly, the Government and to the provincial authorities has been limited.
- In 2018, after reviewing legal documents on biodiversity show that the provisions of the Law on Gender Equality 2006 and requirements on gender mainstreaming are not clearly reflected in the documents. Raising awareness of biodiversity conservation has therefore not mentioned gender equality much, especially the role of women in conservation activities.
- Awareness-raising on biodiversity conservation is a process that needs to be ongoing, but at present there is no budget to carry out these activities regularly every year.

Aichi Biodiversity Target 2: Biodiversity values integrated

Viet Nam has integrated biodiversity into the strategies and plans of sectors and localities. Many studies have been undertaken at different levels to estimate the value of ecosystem services, with targets to include the results in the national audit system.

1. Integrating biodiversity conservation into sectoral and inter-sector policies and programs

1.1. Integrating biodiversity conservation into inter-sector plans, programs and policies for regional development

The contents of environmental protection have been integrated by Viet Nam's Government into national plans, programs and policies as follows:

- Hunger elimination and poverty alleviation strategies: objectives for environmental protection and biodiversity include executing a program of planting five million hectares of forest; increasing the forest cover from 33% in 2000 to 41.45% by 2017; and a focus on addressing environmental degradation and promoting conservation of natural resources.
- The national strategy on responding to climate change: This aims to improve the quality of forests, promote afforestation and forest cover; to move towards efficient exploitation of forests; to maintain and improve forests' resilience against natural disasters, desertification, erosion, and land degradation; and to enhance the protection, management, and development of submerged forests and submerged land ecosystems, with a target to increase forest cover to 42% by 2020.
- A plan to respond to climate change at various phases, especially in the period 2016-2020 for different sectors.
- Territorial development plan: To form green corridors or biodiversity corridors connecting protected areas.
- Land use planning: specifically, the project '*To strengthen provincial capacity to integrate biodiversity conservation priorities into local land use planning'* is a component of NBSAP that was piloted in Son La and Lang Son provinces in 2015. Pilot results show that, when adjusting the land use planning of Son La and Lang Son provinces, contents related to biodiversity conservation should be considered. Both national and provincial planning for land use need to include biodiversity related indications, for instance the area of land set for protected areas as special use forest.
- Viet Nam has a '*Sustainable Development Strategy in the period of 2011-2020: Toward rational use and sustainable development of natural resources, including biological resources and biodiversity'*.
- Green Growth Strategy: this aims to accelerate the process of restructuring and improving economic institutions towards using natural resources more efficiently and to enhance the competitiveness of the economy, through increased investment in technology, natural capital, and economic instruments. This will help Viet Nam to cope with climate change, reduce poverty, and ensure sustainable economic development.

1.2. Integrating biodiversity conservation in the implementation of international conventions

Environmental protection and biodiversity conservation have been integrated into various programs and action plans, to implementat international treaties that have been signed by the Vietnamese Government. These include the UNESCO World Heritage Convention; the Ramsar Convention; CITES; the Convention on Biological Diversity; the Cartagena Protocol on Biosafety; the United Nations Framework Convention on Climate Change in the period of 2007-2010; and the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing;

1.3. Integrating biodiversity conservation into related sectors

Biodiversity conservation has been integrated into policies, strategies, plans, and programs of relevant sectors, as well as inter-sector areas. This is reflected and regulated in decisions made by the Government or Ministries through various proposed programs and plans, especially in sectors such as agriculture, forestry, fisheries, natural resources, environment, tourism, industry, education, training, science and technology.

Circular No. 29/2014/TT-BTNMT dated June 2, 2014, was introduced by MONRE to provide guidance for the formulation and adjustment of land use that is integrated with biodiversity conservation. MONRE has also developed a document named *'Methodology and guidelines for integrating biodiversity conservation into provincial land use planning'.* Under a NBSAP project implemented in 2015, the integration of biodiversity conservation into land use planning was studied and piloted in Lang Son and Son La.

In 2015, MONRE, with the support of the Asian Development Bank, received support for the project '*Applying and improving the national environmental safety system - Integrating biodiversity considerations into the environmental safety system of Viet Nam'*. This developed a technical guideline entitled '*Impact assessment of biodiversity integrated in environmental impact assessment'.*

Some results:

The integration of biodiversity conservation into sector and inter-sector development policies has achieved certain successes, especially in economic sectors. Some notable achievements are: annual increases in forest cover; various programs such as development and cultivation of valuable species and/or plantation of native trees, which have generated many commercialized agro-forestry products, thereby reducing pressures on over-exploitation of natural resources; and education, training, and awareness-raising on biodiversity conservation, especially for conservation teams in local communities. It is essential to have biodiversity conservation integrated into provincial land use planning, as this not only creates compatibility between the two types of planning but, more importantly, gradually introduces biodiversity conservation into the system for land legislation. In addition, demonstration and replication of conservation oriented community livelihood models in and around the buffer zones of protected areas, linking with poverty-alleviation programs, have facilitated improvement of villagers' livings and reduction of resource exploitation.

2. Studies on economic valuation of ecosystem services in Viet Nam

In order to evaluate the economic value of natural resources (environmental assets), some projects examining ecosystem services were introduced in the late twentieth century. The ecological value of mangrove ecosystems in Viet Nam was first identified by Nguyen Hoang Tri. Subsequently, Nguyen Hoang Tri *et al.* (2000) calculated the total economic value of the Gio mangrove forest resources. In terrestrial areas, Nguyen Duc Thanh (1996) studied the tourism value of Cuc Phuong National Park, Le Minh Ngoc and Dinh Duc Truong (2006) studied Bach Ma National Park, and Pham Khanh Nam (2003) assessed the tourism value of Hon Mun Reserve.

In recent years, more studies and economic valuation methods have been carried out and applied for natural ecosystems in Viet Nam, including for forests, mangroves, coral reefs, and seagrass beds. Research results show that services of natural ecosystems have contributed significantly to economic development, livelihood, and human life. According to Nguyen Minh Huyen *et al.* (2010) and Nguyen Quang Hung *et al.* (2013), the economic value of mangrove ecosystems is estimated at 0.204 to 1.67 billion VND /ha /year; coral reef ecosystems at 1.71-11.42 billion VND/ha/year; and seagrass ecosystems at 0.656 billion VND/ha/year.

In a state-level project, Tran Dinh Lan et al (2015) estimated the goods and services of marine ecosystem in Bach Long Vi island, Con Co and Tho Chu archipelago respectfully, as: approximately VND 599 billion/year (approximately USD 26.62 million) equivalent to 94.3 million VND/ha/year; VND 267.5 billion/year (approximately USD 12 million) equivalent to VND 307

million/ha/year and VND 565.2 billion/year (approximately USD 25 million), equivalent to VND 125.47 million/ha/year.

In the project '*Overcoming barriers to improve management effectiveness of protected areas in Viet Nam'* (2013), the economic value of Bidoup-Nui Ba National Park, Lam Dong province was estimated by its goods and services at VND 25,747 billion/year. Meanwhile, total funding for the park is about VND 40 billion/year, equivalent to just 0.16% of the value of its natural resources.

In the Thai Thuy wetland area of Thai Binh province, many studies have been conducted to economically value the ecosystem. The Viet Nature Conservation Centre and Vietnature (2016) estimated economic value through a quick assessment of coastal wetland ecosystem services. It was shown that exploiting natural aquatic resources has brought the province up to VND 49.7 billion/year (USD 2.23 million) and aquaculture and salt production VND 259,917 billion/year (USD 11, 66 million). The total economic value of the Thai Thuy wetland area was estimated at USD 14.94 million per year, plus an additional USD 60.26 million from carbon sequestration. Furthermore, research on wetland ecosystem services in Thai Thuy under the Wetlands Project (ISPONRE, 2017) estimated that the total economic value of the area was USD 3,034 million per year (given initial assumptions that the possibility of a typhoon is high during 10%/year and that only Thai Thuy people are willing to contribute to biodiversity conservation of the local wetland area).

Assessing the economic value of natural ecosystems and biodiversity helps decision-makers and managers to identify conservation priorities and acts as basis for a trade-off between conservation goals and development goals. However, in Viet Nam, economic valuation of ecosystems is still only a research topic. Research results have been reported to local and central management for their consideration when carrying out economic development activities but economic values from ecosystem services have not yet been included in Viet Nam's national accounting system.

In the current System of National Accounts, natural resources that are used in production are considered as a contribution to the national income, rather than a depreciation of resources. Many environmental products/services have not been fully evaluated and recorded in the current accounting system, leading to inadequate recognition of the need for their conservation.

The United Nations has now introducted an integrated Green GDP calculation framework for consistent application in member countries. The Government of Viet Nam has looked to gradually integrate green accounting into the national accounts. The Prime Minister signed Decision No. 43/201/QD-TTg dated June 2, 2010, on the National Statistical Indicator System, which has developed and applied a green GDP target into the system of socio-economic indicators from 2014. However, implementation has only reached the stage of experimental calculation being carried out; specifically, in two seperate studies by the Central Institute for Economic Management and the Office of Sustainable Development (the Ministry of Planning and Investment).

3. Spatial data on biodiversity

3.1 National biodiversity map

During the 1980s and 1990s, Viet Nam built the Viet Nam National Atlas; this was then published in 1996. The Atlas includes some maps of Viet Nam's terrestrial and marine biodiversity. In Viet Nam, national-level data on biodiversity is mainly in the form of statistics,however there is also some limited data on forest cover and distribution of threatened species in national maps and maps of protected areas. Forest cover maps have been created by

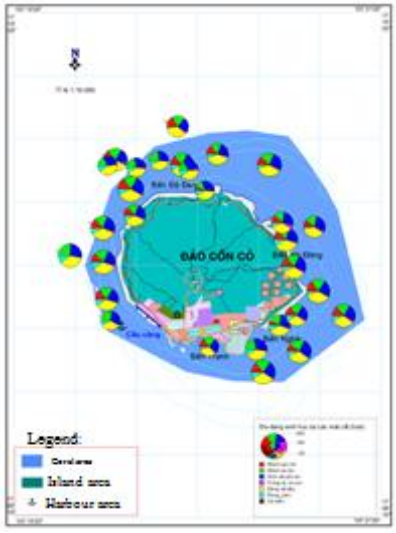
the Forest Inventory and Planning Institute under MARD and can be accessed.

Some other national biodiversity maps include those created by the WWF in collaboration with MONRE of Viet Nam's ecoregions and ecosystems. This report also includes a number of biodiversity related maps provided by the UNBiodiversity Lab.

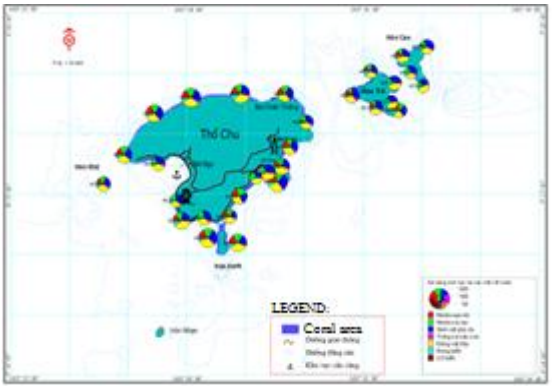
3.2 Maps of biodiversity in protected ares

Most terrestrial protected areas in Viet Nam have maps that show their division into functional units. In addition, vegetation maps, as well as the distribution of threatened species of protected areas, and/or of the whole territory, have been created as part of various scientific research projects.

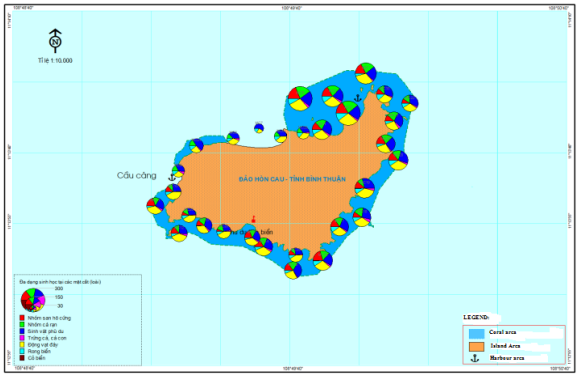
Map of wetland ecosystems in Xuan Thuy NP in 2013



Biodiversity map of Con Co Island



Biodiversity map of Tho Chu Island



Biodiversity map of Hon Cau Island

Figure 1: Biodiversity maps in Xuan Thuy National Park and some other coastal islands

(Source: Project "National Biodiversity Data System (NDBS JICA-BCA-VEA-MoNRE, 2014); Project I.2 Research Institute for Marine Fisheries, 2015)

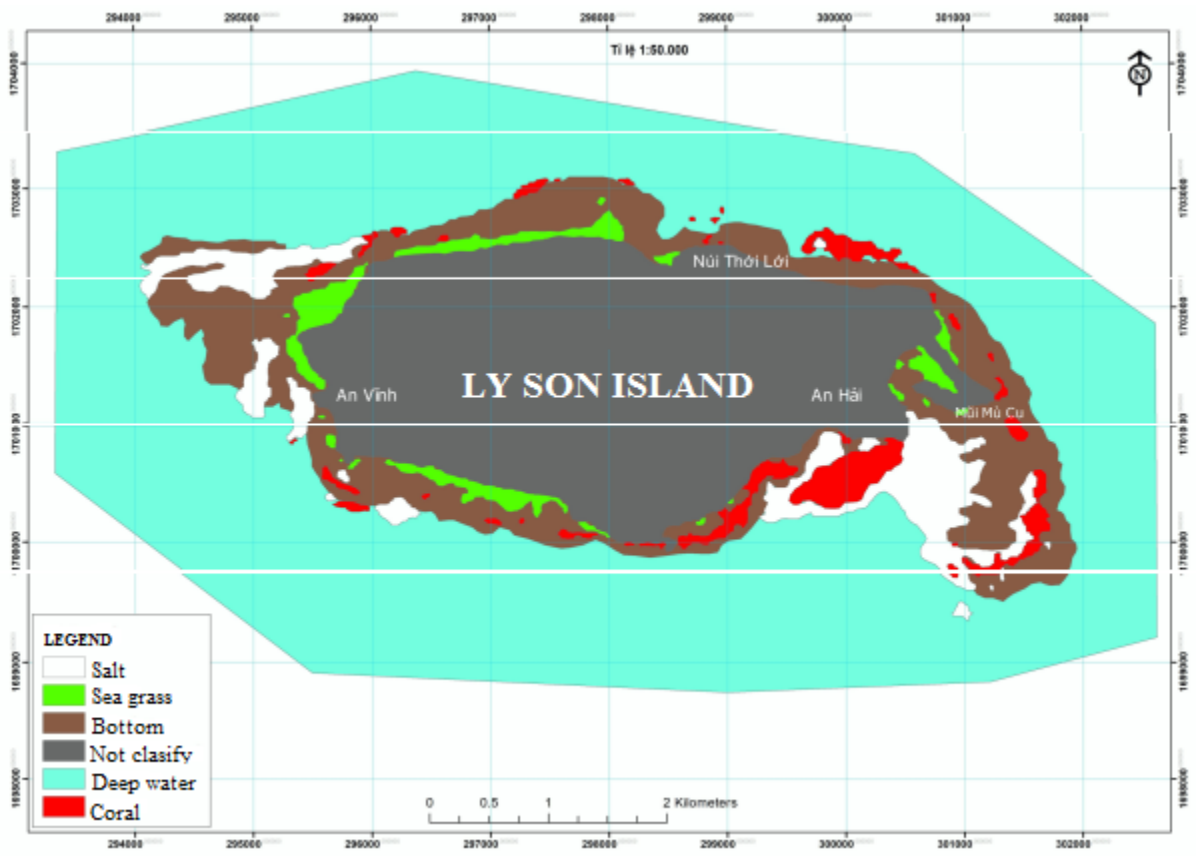


Figure 2: Map on distribution of coral reefs, seagrass beds along Ly Son island, Quang Ngai province (Source: Nguyen Hao Quang, Luong Van Thanh, Ho Dinh Duan, 2015)

Aichi Biodiversity Target 3: Incentives reformed

1. The Government of Viet Nam aims to control activities that have negative impacts on biodiversity

To implement the objectives in Viet Nam's NBSAP, the Government aims to instate measures to eliminate activities harmful to biodiversity. The Government shall also develop legal documents, mechanisms and policies for the management, control, and monitoring of land use conversion for the construction of agro-industrial works. The government has provided a wide range of policies and incentives to facilitate and support local communities living in and round the protected areas' buffer zones to effectively participate in conservation and livelihoods development.

In Chapter III of the Environment Law 2015, environmental protection concerns are covered in Articles 35, 36, 27, and 38. Specifically, these refer to environmental protection concerns during the inspection, assessment, and development for the planning of utilization of natural resources and biodiversity; protection and sustainable development of forest resources; and environmental

protection during survey, exploration, extraction and utilization of natural resources and minerals.

The Prime Minister issued Decision No. 1216/QD-TTg dated September 5, 2012, on the approval of the National Strategy for Environmental Protection to 2020, a vision to 2030. The overall goal of this Decision is to control, and substantially reduce the level of environmental pollution, resource depletion, and biodiversity loss. Additionally, working to continously improve habitat quality, to enhance capacity to respond to climate change, and to implement the goals of sustainable development.

The Prime Minister issued Decision No. 166/QD-TTg dated January 21, 2014 on the implementation of the National Strategy for Environmental Protection to 2020, vision to 2030. Accordingly, by 2020, facilities causing serious environmental pollution will be removed, in accordance with Decision No. 1788/QD-TTg dated October 1, 2013, of the Prime Minister. Policies to encourage businesses and service facilities to build and apply environmental management systems up to ISO 14000 have also been implemented. The Decision also refers to complying with quotas on emissions and forming a quota transfer market; regulations on auditing waste and product life cycle assessment; promulgating regulations on the responsibilities of companies engaged in mineral exploitation for investment in infrastructure development, hunger reduction, poverty alleviation, job creation and healthcare of local communities (where mineral exploitation takes place); and reviewing and adjusting the planning for development of golf courses, hydropower projects, and mineral exploitation projects in order to exploit and use effectively and sustainably local land, water, and forest resources.

In 2015, the Viet Nam Environment Administration (VEA), with support of the Asian Development Bank (ADB), under the project "*Applying and improving the national environmental safety system - Integrating biodiversity considerations into the national environmental safety system of Viet Nam*" developed the Technical Guideline: *Intergrating Biodiversity Impact Assessment in Environmental Impact Assessment.*

2. Activities with positive impacts on biodiversity

2.1. Assessed potential impacts of agro-industries

Along with socio-economic development, activities such as logging for commercial purposes, and change of forest to other purposes (such as industrial tree planting, hydropower construction, mineral exploitation, and road construction) are the main cause of loss and degradation of natural forest ecosystems and have impacts on populations of threatened species. Accordingly, an environmental impact assessment must be completed before the construction of all industrial, agricultural, and mining facilities. Potential impacts of those projects on the environment and biodiversity can thus be identified and evaluated, and mitigation measures proposed. All agricultural and industrial sectors must comply with the provisions of the Law on Environment, the Law on Biodiversity and other related legal documents.

Every year, the Forest Protection Department (Viet Nam Administration of Forestry) prepares reports on forest protection using data on forest fires, and from violations of the Forest Law that are prosecuted (published on the Forest Protection Department's website: www.kiemlam.org.vn).

2.2. Payments for forest environmental services

Paying for forest environmental services primarily aims to mobilize financial resources from

service users, mainly industries such as hydropower plants, water suppliers, and facilitate community engagement in watershed forest protection and nature conservation. Many circulars guiding the implementation of Decree 99/2010/ND-CP and its revision, Decree 147/2016/ND-CP have been issued by MARD, such as Circular No. 80/2011/TT-BNNPTNT dated November 23, 2011, providing guidance on how to determine payments for forest environmental services. Circular No. 20/2012/TT-BNNPTNT dated May 07, 2012, provides procedures for checking and collecting payments for forest environmental services. Circular No. 60/2012/TT-BNNPTNT dated November 09, 2012, stipulates the principles and methods of determining the forest area incorporated into payments for forest services.

In 2008, payments for forest environmental services was promulgated and piloted in Lam Dong and Son La provinces. Accordingly, water users, including hydropower plants, bottled water companies, and other entities, are obligated to pay for environmental services. Total payments for forest environmental services in three years until August 2014 were VND 3,329 billion (USD 157 million), most of which came from hydropower plants (97%), bottled water facilities (2%) and tourism businesses (less than 1%).

According to a preliminary report on eight years of payments for forest environmental services, the total revenues collected by June 30, 2016 were VND 5,744,792 billion.

2.3. Reduce Emissions from Deforestation and Forest Degradation (REDD+) program: Since 2008, Viet Nam has been cooperating with the World Bank, the UN-REDD Program and some international NGOs to implement REDD+, to reduce greenhouse gas emissions by reducing deforestation and forest degradation, and compensating those implementing REDD+ activities at the local level. The Netherlands Development Organisation is currently implementing a pilot project to integrate REDD+ into areas that are have high levels of biodiversity, in order to promote conservation. REDD+ is an opportunity to mobilize funding for biodiversity conservation if conservation objectives are well integrated into the overall goal of developing forest ecosystems.

2.4. Mobilizing funding from businesses: There are many cases in which enterprises are willing to contribute to biodiversity conservation. In Kien Giang, Holcim International Cement Company has pledged to contribute approximately USD 1 million to the conservation of limestone karst landscapes and threatened species, including the silver-headed langur and sarus crane. Holcim staff and local communities have been trained about environmental protection.

2.5. Establishing funds to support biodiversity conservation and environmental protection activities

- Viet Nam Conservation Fund (VCF) is a trust fund from foreign aid that was established in 2005, with a total amount of USD 15 million; this is non-refundable aid from the World Bank, the Global Environment Facility and the Dutch Government. VCF will provide financial and technical support to projects aiming to enhance the management of special-use forests in Viet Nam. The Fund has offered support to about 70 protected areas, enabling them to carry out conservation-related activities. This is an effective form of support, especially for small protected areas that have limited local capital sources.
- Trust Funds (TFF), Viet Nam Conservation Fund (VCF): previously established to support the implementation of the Vietnam Forestry Development Strategy 2006-2020

by ODA sources, and since 2016 they have been integrated into Viet Nam Forest Protection and Development Fund (VNFF).

- In 2007, the Viet Nam Fund for Aquatic Resources Reproduction (VIFARR) was established to support biodiversity conservation projects in the fisheries sector, but there has been no progress in mobilizing resources to sustain its operation.
- Community Development Fund (CDF). This is a small fund developed for community development projects by FAO, IFAD, ADB and JICA. It aims to assist local people in poverty reduction, environmental protection and capacity building. Some projects have been implemented in national parks that include Cat Ba, Xuan Thuy, Ba Be, Na Hang and Bidoup-Nui Ba.

2.6. Models and initiatives to conserve biodiversity

In order to harmornize biodiversity conservation and economic development, it is important to implement measures and models for sustainable use of natural resources that incorporate the role of communities, since all conservation models aim to benefit communities. Within the scope of international and national projects, Vietnamese experts, in collaboration with foreign consultants, have developed and applied hundreds of models and initiatives to conserve biodiversity for many localities, especially in buffer zones, ecological rehabilitation zones, and development zones of protected areas and biosphere reserves. Some noteworthy conservation models include:

Community-based conservation models:

- With the support of a CARE International sub-project under the Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (2006) and a WWF-Coca Cola project (2008-2010), a co-management model was piloted in Tram Chim National Park. This encouraged local people to participate in the development of a plan to manage the use of natural resources in accordance to guidance from the management board of the national park, and to flexibly apply local knowledge.
- A model for tourism enterprises to participate in the management and reasonable use of coral reef resources was developed and tested in various coral reefs in the central of Viet Nam, specifically in Cu Lao Cham MPA, Nha Trang Bay, by Vo Si Tuan *et al.* (2011).
- A model of 'Sustainable Livelihoods and Community-Based Conservation of Wetlands Natural Resources' was implemented at the Lang Sen Wetland protected area and contributed to improving the livelihoods of people living in the buffer zone, raising awareness about wetlands and experimenting with the co-management mechanism.
- In 2008, the Center for Natural Resources and Environment of Viet Nam National University developed a model of integrated, community-based management of coastal mangrove forest resources in Ha Thu hamlet, Hai Lang commune, Tien Yen, Quang Ninh province.
- According to a report from Thua Thien Hue Provincial Department of Natural Resources and Environment (2018), from 2015 onwards, 23 fishery protection zones in Tam Giang and Cau Hai lagoons were established. These have an area of 614 ha for community-based conservation. This model has been implemented and is supported by the community of local fishermen.
- A model of conservation by the Vietnamese Heritage Tree was initiated by Viet Nam Association for Conservation of Nature and Environment in 2010. In 2018, after 8 years of implementation, the organization has identified the conservation of more than 4,500

trees that range in age from over 100 years to 2200 years. The identified trees are from 120 different species and are distributed in 54 of the63 provinces in Viet Nam.

Conservation management models:

- A system of MPAs were established in Tra Trao (Van Hung commune, Van Ninh district, Khanh Hoa). This is an effective model for integrated coastal zone management under Partnerships in Environmental Management for the Seas of East Asia.
- The project '*A model for integrating ecosystem-based climate change adaptation measures'* was developed by the MONRE with the support of the World Bank, and in collaboration with WWF, and was tested in some coastal areas.
- The project '*A model of mangrove and seagrass bed rehabilitation and management'* was implemented in Thuy Trieu lagoon area in Cam Lam district in 2012-2014. Two models of rehabilitation of mangrove species have been conducted in areas that are used for shrimp farming and in deserted tidal flats.

Livelihood models for local communities:

- In 2013, pursuant to Decision No. 2920/QD-UBND of the People's Committee of Quang Ninh, a project that aimed to commercially develop Quang Ninh *Austriella corrugata* was undertaken. In collaboration with its research partner, by 2017, the Institute of Marine Environment and Resources successfully establised a farming process for *Austriella corrugata* and had modelled its benefits.
- A model of co-management was developed for sustainable extensive clam farming. In 2015, the Project Management Board of Xuan Thuy National Park implemented and finalized a project of piloting co-management of clam farms in an ecological rehabilitation zone of Con Lu.
- Ecotourism associated with biodiversity conservation: in Viet Nam tourism models have now been developed in association with biodiversity conservation in protected areas and biosphere reserves. Those models fall within the categories of green tourism, community based ecotourism or sustainable tourism, and are based on with the belief that biodiversity is a product to develop tourism, supporting socio-economic development and improving community life, especially for communities in buffer zones. However, tourism must simultaneously contribute to conservation and sustainable development of biodiversity resources.

Agro-Forestry-Fishery combined models:

- A model of combined forestry – fishery was developed in an estuary in the northern coast. A model of shrimp farming or mangrove rehabilitation has been implemented by the Center for Natural Resources and Environment Research in Tien Hai, Thai Binh
- A model of mushroom production was developed in communes in the buffer zone of the Xuan Thuy National Park. In 2010, with the support of the CORIN Asia project, models for communes in the buffer zone of Xuan Thuy National Park were developed. Bee-keeping was also applied for small- and large-sized gardens in Giao An and Giao Thien communes.
- - In Kien Giang Biosphere Reserve, models generating alternative incomes for local communities in wetland areas, especially for poor women and ethnic minorities, have been implemented with the support of the GIZ Kien Giang project.

Aichi Biodiversity Target 4: Sustainable production and consumption

Sustainable production and consumption has been covered in UN Action Programs. The CBD has also made recommendations on sustainable wildlife management.

1. Biological resources in the national economy and human well-being in Viet Nam

Although it has not been regularly recognised, the exploitation and use of biodiversity has contributed substantially to the national economy, especially in such sectors as agriculture, forestry, fisheries and the pharmaceutical industry. According to the Statistical Yearbook (2017), agriculture, forestry and fisheries contributed significantly to gross domestic product (GDP), although their share of the contribution decreased from about 20% in 2010 to about 17% in 2016, and their export value increased from USD19 billion in 2010 to USD36.37 billion in 2017, accounting for 15% of Viet Nam's total export turnover. Approximately 20 million people depend on fisheries for most or part of their income and exploit and use over 300 marine species and over 50 freshwater aquatic species of economic value. Approximately 25 million people live in or near forests and derive 20-50 percent of their income from non-timber forest products, including hundreds of species of medicinal plants and latex plants. Natural ecosystems of high biodiversity also underpin much of Viet Nam's rapidly-expanding tourism industry. Eco-tourism is becoming popular in protected areas, which promotes both the discovery and education of nature, and brings benefits to local people who provide the service. In addition to these economic benefits, biodiversity supports a wide range of critically important ecosystem services. The terrestrial and coastal water vegetation helps to regulate the climate through carbon storage, filtering air and water, decomposing waste, and mitigating the harmful effects of natural disasters such as landslides, floods, and typhoons.

2. Excessive exploitation and unsustainable use of biological resources in Viet Nam

Viet Nam is a highly populated country, but limited in territorial area. Increased development, combined with high consumption, has put pressure on natural resources. For example, according to the Institute for Seafood Research (2016), seafood resources, especially in coastal areas, have been excessively exploited, leading to risk of deterioration. In recent years, it has also been observed that in addition to over-explotiation, the production volumes are made up of relatively small fish, indicating that many animals are not reaching sexual maturity. This fact reflects that exploitation demands have exceeded the reproductive ability of fish populations. For terrestrial biological resources, exploitation, trading and consumption of precious and rare wildlife products and plants still take place.

3. Actions towards sustainable production and consumption in Viet Nam

3.1. Issuance of legal documents

Sustainable production and consumption is the use of goods and services that meet the basic needs of people, as well as providing a better quality of life, without jeopardizing the ability of future generations to meet their own needs. This includes minimizing the use of natural resources, hazardous materials, and reducing emissions of pollutants throughout the product life cycle. In the context of unsustainable exploitation and use of ecosystem services in Viet Nam, the Government has issued legal documents, programs and plans that aim for sustainable consumption. These include:

- Laws relating to biodiversity, such as the Law on Forestry, the Law on Fisheries and

the Law on Biodiversity (2008). These stipulate biodiversity conservation principles and tasks at the central, ministerial, and local levels, creating a legal basis for local communities to participate in the conservation of nature and biodiversity resources, and through new mechanisms for benefit sharing.

- Decree No. 33/2010/ND-CP dated March 31, 2010, of the Government stipulates the management of fishing activities of Vietnamese organizations and individuals in coastal regions, with an objective toward having effective exploitation in parallel with protection and development of aquatic resources.
- Decree No. 99/2010/ND-CP dated September 24, 2010, of the Government regulates payments for forest environmental services. MARD has accordingly issued several circulars guiding the implementation of Decree 99 such as Circular No. 80/2011/TT-BNNPTNT dated November 23, 2011, providing guidance on how to determine payments for forest environmental services; Circular No. 20/2012/TT-BNNPTNT dated May 7, 2012, guiding procedures for checking and collecting payments for forest environment services; and Circular No. 60/2012/TT-BNNPTNT dated November 9, 2012, stipulating principles and methods for determining forest areas that are subject to payments for forest environmental services.
- Pursuant to Decision No. 1393/2012/QD-TTg of the Prime Minister the 'National Strategy for Green Growth in the period of 2011-2020, vision to 2050' was approved with the following specific objectives: i) to restructure the economic system toward green growth for existing sectors and to encourage the development of economic sectors of highly-added values and effective uses of energy and resources; ii) to study and increasingly apply technology to more effectively use natural resources, reduce greenhouse gas emissions, and contribute to Viet Nam's response to climate change; iii) to improve people's living standard, building environmentally friendly lifestyles through creating jobs focused on green industrial, agricultural and services sectors, to invest in natural capital, and to develop green infrastructure.
- Decision No. 899/QD-TTg dated June 10, 2013, approving a plan of restructuring the agriculture sector in the direction of enhancing value and sustainable development.
- Pursuant to Decision No. 76/2016/QD-TTg dated January 11, 2016, of the Prime Minister, the 'National Action Plan on sustainable consumption and production to 2020, vision to 2030' was approved. Overall objectives of the plan are to gradually change existing production and consumption patterns towards more efficient use of resources and energy; to enhance the use of raw materials, renewable energy, and environmentally-friendly products; to minimize, reuse and recycle waste; to sustain the ecosystem sustainability at all stages of the product lifecycle from harvesting and supplying raw materials to processing, distribution, consumption, and disposal.
- In Decision No. 886/2017/QD-TTg signed on 16/6/2017, the Prime Minister approved the 'Program for Sustainable Forestry Development for the period of 2016-2020', with specific objectives up to the year 2020 as follows:
    - The growth rate of forestry production value ranges from 5.5% to 6.0% per year.
    - The national forest cover will be 42% and the forest area will be 14.4 million ha.
    - Average plantation productivity is 20 m^3/ha/year.
    - The value of wood and forest products exports ranges from USD 8 billion to USD 8.5 billion.
    - Maintenance of 25 million of regular jobs, increase incomes, contribute to hunger

elimination, poverty reduction, and improve livelihoods of people working in forestry, linking to implementation of "new-rural" programs, and ensuring security and defense.

In addition, Viet Nam has participated in sustainable development programs from the United Nations and has also issued the 'Strategic orientation for sustainable development for Viet Nam' (Agenda 21 of Viet Nam) and the 'Sustainable Development Strategy for Viet Nam in the period of 2011-2020'. In these, sustainable production and consumption are emphasized.

In 2017, the Prime Minister signed Decision No. 622/QD-TTg dated May 10, 2017, on the introduction of the 'National Action Plan to implement the Agenda 2030 for sustainable development'. In this strategy, Goal 14 is to conserve and sustainably use the oceans, seas, and marine resources for sustainable development and Goal 15 is to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.

As stipulated in the Law on Environmental Protection and the Law on Biodiversity, MONRE is responsible for the unified state management of environmental protection and biodiversity. In addition, in sectoral strategies and other national programs related to sustainable development, MONRE is to coordinate with other ministries and sectors to undertake state management. Accordingly, MONRE acts as a government agency to execute state management functions in the fields of land and water resources; mineral resources and geology; the environment; hydro-meteorology; climate change; surveying and mapping; general management of natural resources and protection of sea and island environments; exploring; and state management of public services in areas under its management.

3.2. Specific activities

To implement CITES

Viet Nam joined CITES in 1994 and since then has made great efforts to control trade in threatened wild species. However, Viet Nam is still a hotspot for shipment of threatened species, especially 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.

The Prime Minister has issued many directives to prevent the of consumption and trade of threatened species. For example, in 2016, the Prime Minister issued Directive 28/CT-TTgadopting a number of urgent measures to prevent and fight against violations to wildlife species.

In the framework of the project '*Strengthening biodiversity conservation through policy reform and changing current wildlife consumption in Viet Nam'*, MONRE developed a communication strategy to reduce wildlife consumption and published leaflets about the need to stop the trade and consumption of wildlife products.

Representatives of Governments and Regional Economic Integration Organizations gathered in Hanoi on 17 November 2016 and agreed on the *Hanoi Statement on Illegal Wildlife Trade*. This endorsed recommendations on combating the illegal trade and encouraged governments to take strong actions against wildlife crime, both on the demand and supply sides.

In 2017, the Minister of Agriculture and Rural Development promulgated Circular No. 04/2017/TT-BNNPTNT on the list of species of wildlife specified in the annexes of CITES.

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.

In order to end illegal wildlife trade and consumption in Viet Nam, Vietnamese regulatory authorities have gradually strengthened the legal framework of, and policies on, the management and protection of wildlife, supplementing shortcomings, gaps and inadequacies of existing policies. This aims to strengthen the law and the penalties and decrease profits generated from illegal wildlife trade; raise awareness and improve law enforcement; mobilize community participation in wildlife protection; undertake capacity-building for law enforcement agencies to control illegal and unsustainable wildlife trade; and conduct regular inspection of wildlife hunting, transportation, and consumption at restaurants, hotels, processing and trading facilities.

Research activities on breeding, raising, rescue and artificial propagation of endangered, precious and rare species

The raising and planting of species on the list of priority protection species is stipulated in Article 13 of Decree No. 160/2013/ND-CP. Priority protection species are raised or planted in biodiversity conservation facilities, and provincial people's committees are responsible for reviewing, issuing, and certifying those facilities.

MONRE issued Circular No. 25/2016/TT-BTNMT dated September 22, 2016, on application forms for certificates of biodiversity conservation facilities and report templates on the status of species that are on the list of endangered precious and rare species prioritized for protection and held in such facilities. This aims to to assist provincial people's committees in guiding organizations and individuals to apply for certificates for such facilities.

Thanks to incentive policies for reproduction of threatened species and their high economic value, some species that were extinct in the wild in Viet Nam have now been studied for commercial raising. There are some noticable successes in raising wild and rare species at local facilities such as:

- *Crocodylus siamensis*, which is in danger of extinction in the wild, has now been released through a reintroduction program into Cat Tien National Park. According to a preliminary assessment, the released population of crocodiles has been established.
-
- *Glyptostrobus pensilis* has been studied and there has been some initial success achieved in clonal propagation, opening up hopes for conservation and development of this threatened species.
- As a result of various research projects, the fisheries sector has succeeded in reproducing breeds such as as *Semilabeo obscurus, Catlocarpio siamensis, Hemibagrus guttatus* and *Bagarius rutilus*, which are considered rare species in the Red Book of Viet Nam (2007).
-
- In 2010, the Institute of Oceanography, Nha Trang studied and achieved success in reproducing a *Hippocampus kellogi* that was 35 cm long. This is a rare sea horse species, as defined in the Red Book of Viet Nam, IUCN Red List (2007) and Appendix II of CITES.
- In 2017, the Institute of Marine Resources and Environment succeeded in artificial reproduction and commercial raising of *Austriella corrugata* – a species of high economic

value in the Quang Ninh mangrove area.

Implement the Sustainable Forestry Development Program

According to the draft 2018 report of the Government on the results of three years of implementation of the 'Program for Sustainable Forestry Development' for the period 2016-2020, some targets and tasks have been achieved, as following:

- Forest protection: Between 2016-2018, the number of violations regarding to forest protection that annually recorded and reported by the Forest Protection Department was at an average of 17,665 cases, accounted for an average reduction of 9,600 cases per year compared to the 2011-2015 period. It is estimated that the period 2016-2020 period could reduce 39% of the total record compared to that given to the period 2011-2015.
- Decrease in the area of the damaged forests: Between 2016-2018, the average damaged forest area is 2,430 ha per year, decreasing by 270 ha per year, equivalent to 10% decrease compared to that occured in the period 2011-2015. It is estimated that the 2016-2020 period will be 30% lower than in the period 2011-2015.
- Forest areas allocated to households, individuals and communities for forest protection increased from 4,944 million ha / year in 2011-2015 to 6,143 million ha / year.
- Forest plantations: In the 2016-2018 period, total area for forest plantations is 675,000 ha, including 627,000 hectares production forest and 47,400 ha special-used forests .
- Sustainable forest management: as of August 2018, the total area of forest certified FSC was 229,281 ha (147,667 ha of planted forest and 81,604 ha of natural forest) in 17 provinces. There have been 36 certificates granted to four households and 32 forestry companies. Timber production is at 2.0 million m^3, and certified wood has a 10-15% higher selling price than unlicensed wood.

Payments for forest environmental services

According to a preliminary report on eight years of payments for forest environmental services, the total revenues collected by June 30, 2016 were VND 5,744,792 billion.

- By management levels: The Central Fund collected VND 4,236.558 billion (accounting for 74% of the total), while provincial funds collected VND 1,508.234 billion (accounting for 26%).
- By types of services: Revenues collected from hydropower plants was VND 5,586,497 billion (97% of the total), from water treatment facilities was VND 149.680 billion (2.5%) and VND 8.615 billion from tourism services (accounting for 0.2%).
- By years: In 2011, payments received were VND 282,928 billion, VND 1,183,915 billion in 2012, VND 1,096,389 billion in 2013, VND 1,335.013 billion in 2014, VND 1,327,779 billion in 2015, VND 518.766 billion in the first half of 2016.

Out of the VND 5,744,792 billion collected, the amount paid to forest owners and non-forest owners was VND 4,549,620 billion (minus 0.5% for management fee at the central fund, 10% at provincial funds, 5% for reserve and VND 370.571 billion approved by the Prime Minister for other purposes). The disbursement to forest owners and non-forest owners has reached 86.71% (Source: A brief of eight years of operation of the Forest Protection and Development Fund (2008-2015) and five years of implementing payments for forest environmental services (2011-2015), MARD, 2016).

Development of organic agriculture

According to information from MARD (2018), Viet Nam now has 33 provinces and cities under central authority that have organic agriculture. Although Viet Nam is behind many countries around the world in the production of organic products, the efforts of businesses and farmers have brought Viet Nam to the list of 170 countries participating in the production of agricultural organic products.

Many kinds of organic crops have been exported to global markets, including the United States, Japan, Australia and Korea, for example, Hoa Sua rice by Vien Phu Organic & Healthy Food Company (Ca Mau province) and/or Tam Viet rice by Mr. Vo Van Tieng (Dong Thap province). Furthermore, the TH Group is currently operating an organic dairy cow farm with a herd of 1,000 cows. Ca Mau is one of 33 provinces participating in large organic agricultural production, with the main product being organic shrimp. The province now has 12 associated businesses producing organic shrimp on an area of 20,000 hectares, with 4,000 farming households and a total organic shrimp output from 8,000 to 9,000 tons / year.

Establishment of agro-based production procedures under GAP

The Vietnamese Academy of Agricultural Sciences (belonging to MARD) has developed hundreds of accredited technology processes, including GAP agricultural production processes, value chain enhancement, safe agricultural production, and protection of appellations of origin. Most of these technology has also been completed and transferred to most provinces in the country.

Development of aquaculture facilities granted with Sustainable Seafood Certification

According to the Vietnamese Association of Seafood Exporters and Producers (VASEP), as of early 2013, Viet Nam has applied sustainable seafood certification from the Aquaculture Stewardship Council (ASC). *Implement the strategy for cleaner production in industry*

According to Viet Nam's Voluntary National Review on the Implementation of the Sustainable Development Goals (2018), the cleaner production strategy in industry has been deployed in 63 provinces and cities under the central government and has the participation of more than 9,000 enterprises in various industries, including mining, steel production, the food and beverage industry, chemical industry, construction and other processing industries. Many models of sustainable production in industry and in sustainable product design have been initially developed, mostly thanks to support from development partners, but broader implementation is still limited.

Periodic environmental reports by corporates

Purusant to Circular No. 36/2015/TT-BTNMT, corporate entities should prepare an annual report on hazardous waste management according to a template in Appendix 4 (A) issued in Circular No. 36/2015/TT-BTNMT and submit it to Departments of Natural Resources and Environment through the Environmental Protection Agency.

For facilities whose reports on environmental impact assessment have approved, their detailed plans for environment protection must include monitoring and evaluation of waste management once three months and a synthesized monitoring report is to be submitted to the state management agency once a year.

Developing and applying tourism models associated with biodiversity conservation

In Viet Nam, the tourism sector only contributes 3.8% of GDP (2016 data); however, this is still not commensurate with tourism potential. Tourism models associated with biodiversity conservation have been developed and operated at several national parks and biosphere reserves. Biodiversity can be product to develop tourism, socio-economic development and community life, especially for communities in protected area buffer zones. However, tourism development has not generated significant contribution in returning to the conservation and sustainable development of biodiversity resources.

Develop renewable energy sources and increase efficiency in use of energy

According to Viet Nam's 'Voluntary National Review on the Implementation of the Sustainable Development Goals' (2018), Viet Nam recently issued and implemented several policies to encourage the development of renewable energy sources. Many renewable energy development projects have been implemented, such as wind and solar power projects. The country currently has 77 industrial wind power projects registered in 18 provinces and cities across the country, with a total capacity of 7,000 MW. However, there are only three projects completed and connected to the national electricity system, with a capacity of 48.2 MW. If all registered projects are put into operation, it will help Viet Nam achieve the Government's goal of developing and using wind capacity of 6,200 MW by 2030. The use of biomass has also been developed in many rural areas and is expected to reach 2,000 MW by 2030.

Increasing energy efficiency in production and consumption is one of the significant solutions for reducing the impact of economic growth on the environment. Over the past decade, Viet Nam has implemented a series of policies and measures in this direction, such as prioritizing the development of renewable energy in accordance with Viet Nam's conditions; and encouraging efficient use of energy in production and living through the application of energy-saving technologies. In the period 2011-2015, Viet Nam's energy saving rate reached 5.6%, equivalent to total energy savings of nearly 11.3 million tons of converted oil. In particular, the energy use of the energy-intensive industrial production sectors decreased gradually: the steel industry decreased by 8.1%, cement fell by 6.3%, and yarn down by 7.3%. Resolution of the National Assembly No. 142 / QH13 / 2016 on the 5-year national socio-economic development plan for 2016-2020 has brought the target of reducing energy consumption on GDP into the national socio-economic criteria system.

Activities to enhance sustainable consumer awareness

According to Viet Nam's 'Voluntary National Review on the Implementation of the Sustainable Development Goals' (2018), Viet Nam has applied green labeling that was initiated by MONRE in 2009. This encourages production and consumption of products that use resources and energy efficiently. To date, MONRE has developed and issued criteria for issuing green labels for nine groups of products in the manufacturing sectors, such as packaging, washing powder, printing ink, batteries, electric lights, office equipment and building materials.

With a view to sustainable consumption, Viet Nam has applied a number of economic tools, such as a tax on mineral exploitation and water resources, environmental protection tax, and environmental protection fees for wastewater. The Law on Environmental Protection Tax issued in 2010 applies to eight groups considered to be essential goods and have a large impact on life.

Viet Nam aims to apply a green GDP into the national socio-economic indicator system

Assessing the economic value of natural ecosystems and biodiversity helps decision makers and managers to identify conservation priorities and act as basis for a trade off between conservation goals and development goals. However, in Viet Nam economic valuation of ecosystems is still only a research topic. Research results have been reported to local and central management for their consideration when carrying out economic development activities so that biodiversity and the value of natural ecosystems is guaranteed. Although provided, economic values from ecosystem services have not been included in the Viet Nam national accounting system.

In the current System of National Accounts, natural and environment resources which are used in production are considered a component to the national income, rather than a depreciation of resources. Many environmental products/services have not been fully evaluated and recorded in the current accounting system, leading to inadequate recognition of their growth. The United Nations has now introducted an integrated Green GDP calculation framework for consistent application of member countries.

Following the same framework, the Government of Viet Nam has looked to gradually integrate green accounting into the national accounts. The Prime Minister signed Decision No. 43/201/QD-TTg dated June 2, 2010, on the National Statistical Indicator System, which plans to develop and apply the green GDP target in the system of socio-economic indicators from 2014. The implementation has reached the stage of experimental calculation carried out in two seperate studies by the Central Institute for Economic Management and the Office of Sustainable Development (the Ministry of Planning and Investment).

Aichi Biodiversity Target 5: Habitat loss halved or reduced

1. Changes in typical ecosystems in Viet Nam

1.1. Forest ecosystems

Forests in Viet Nam are the habitat of most terrestrial wildlife species, and contain the highest levels of biodiversity. In 1990, the forest cover rate was only 27.8%, made up by 9,175,000 ha of forests.However, due to forest plantations, forest area has gradually increased and reached to 14,415,381 hectares in 2017, accounted the forest cover by 41.45%. However, this was still lower than expected as bare land and hills still constitute over 2 million hectares.

A draft report authorized by the Government in 2018 documenting the results of 3 year implementation of the Target Program on Sustainable Forestry Development for the period 2016-208 has provided some sets of accomplishment as follows:

- Forest protection: Between 2016-2018, the number of violations regarding to forest protection that annually recorded and reported by the Forest Protection Department was at an average of 17,665 cases, accounted for an average reduction of 9,600 cases per year compared to the 2011-2015 period. It is estimated that the period 2016-2020 period could reduce 39% of the total record compared to that given to the period 2011-2015.
- Decrease in the area of the damaged forests: Between 2016-2018, the avarage damaged forest area is 2,430 ha per year, decreasing by 270 ha per year, equivalent to 10% decrease compared to that occured in the period 2011-2015. It is estimated that the 2016-2020 period will be 30% lower than in the period 2011-2015

- Afforestation: in the period 2016-2018 a total area of 675,000 ha as intensive plantation done, equivalent to an average of 225.000 ha yearly, of which the area of production forest was 627,000ha, or 209,000 ha per year, plus 47,000 ha for special use forest and protection forest, equivalent to 15,800 ha per year;

However, given that plantations are normally monocultures, the diversitywithin plantation forests is much less than that of multi-storey, natural, evergreen tropical forests.

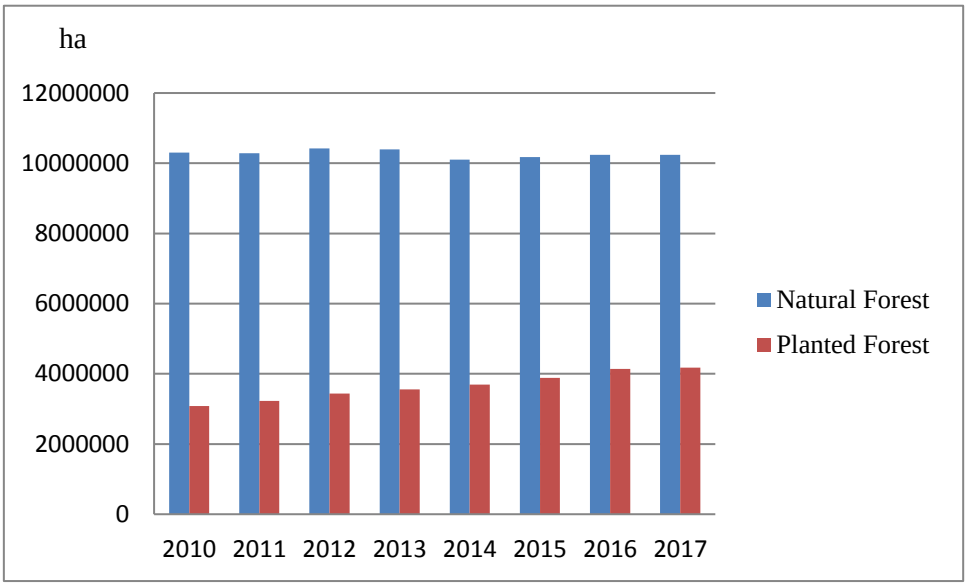


Figure 3: Changes in the area of natural forests and planted forests from 2010 to 2017

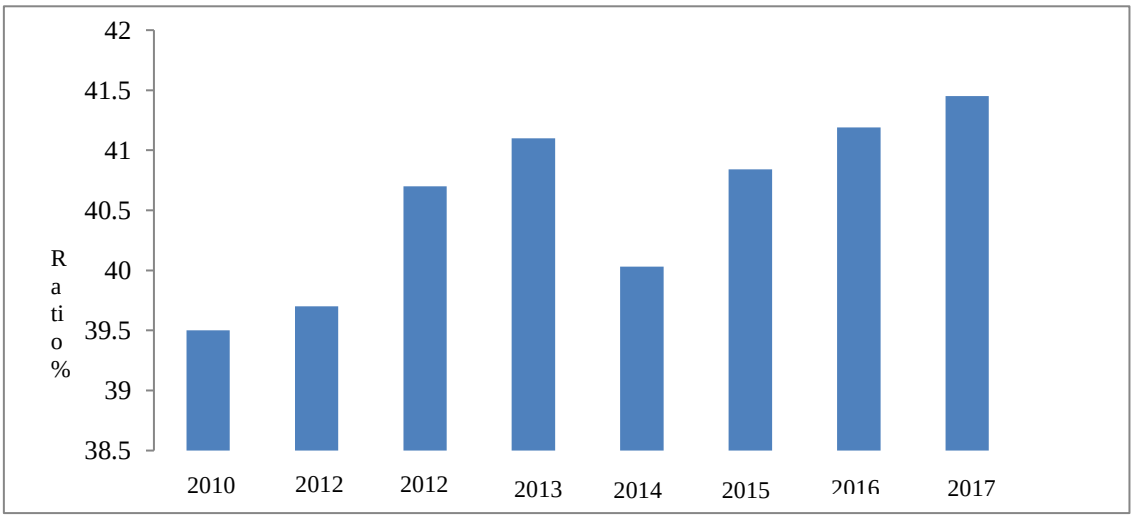


Figure 4: Changes in Forest cover from 2010 to 2017

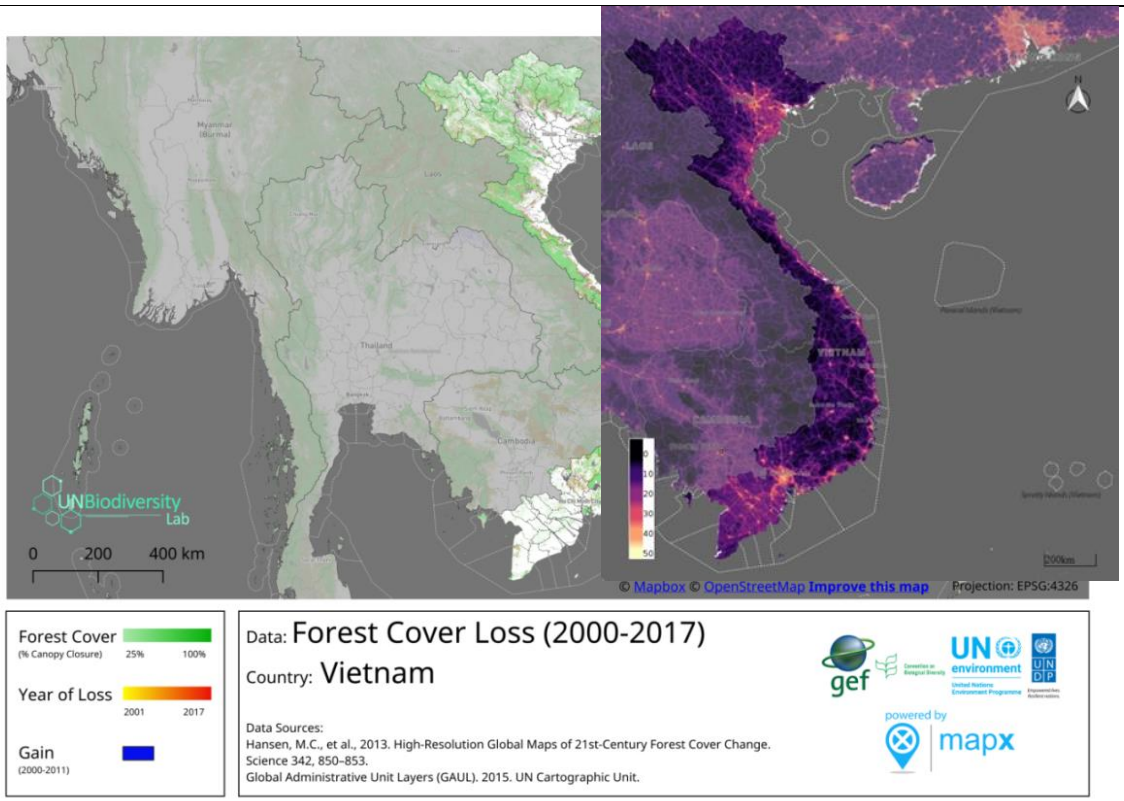


Figure 5: Forest cover and forest loss in the period 2000 – 2017

(source: UNBiodiversityLab, 2018)

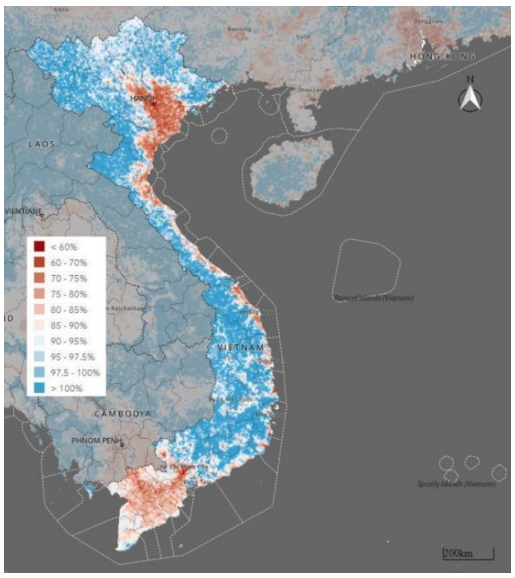


Figure 6: Biodiversity Intactness Index

(source: UN Biodiversity Lab, 2018)

Figure 7: Human Footprint 2009

(source: UN Biodiversity Lab, 2018)

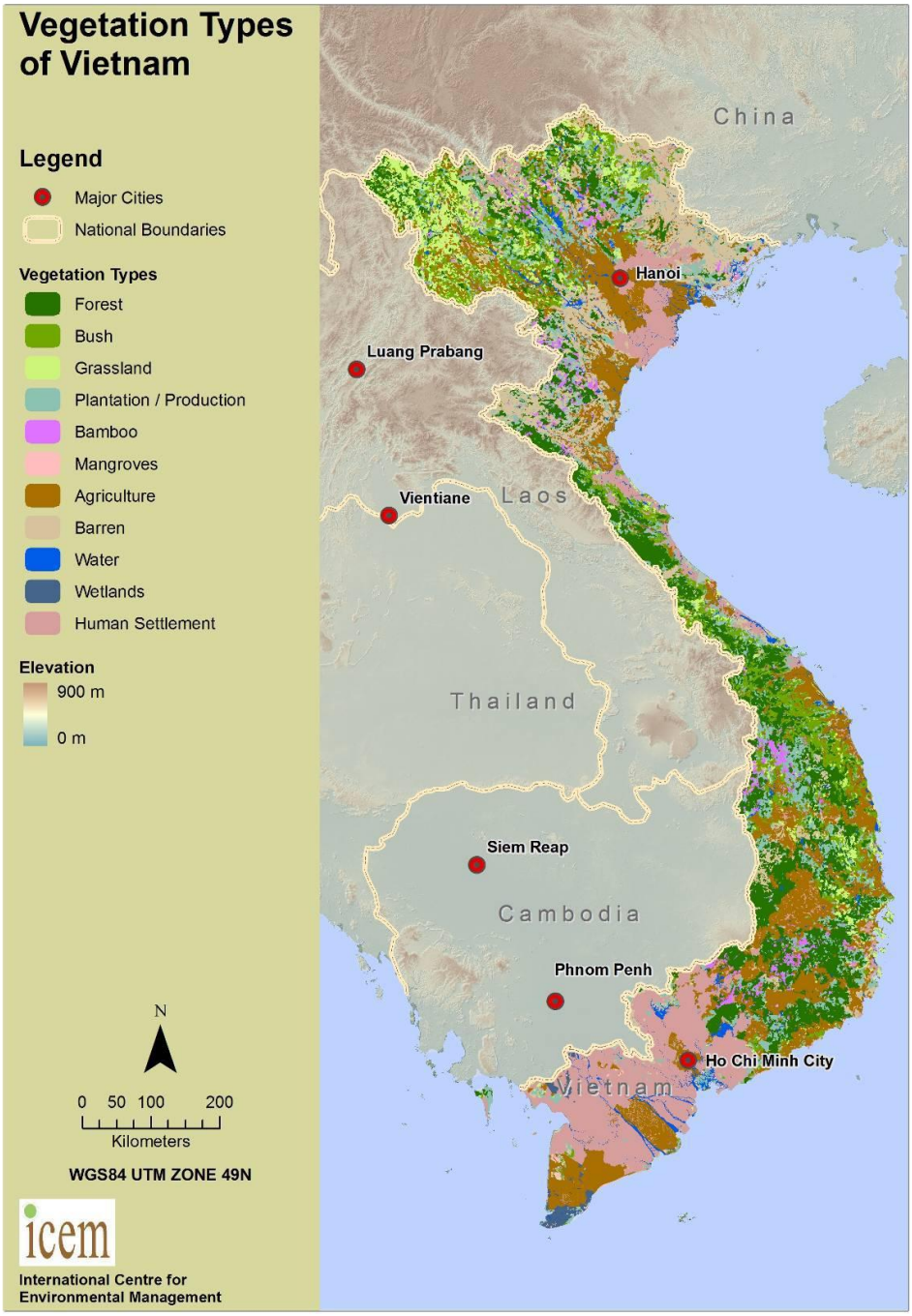


Figure 8: Map of vegetation types

(Source: ICEM, 2010)

1.2. Mangrove Ecosystems

Mangroves are plant communities formed in coastal tidal areas and tidal estuaries in tropical regions and tropical Asia. They are considered a very important ecosystem in coastal tidal areas; this is especially applicable to estuaries, which have the highest biological productivity. Mangroves are home to many animal species in their juvenile life stages and home to many other marine species. There has been a strong downward trend in the area coverage of coastal mangroves in Viet Nam, from 408,500 ha in 1943 to 83,288 ha in 2003 (83,288 ha). This means that in 60 years, four fifths of mangrove areas in Viet Nam have been lost.

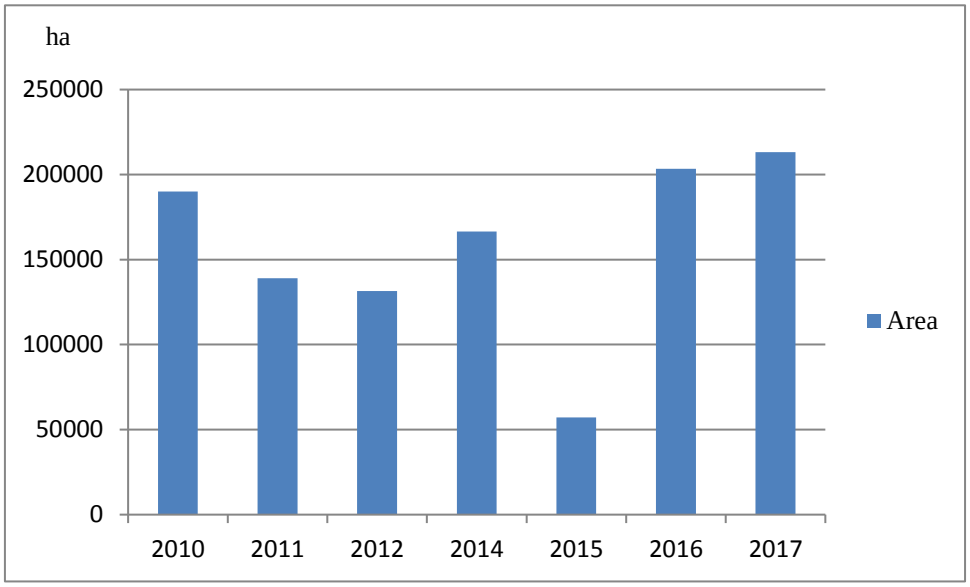


Figure 9. Changes in the area of mangrove forests from2010 to 2017

For the period of 2010 to 2017, according to statistics by MARD, there has been little overall change in the mangrove forest, except in 2015. The area of mangrove was lowest in 2015, with 57,211 ha. In 2017, it reached 213,142 ha. Studies show that from 1975 onwards, clearance for shrimp farming and other aquaculture, together withland use conversion for infrastructure and residential construction were the main causes of the reduction of mangrove forests. The subsequent increase can be explained by areas being newly afforestated.

Figure 10: Mangrove Forest Cover for the 21st Century (2014)

(source: UN Biodiversity Lab, 2018)

1.3. Seagrass ecosystem

Viet Nam has 14 seagrass species in its coastal sea grass ecosystems, which are distributed in almost all tidal areas ofwater bodies along the coast and along the shores of Vietnamese islands (except tidal areas such as the large estuaries of the Red River in the north and the Mekong River in the south). Seagrass ecosystems are high in biomass and have a diverse marine fauna. Communities in seagrass beds in Viet Nam are estimated to number nearly 1,500 different species of creatures, of which coastal grasses have more than 1,000 species (Nguyen Thi Thu, Cao Van Luong et al. (2011). In particular, the seagrass beds of Phu Quoc island are home to Dugon dugon, which is globally listed as Vulnerable on the IUCN Red List. Nguyen Thi Thu, Cao Van Luong et al. (2011) identified that the area of seagrass beds in Viet Nam is over 20,000 ha. In particular, the coastal strip accounts for about 50%,

equivelent to about 10,000 ha. The areas with large and concentrated grass cover are found only in coastal lagoons of the central region, and account for more than 75% of the total area of coastal grass.

However, coastal seagrasses have been seriously degraded. In 10 years, the area of coastal seaweed lost has been an average of 40-50%. According to Nguyen Van Tien (2013), Viet Nam's seagrass area is 18,130 ha.

According to remote sensing conducted by Cao Van Luong et al. (2012), the area of seagrass beds in coastal waters of Viet Nam was about 17,000 ha, scattered in bays, islands and lagoons. In the same study, it was shown that the area of seagrass beds had declined by 50% compared to 1999. In particular, the seagrass beds in Tam Giang - Cau Hai have been reduced by 60% of its area when compared to 1999 figures.

Cao Van Luong et al. (2014) investigated and identified 2,858 ha of seagrass beds in the western coast of Tonkin Gulf of Viet Nam.

Threats to the existence of seagrass beds result from economic activities such as maritime operations, fishing using destructive techniques, tourism, aquaculture, land reclamation, etc. These activities have exerted pressure on seagrasses through waste-water discharges, by damaging habitats, degrading water and altering sediment loads. In addition, natural disasters such as hurricanes, together with coastal flows, transport of sediments during floods, and global sea level rise are also great threats to seagrass beds. According to a survey by WWF in 2003, Phu Quoc and Con Dao are the two remaining sea regions in Viet Nam in which sea cows (Dugong dugon) live, but there are fewer than 100 individuals. However, according to the management board of Phu Quoc Protected Area (2016), Dugong dugon is no longer being seen in the seagrass beds that are under the management of the protected area.

Figure 11: Distribution of Seagrasses by 2017

(source:UN Biodiversity Lab, 2018)

1.4. Coral reef ecosystems

According to the book *South China Sea monograph, Volume IV: Marine Biology and Ecology (Publishing House for Natural Science and Technology, 2009),* the geographical positions and natural conditions of Viet Nam's seas are generally favorable for coral development, especially for coral reefs. Apart from estuarines and river mouths, which have light salt levels and are muddy, corals are distributed mostly on continental and island crusts and are particularly developed in the Hoang Sa and Truong Sa archipelagos in the South China Sea. In terms of distribution, corals in the southern seas (South Central, East, Southwest, Truong Sa archipelago) are richer in composition than are those in the north. There are four major coral regions in Viet Nam: the Hoang Sa and Truong Sa archipelagos; the central coastal regions and the south east islands; the west of Tonkin Gulf; and the south-west sea.

Studies have recorded nearly 400 species of coral reefs in Nha Trang Bay, Ninh Thuan, and for Con Dao, over 300 species (Vo Si Tuan, 2003). There are 236 species of coral in the south-western region (Nguyen Huy Yet 2007; 2009). Surveys in 2010, 2011 and 2015 recorded 444 species of coral in 19 islands in the Viet Nam Sea, of which 378 species are of hard coral (Do Van Khuong et al., 2015).

Studies show that coral reefs in Viet Nam are rich in biodiversity and diverse in species composition. It can be said that reef habitat has the largest number of species compared to other marine habitats, with representatives of almost all major animal and plant species living in seas and oceans. Studies show that there are about 2,100 species of fauna in coral reefs in Viet Nam. Of this, the most diverse group is coral reef fish with 763 species, followed by the molluscs with nearly 700 species, crustaceans with more than 250 species, polychaete worms with about 170 species and echinoderms with nearly 100 species.

According to survey and research conducted in 2008-2010 by the Institute of Marine Resources and Environment, the total actual area of coral reefs in Viet Nam is about 14,130 ha. According to Nguyen Van Long and Vo Si Tuan (2014), the total area of coral reefs in Viet Nam's waters is 13,355 ha.

Table 4: Distribution and area of coral reefs in coastal waters in Viet Nam

(*: Marine protected areas (MPAs), in accordance with Decision 742/QD-TTg)

Area	Locations	Estimated Coral Reef Area (ha)	Within existing MPAS (ha)	Number of Hard Coral Species
The Gulf of Tonkin	Dao Tran*	NA	NA	48
	Co To*	370	370	121
	Ha Long-Cat Ba*	500	500	171
	Bai Tu Long	NA	NA	115
	Bach Long Vi*	1,578	1,578	93
	Hon Me*	NA	NA	72
	Con Co*	274	274	166
The coastal central	Hai Van-Son Cha*	NA	NA	102
	Da Nang	105	NA	226

areas	Cu Lao Cham*	311	311	227
	Ly Son*	1,704	1,704	79
	Phu Yen	303	NA	139
	Van Phong	1,618	NA	292
	Nha Trang*	731	183	350
	Ninh Hai (Nui Chua*)	2,330	1,070	310
	Hon Cau*	506	506	184
	Phu Quy*	1,488	1,488	239
The eastern and western southern coasts	Con Dao*	903	903	307
	Nam Du	80	NA	126
	Phu Quoc*	474	292	251
	Tho Chu	80	NA	198
Total		13,355	9,179	403

Source: Nguyen Van Long and Vo Si Tuan (2014)

As part of the project '*Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, UNEP/GEF/SCS'* led by the Institute of Oceanography, a survey was conducted in 200 coral reefs along the coastal Viet Nam. Findings show that only 1% of the studied reefs had high coral cover, while those having low coral cover accounted for 31%. The reefs having average and fair coral cover accounted for 41% and 26%, respectively.

Figue 12. Distribution of coral reefs by 2010

(source: UN Biodiversity Lab, 2018)

According to the project, coral cover in coastal areas has been declining, with a decrease of more than 30% over the last 10 years in many areas. Some identified threats to coral reefs include: overexploitation, destructive fishing, sedimentation, pollution, outbreak of pests such as sea-buckthorn (*Acanthaster planci*), sea urchin,invasion of porifera (sponges), and natural disasters. These include events such as algal blooms in Ca Na Bay in 2002; sea-buckthorn bursts in Nha

Trang Bay, Van Phong and Cu Lao Cham (2002 - 2004); the umulative effects of high temperatures and low salinity for a short period, as with, for example, Con Dao in 2005; the effects of floods from the mainland, such as to Cu Lao Cham coral reefs (2006); and bleaching of corals, such as in the waters of Phu Quoc (2010) (Vo Si Tuan et al., 2005; 2013). Studies of the current status of reef resources in coastal areas of Viet Nam also reflect the poor diversity of aquatic organisms, such as fish, mollusks, Echinodermata, crustaceans (Vo Si Tuan et al., 2008). Coastal coral reefs are facing serious deterioration due to overexploitation, unreasonable use and environmental pollution.

2. Legal documents on preventing losses of important natural ecosystems

Important natural ecosystems of high biodiversity value, such as terrestrial forests, wetland forests, coral reefs, and seagrass beds have shrunk or degraded in quality. As such, the Government of Viet Nam has developed and issued a number of legal documents, together with management policies and mechanisms. These relate to natural ecosystems, especially those that are of high biodiversity value but very sensitive to human impacts, such as natural inland forests, mangrove forests, coral reefs, and seagrass.

- The Biodiversity Law (2008) has a whole separate chapter on conservation and sustainable development of natural ecosystems; this has 21 articles. In other laws, such as the Forestry Law (2017) also contains a chapter on forest protection, and, in particular, Article 37 stipulates the protection of forest ecosystems. In addition, the Fisheries Law (2017) contains Article 15 on marine protected areas and Article 17 on aquatic resource protection areas.
- According to Viet Nam's NBSAP, the first specific target is identified as: To improve quality and increase the area of protected natural ecosystems; primary forest remains at 0.57 million hectares coupled with effective protection plans; mangrove forests, seagrass beds, and coral reefs are maintained at the current levels; 15% of degraded critical ecosystems are restored.
- Pursuant to Decision 45/QD-TTg dated January 8, 2014, the 'National Master Plan for Biodiversity Conservation to 2020, orientation to 2030' was approved. In this, plans for existing protected areas were systematically organized and 46 new protected areas were declared, bringing the total number of existing and newly-planned protected areas nationwide to 219 with a total area of about 3,067,000 ha and distributed evenly through the country.
- Decree No. 29/2019 / ND-CP dated March 8, 2019 of the Government, detailed a number of articles and measures to implement the Law on Fisheries (2017).
- Decree No. 156/2018/ND-CP dated November 16, 2018 of the Government, detailed the implementation of a number of articles of the Law on Forestry (2017).
- Decree No. 40/2015/ND-CP dated April 27, 2015 of the Government, on amending and supplementing a number of articles of Decree No. 157/2013/ND-CP dated November 11, 2013, on administrative sanctions for violations to the provisions on forest management, forest development, forest protection, and forest product management.
- Decision No. 742/QD-TTg dated May 26, 2010 of the Government, on approving the master plan of the system of marine protected areas in Viet Nam to 2020.

- Decision No. 07/2012/QD-TTg dated February 8, 2012 of the Prime Minister, on introducing a number of policies to strengthen forest protection.
- Decision No. 57/QD-TTg dated January 9, 2012 of the Prime Minister, on approving the 'National Plan for Forest Protection and Development' in the period of 2011-2020.
- Decision No. 218/QD-TTg dated February 7, 2014 of the Prime Minister, on approving the 'Strategy on Management of Special-use Forests, Marine Protected Areas and Inland Water Conservation Areas in Viet Nam to 2020, vision to 2030'.
- Decision 1976/QD-TTg dated October 30, 2014 of the Prime Minister, on approving the planning of the national special-use forest system to 2020, vision to 2030.
- Decision No. 2295/QD-TTg dated December 17, 2014, approving the integrated coastal management strategy in Viet Nam to 2020, vision to 2030.
- Decision No. 120/QD-TTg dated January 22, 2015 of the Prime Minister, on approving the plan for coastal forest protection and development in response to climate change in the period of 2015-2020.

In addition, there are other legal documents by MONRE and MARD that provide guidance for the implementation of the aforementioned documents.

3. Measures and actions taken to protect important natural ecosystems

3.1. Preventing deforestation

According to a report created by MARD (2016), forest protection and development activities have been implemented as follows:

- In furtherance of Directive No. 1685/CT-TTg dated September 27, 2011 on strengthening the direction and implementation of forest protection measures, preventing deforestation and actions against public officials, governments of all levels have paid more attention to forest management and protection. Together with many local socio-economic development programs and forest protection and development projects, positive impacts on forest protection have been recorded.
- Exercising the intention of socializing forest protection and management, ensuring that each forest has its owner identified through the policy of land and forest allocation. Average contracted forest area per year has increased from 2,600,000 ha/year in the period of 2006-2010 to 4,900,000 ha/year from 2011 to present.
- Regularly organizing awareness-raising and education activities to mobilize communities and local authorities to pay more attention to forest protection and management. This aims to change local awareness at different levels, especially at the grassroot level, and promote the participation of local people in forest protection. Over 62,000 agreements on forest protection and development have been signed among village communities.
- The Central Steering Committee for urgent issues in forest protection, and forest fire prevention and fighting, regularly organizes meetings, assigning responsibilities to each member for directing and urging localities. Inspection teams have annually visited hot spots of deforestation and key areas of high forest fire risk, to inspect and urge localities

to take initiative in forest protection and forest fire prevention and fighting. Provinces have strengthened their approach to forest fire prevention, reviewing and completing forest fire prevention and fighting plans under the "4 on-the-spots" practice. MARD regularly publishes and provides information and warnings about forest fires on mass media (TV, radio and newspaper) so that forest owners are informed and take preventive measures.

- The organizational system of the forest protection force has been strengthened from the central to the local level. There have been 42,000 forest protection groups established in the country.
- A steering committee has been established in 58 out of 63 provinces to take care of urgent issues in forest protection, forest fire prevention and fighting. A steering committee has also been established in more than 460, out of 520, forest districts and in 4,816, out of 5,985, forest communes. These committees direct, administer, and promote forest owners to take actions on forest protection, forest fire prevention and fighting at the local level and, at the same time, take care of combatting deforestation and forest fire fighting at grassroots levels.
- In the period of 2011-2015, afforestation, including reforestation, totalled 1,088,700 ha; area zoned for regeneration totalled 361,000 ha/year on average, contracted forest area for protection totalled 4,900,000 ha; and rehabilitation and restoration totalled 11,800 ha, at an average of 2,360 ha per year.
- For coastal protection forest, area newly planted by November 30, 2015 reached 1,968 ha (1,103 ha of mangrove forest, 301 ha of sand-shielding forest, 564 of combined protection and production forests). Furthermore, area zoned for regeneration and rehabilitation totalled 1,105 ha (763 ha of mangrove forests, 343 ha of sand-shielding forests); and area of forest contracted for protection totalled 12,681 ha (protection forest: 12,326 ha, production forest: 355 ha).
- Implemented ‘Program for Sustainable Forestry Development for the period 2016’ sucessfully, which focus on:
    - Forest protection: reduce the number of violations of law on forest protection (39%), and the damaged forest area (30%);
    - Forest plantations: In the 2016-2018 period, total area for forest plantations is 675,000 ha, including 627,000 hectares production forest and 47,400 ha special-used forests;
    - Applying sustainable forest management certificate: As of August 2018, the total area of forest certified under the FSC system is 229,281 ha, in 17 provinces with 36 applications certificates.

3.2. Payments for forest environmental services

Payments for forest environmental services was promulgated and piloted in 2008.

Total payments for forest environmental services in three years to August 2014 were VND 3,329 billion (USD 157 million), most of which came from hydropower plants (97%), clean water facilities (2%) and tourism businesses (less than 1%).

According to a preliminary report on eight years of payments for forest environmental services, the total revenues collected by June 30, 2016 were VND5,744,792 billion.

3.3. Wetlands Inventory Updates

In 2016, within the framework of the project: '*Conservation of Important Wetlands and Associated Habitats'*, MONRE and a consultant agency undertook inventory updates of wetlands in Viet Nam and completed a detailed list and map of listed important wetlands. Accordingly, the total wetland area of Viet Nam is currently 11,847,975 ha (excluding the area of rivers and streams that are seasonally flooded, springs, spots of hot water, and mineral water), accounting for 37% of Viet Nam's total land area. In addition, there are 74 important wetland areas (at international and national levels). A wetland database has also been established. These data can be used as up-to-date statistics on wetland areas and their distribution in Viet Nam.

3.4. Research of coral reef rehabilitation and regeneration

The Institute of Oceanography in Nha Trang and the Institute of Marine Environment and Resources in Hai Phong, under the Viet Nam Academy of Science and Technology, have carried out experimental research on planting and reproducing coral reefs. This has been done with the participation of communities and enterprises in some marine protected areas, such as Con Co (Quang Tri), Cu Lao Cham, Son Tra and Nha Trang Bay.

3.5. Models and initiatives of biodiversity conservation

To harmorize biodiversity conservation and economic development, it is nescessary to apply measures and models for sustainable use of natural resources. In this, community participation is of the utmost importance, as all conservation models should aim to serve the community. Over time, and within the framework of international and national projects, Vietnamese experts together with foreign consultants have developed and applied hundreds of models and initiatives of biodiversity conservation for many localities, especially for buffer zones, ecological rehabilitation zones, and biosphere reserves.

Aichi Biodiversity Target 6: Sustainable management of aquatic living resources

1. Aquatic living resources

Investigations of aquatic living resources in Vietnamese waters have been conducted by the Institute of Marine Environment and Resources in Hai Phong, under the sub-project '*Baseline survey on the current status of and changes in marine resources in Viet Nam'* in the period of 2011-2015. The synthesis report (2016) provides some key information on Viet Nam's aquatic living resources as follows:

- Viet Nam's sea is of high biodiversity value and has abundant marine species. According to various surveys of marine resources in the period of 2011-2015, there are 941 species of seafood, belonging to 462 varieties and of 191 families (of which the South East Sea contains 619 species, the Central Coast 457 species, the Gulf of Tonkin 430 species and the middle of the South China Sea 129 species).
- The total average reserve of key marine resources in Viet Nam is estimated at 4.36 million tons, 12.9% lower than in the period 2000-2005. The reserve of small surface-dwelling fish is 2.65 million tons (accounting for 60.7% of the total stock of marine resources); deep sea fish is 643 thousand tons (14.7%); crustaceans make up 38.1

thousand tons (0.9%); coral reef fish 2.6 thousand tons (0.1%); and large surfacedwelling fish 1,031 thousand tons, (23.6%).

2. Fishing status

According to the Directorate of Fisheries, total output of aquatic products reached over 7.28 million tons as of the end of 2017 (+5.6% y/y). Production volume in 2017 was reported at 3,421 thousand ton (+5.7% y/y), of which marine fisheries catches reached 3,221 thousand tons (+5.7% y/y), and domestic production was 200 thousand tons (+5.7% y/y).

According to the Research Institute of Marine Fisheries (2016), marine fisheries catches for Viet Nam by species (from July 2014 to June 2015) were reported at 3.72 million tons. The Central Coastal had the highest production, at 1.45 million tons, accounting for 39% of the total catch. The catches of the south-eastern provinces were about 924 thousand tons (accounting for 25%); the south-west's was approximately 699 thousand tons (19%). The catches in the Gulf of Tonkin was the lowest, at only 652 thousand tons (17%).

Table 5: Fisheries production in 2017

Units: Volume (1,000 tonnes); Area: (1,000 ha); Number of vessels (1,000); Number of passengers (1,000); Export value (USD million); production value (VND billion).

No.	Item	2017 Target	Actual 2016 performance	2017 estimates	Comparision (%)	
					to the target	to 2016
I	Production value	105%	200,902	212,985	-	106
	Catches		78,630	83,482	-	106.2
	Culture		122,272	129,503	-	105.9
II	Total output	7,000	6,895	7,279	104	105.6
1	Catches	3,300	3,237	3,421	103.7	105.7
	Marine catches		3,047	3,221		105.7
	Domestic production		190	200		105.3
2	Culture	3,700	3,658	3,858	104,3	105.5
	Brackishwater prawn	675	657,2	683,4	101,2	104
	- *Black Tiger Shrimp*	265	263,8	256,4	96,8	97.2
	- *CT Shrimp*	410	393,4	427,0	104,1	108.5
	Pangasius	120	1,187	1,250	104,2	105.3
III	Culture area		1,071	1,103		103.1
	Brackishwater prawn	700	694.6	721,1	103	103,8
	- *Black Tiger Shrimp*	600	600.4	622,4	103,7	103,7
	- *CT Shrimp*	100	94.2	98,7	98,7	104,7
	Pangasius	5	5.05	5,227	104,5	103,5
IV	Number of fishing vessels		109.9	109.6		99.7
	Offshore teams		3,500	4,400		125.7
	Number of vessels		10	12		120

	Number of participants		100	120		120
V	Export value	7,100	7,162	8,399		117.3
1	Shrimps of many kinds		3,151	3,863		122.6
	- *White leg shrimp*		1,958	2,535		129.5
	- *Black Tiger Shrimp*		931	880		94.6
2	Pangasius		1,715	1,785		104.1
3	Tuna		508	597		117.1
4	Other fish species		1,139	1,328		116.7
5	Squid and octopus		439	620		141.3
6	Other aquatic products		209	206		98.6
Source: The Directorate of Fisheries						

3. Pressures on fisheries

3.1. Over-exploitation of fisheries resources

Over-exploitation of fisheries resources has been increasing in recent years. Details are as follows:

- Many marine species are being considered over-exploited in sea areas, including in the Gulf of Tonkin (silver fish, *Evynnis cardinalis*, *Saurida tumbil*, *Saurida undosquamis*); the Central Coastal (Chinese squid, Indian squid, *Priacanthus macracanthus*, Goatfish, Round scad); the South East (tuna, silver fish, Round scad, *Saurida tumbil*); and the South West (*Saurida umeyoshii*).
- Sizes of fish species that dominate production volumes in coastal regions of Viet Nam are relatively small, with animals not reaching sexual maturity. The proportion of sexual immaturity in the Gulf of Tonkin is about 58%; 64% in the Central Coastal, 40% in the South-east and 44% in the South-west.
- The total number of fishing vessels throughout the country as of May 2014, was 113,557 (according to the statistics of coastal provinces). In terms of fleet structure, vessels in the coastal areas (<90 CV of capacity) make up the majority of the total fleet, while offshore vessels (>90 CV of capacity) account for a much smaller share.
- Over 70% of the total number of marine fishing boats in Viet Nam operate mainly in coastal waters, accounting for about 35% of the total seafood exploitation. However, the coastal waters only occupy about 11% of the exclusive economic zone and, since this is also the traditional fishing area of Viet Nam, it is continually over-exploited and the pressures of exploitation in this area are increasing. The primary issues that contribute to overexploitation are that the number of fishing boats is too large; small vessels conduct their fishing activities freely; and there is an uncontrolled increase in the number of fishing boats. These factors have all caused an imbalance between exploitation capacity and natural reserves and the economic efficiency of this industry is gradually decreasing. Although the total fisheries outputs have been increasing continuously, the average yield (ton / cv / year) shows a declining trend.
- Investigations and studies on aquatic living resources in Vietnamese waters have been conducted by the Institute of Marine Environment and Resources in Hai Phong, under

the sub-project 'Baseline survey on the current status of and changes in marine resources in Viet Nam' in the period of 2011-2015. Study results show certain similarities: coastal fish stocks are depleted due to over-fishing and illegal exploitation of fisheries; and exploitation practices that destroy marine fisheries are being used, including bottom trawling with small netting, the use of explosives, and the use of cyanide for fishing in coral reef regions.

- Many high-value aquatic species have been severely affected in terms of their abundance, such as brookfish, tilapia, lobster, abalone, etc. Destructive fishing techniques such as use of explosives, toxins, and electric shocks to capture fish are rampant and uncontrollable in both inland waters and offshore, posing a serious threat to natural ecosystems.

3.2. Extensive development of hydropower dams

Hydropower dams and reservoirs have been built mostly on main rivers in uplands where are homes to natural forests of high biodiversity values. This not only flooded valleys that were originally covered by natural forests, but also created barriers for migratory fishes, leading to changes in the reproduction, growth, and feeding behaviors of these aquatic organisms. This construction also has many impacts on downstream rivers, including estuarine ones. Many hydropower reservoirs have not followed standard processes, such as flood discharge, flows, etc, which this has subsequently caused human and economic losses, severely affecting downstream ecological systems.

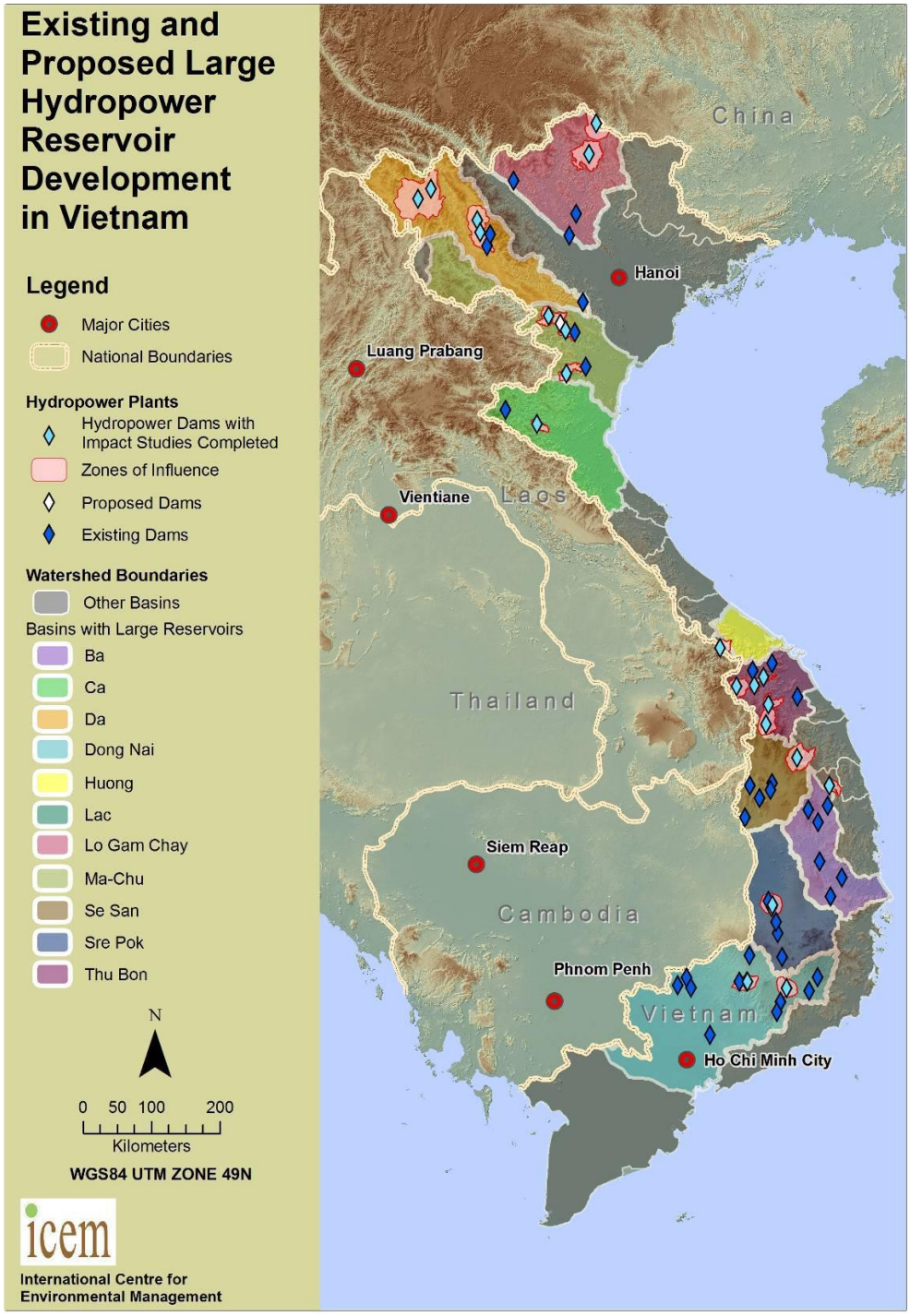


Figure 13: Map of large dams and hypropowers in Viet Nam

(Source: ICEM, 2010*)*

3.3. Pollution caused by human activities

Rapid urbanization and industrialization in river basins and coastal areas has seriously affected water quality. Untreated domestic and industrial waste water is discharged into rivers, lakes, and coastal areas. This is not well-controlled, leading environment pollution, degrading aquatic ecosystems, and reducing biodiversity. Specifically, such actions have caused the buoyancy of floating plants in inland fresh lakes, and red tides in some coastal areas, causing mass death of aquatic animals, especially fish.

3.4. The system of marine protected areas and inland wetlands is slowly evolving

Ten out of the 16 marine protected areas that are planned under the Marine Protected Area Master Plan have now been established, including Cat Ba, Bach Long Vy, Con Co, Cu Lao Cham, Ly Son, Nha Trang Bay, Nui Chua, Hon Cau, Con Dao and Phu Quoc.

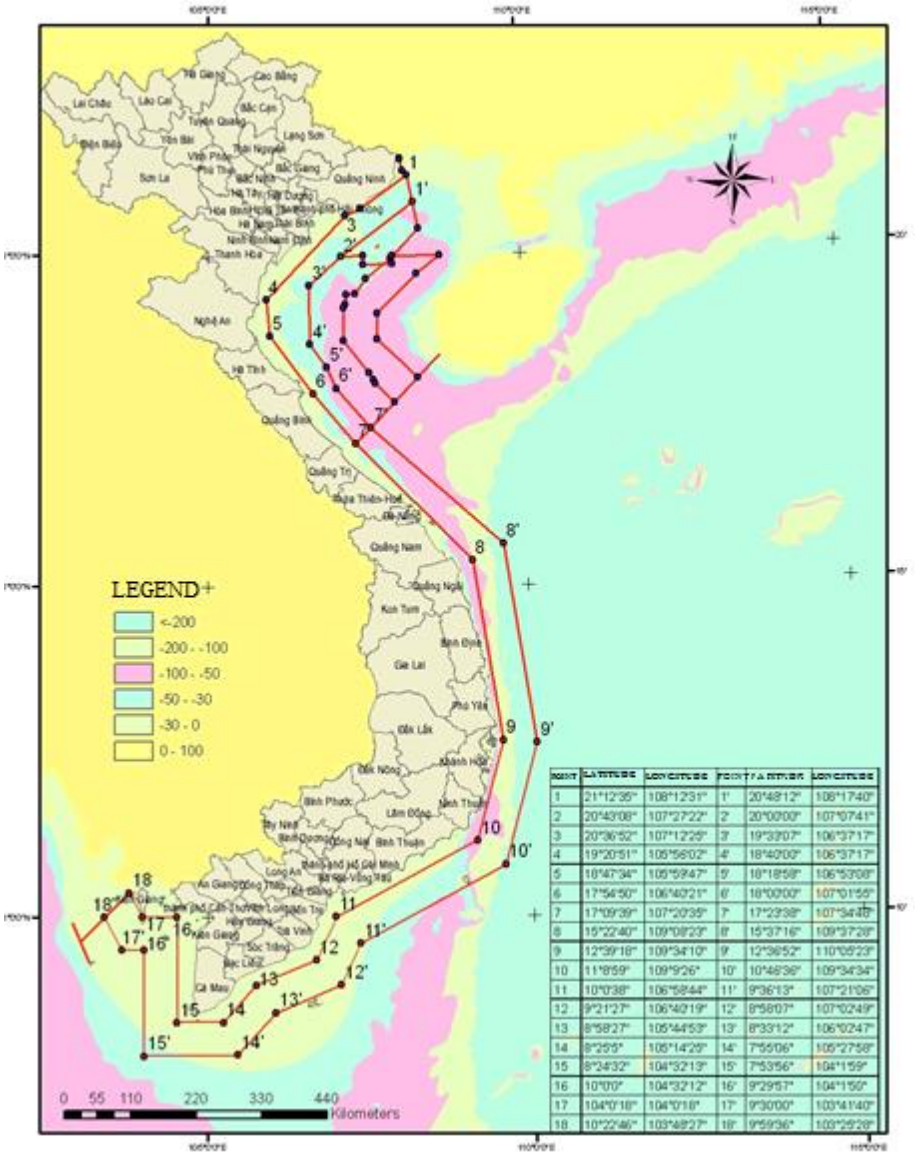
The system of wetland reserves has been implemented slowly, even though wetland reserves are mentioned in the National Master Plan for Biodiversity Conservation (2014). So far, only two wetland reserves have been established in accordance with regulations in the Biodiversity Law; these are the Dong Xuyen Bird Sanctuary and Species Conservation Area in Bac Ninh Province, and the Phu My Species and Habitat Conservation Area in Kien Giang Province.

4. Legal documents on sustainable exploitation and use of aquatic resources

Aiming towards aquatic biodiversity conservation, and sustainable exploitation and use of fishery resources, the Government has developed and promulgated a number of legal documents. These are to serve as guidance for different sectors and localities and include:

- In 2008, the Minister of Agriculture and Rural Development issued Decision No. 56/2008 / QD-BNN on 'Regulation on inspection and certification of sustainable aquaculture'.
- - Chapter 12 contained in The Law on Fisheries (2017), has 12 clauses on aquatic resource protection and development. In particular, Clause 4, Article 13, stipulates that MARD promulgates a list of locations in which fishing is prohibited, fishing gear that is not allowed to be used, and a list of times in which it is prohibited to fish. Furthermore, in Clause 5, there is a stipulation that provincial People's Committees are to provide for additional prohibited objects to those already listed, in accordance with actual local fishing practices (after approval by MARD).
- Decision 485/QD/TTg dated May 2, 2008 of the Prime Minister, approved the 'Proposal for conservation of endangered precious and rare aquatic species to 2015, vision to 2020'. This is targeted towards preventing the decline of threatened species; carrying out rehabilitation programs for endemic aquatic species of high value; biodiversity conservation; and sustainable development of fisheries with community participation.
- - On that basis, the Minister of Agriculture and Rural Development signed Decision No. 82/2008/QD-BNN, announcing a list of threatened species in Viet Nam that need to be protected and rehabilitated. In general, threatened aquatic species recorded in this Decision have been listed in Viet Nam's Red Data Book, published in 1996, 1998, 2000 and 2007.
- In 2010, the Prime Minister approved the 'Master Plan for the system of Marine Protected Areas to 2020'.
- Decree No. 33/2010/ND-CP regulates the management of fishing activities in Viet Nam's sea areas. It aims to instate effective exploitation accompanied with protection and development

aquatic resources; ensure safety for fishermen and fishing vessels operating in sea areas; and ensure that Vietnamese fishing vessels fish in and out of Viet Nam's sea areas lawfully. Mapping out routes for dividing sea areas into different fishing areas aims to appropriately allocate fishing resources, thus contributing to improving the efficiency of fishing activities. Specifically, organizations and individuals engaged in fishing activities in Viet Nam's sea areas must comply with relevant regulations and follow lists of aquatic species banned from exploitation; not use methods, trades and gears that are banned or restricted from use in sea areas; not operate in areas where exploitation is prohibited; and not operate at times when exploitation is prohibited.



POINT	LATITUDE	LONGITUDE	POINT	LATITUDE	LONGITUDE
1	21°12'35"	108°12'51"	1'	20°48'12"	108°17'40"
2	20°43'08"	107°27'22"	2'	20°00'00"	107°07'41"
3	20°36'52"	107°12'26"	3'	19°33'07"	106°37'17"
4	19°20'51"	105°58'02"	4'	18°40'00"	106°37'17"
5	10°47'34"	105°59'47"	5'	18°18'59"	106°53'08"
6	17°56'50"	106°40'21"	6'	18°00'00"	107°01'55"
7	17°09'39"	107°20'35"	7'	17°23'39"	107°34'48"
8	15°22'40"	109°08'23"	8'	15°37'16"	109°37'28"
9	12°39'16"	109°34'10"	9'	12°36'52"	110°08'23"
10	11°8'59"	109°9'26"	10'	10°46'36"	109°34'34"
11	10°0'38"	106°58'44"	11'	9°36'13"	107°21'06"
12	9°21'27"	106°40'19"	12'	8°58'07"	107°02'49"
13	8°58'27"	105°44'53"	13'	8°33'12"	106°02'47"
14	8°2'55"	105°14'29"	14'	7°55'06"	105°27'58"
15	8°24'32"	104°32'13"	15'	7°53'56"	104°1'59"
16	10°0'0"	104°32'12"	16'	9°29'57"	104°1'50"
17	104°0'18"	104°0'18"	17'	9°30'00"	103°41'40"
18	10°22'46"	103°48'27"	18'	9°59'36"	103°29'28"

Figure 14 : Fishing zones in Viet Nam's sea areas

(Issued along with Decree No. 33/2010/ND-CP of the Government Dated March 31, 2010)

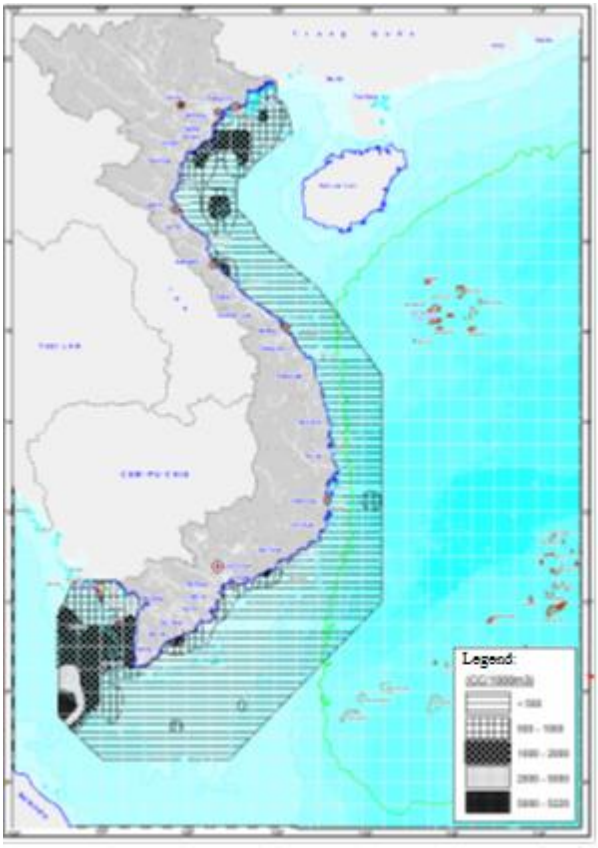
Decision No. 188/QD-TTg dated February 13, 2013 of the Prime Minister approving the 'Program on protection and development of aquatic resources to 2020'.

- The Government has developed and implemented the 'National Strategy for Environmental Protection to 2020, vision to 2030' with one specific target: to mitigate deterioration and exhaustion of natural resources and to restrain the degradation of biodiversity.
- In Decision No. 78/QD-TTg dated January 16, 2018, the Prime Minister approved the 'National Plan of Action on preventing, reducing and eliminating illegal, unreported and unregulated (IUU) fishing to 2025'. This aims to prevent, reduce and eliminate illegal, unreported and unregulated fishing activities of Vietnamese and foreign organizations and individuals in Viet Nam's water; to promote the development of responsible and sustainable fisheries; to contribute to national and regional security and international integration; and to terminate unlawful fishing activities by Vietnamese fishermen and fishing vessels in other countries' sea areas.

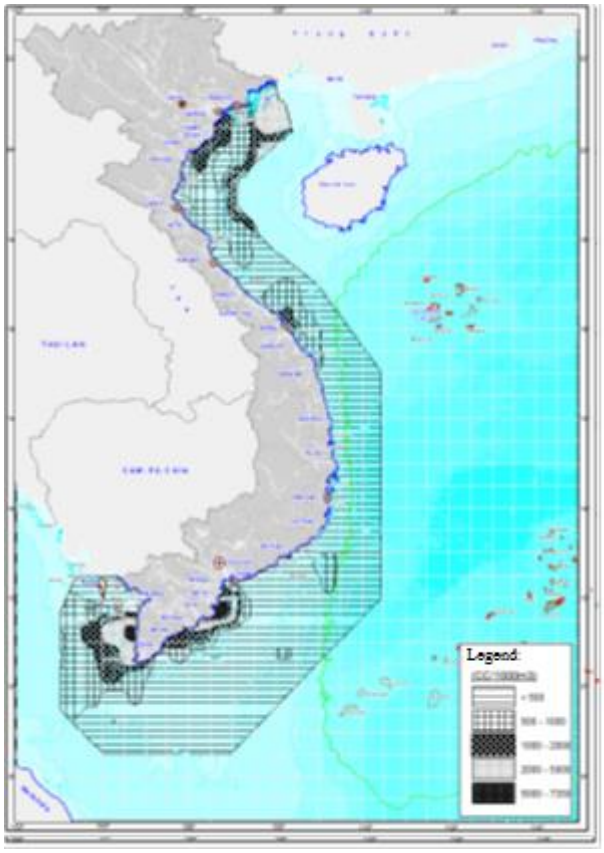
5. Activities to protect aquatic resources

- Coastal provinces have so far developed master plans for areas that are banned from being fished, for areas in which exploitation is prohibited during specific periods, and published lists of trades and gear that are banned from being used.
- By 2017, according to MARD data, ten marine protected areas had been established, including Cat Ba, Bach Long Vy, Con Co, Cu Lao Cham, Ly Son, Nha Trang Bay, Nui Chua, Hon Cau, Con Dao and Phu Quoc. Four others have had detailed master plans completed and applications for approval are being finalised; these include Hon Me, Hai Van - Son Cha, Phu Quy and Nam Yen. Master plans are being developed for two additional locations: Co To and Dao Tran.
- MARD organizes an annual program of aquatic resources release in various types of water bodies such as rivers, lakes, and coastal areas, This has helped to boost regeneration and development of aquatic resources.
- Within the '*Program on protection and development of aquatic resources to 2020'*, there has research on raising some valuable aquatic species has been conducted, including:
    - Successes in reproducing, and then commercially breeding, *Semilabeo obscurus, Catlocarpio siamensis, Hemibagrus guttatus,* and *Bagarius rutilus* which are listed as rare species in Viet Nam's Red List and in the Red Data Book (2007).
    - Thanks to aquaculture development, production volumes of aquaculture products have accounted for more than half of Viet Nam's total annual outputs. According to a report by the Vitenam Directorate of Fisheries, in 2017, the total fishery outputs reached over 7.28 million tons, including fisheries catches of nearly 3.42 million tons and production volumes of 3.86 million tons. Production share accounted for 53% of total outputs (compared with 54% in 2016).
    - In 2017, the Institute of Marine Resources and Environment researched the artificial reproduction and commercial raising of *Austriella corrugata* - a species of high economic value in Quang Ninh's mangrove area.
- The project '*Overall survey of the current status and changes of marine resources in Viet Nam'* was conducted in the period of 2011-2015 by of the Research Institute for Marine Fishery. Based on the study of fish eggs and larve, the study established that there are high concentrations areas of juveniles (natural nusery areas) in Vietnamese sea areas. The results are being used as basis for

the planning of marine resources protection areas in Viet Nam.



Northeast wind season



Southwest wind season

Figure 15. High concentration area of fish juveniles (natural nursery grounds) in Vietnamese seas
(Source: The Research Institute for Marine Fishery: small Project I.9, Project 47 (2011-2015))

6. Development of sustainable fisheries

According to MARD, in 2009, clam products from Ben Tre province have attained MSC certification. This helps clam producers to expand markets to European countries, North America and Korea etc. Since then, the price of MSC certified clam products has increased by 25-30%, helping to raise and guarantee incomes for farmers and, especially, making clam farming in this area sustainable and environmentally friendly.

Up to 2014, sixenterprises were granted with sustainable seafood certification from the Aquaculture Stewardship Council (ASC).

In addition, WWF-Viet Nam undertakes other activities, such as raising the awareness of domestic consumers on the use of green seafood products; reducing demand for unsustainable products; working with ocean tuna fishermen to encourage the rescue of hooked turtles, use fishing hooks to reduce the impact on sea turtles, and communicating with people about protecting sea turtles, marine mammals, sharks and offspring of exploited species (tuna). They are also encouraging fishermen to use nets with larger mesh sizes in the green crab traps at Kien Giang province to helps small crabs escape and send staff on board fishing vessels in order to observe the impact of fishing on sea turtles and other protected species and and guide fishermen

about sea turtles rescues, etc.

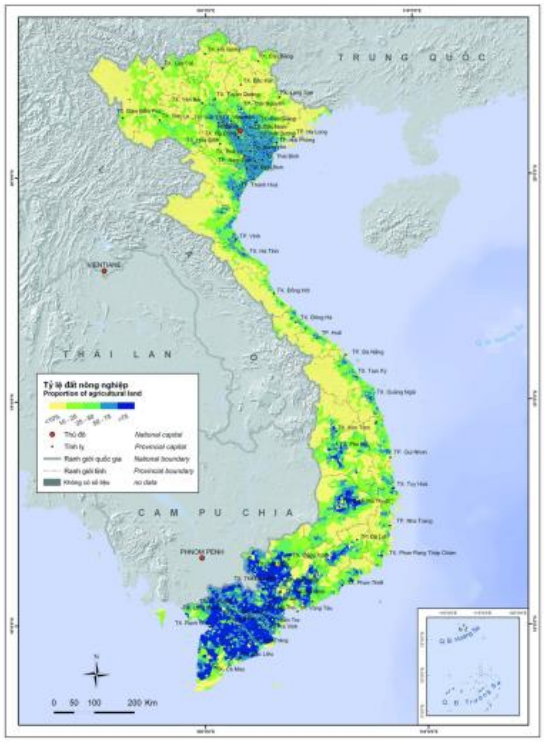
A report by MARD (2018) shows that, given the above efforts, Viet Nam has achieved some initial results in combating illegal, unreported, and unregulated fishing (IUU). International regulations on IUU fishing have been codified in the Fisheries Law of 2017 and guiding documents have been basically enacted. Awareness-raising and dissemination of information about IUU fishing has been conducted. Accordingly, awareness of fisheries management agencies from central to local levels, of fishing communities and of businesses has been enhanced. The situation of fishing vessels violating the waters of Pacific Island countries has also almost ended. Finally, the inspection and control of fishing vessels operating on the sea has been improved and international cooperation, participation in agreements and international conventions on fisheries have made many positive efforts.

Aichi Biodiversity Target 7: Sustainable agriculture, aquaculture and forestry

1. Policies and mechanisms for sustainable agriculture

1.1. Agricultural land use

Viet Nam is considered the cradle of wet rice civilization. Accordingly, the agriculture sector is quite developed, typically focused on wet rice cultivation. According to the General Statistics Office in 2017, there are 8,890,600 hectares of cultivated area of cereal (rice, maize) in the country.



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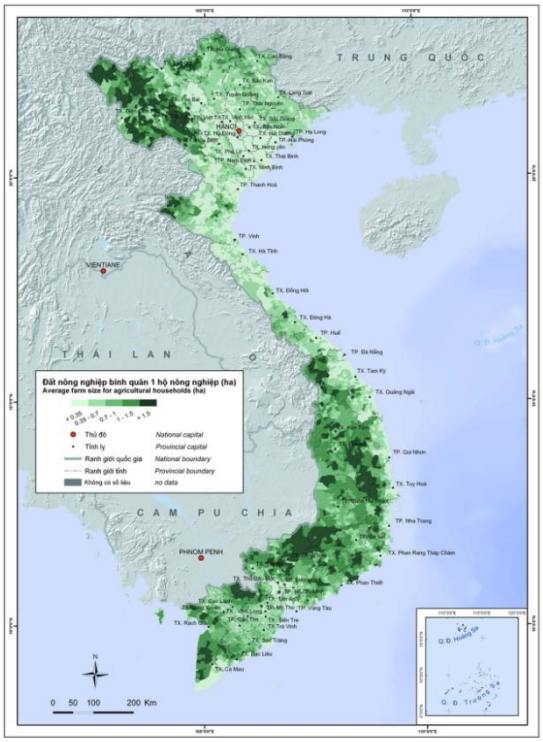


B

Figure 16: Map on proportion of land use for agriculture

(A), Average agricultural land area per household (ha) (B), Forestry

Source: Epprecht, M. And Robinson, T. P. (Eds.). *Agricultural Atlas of Viet Nam. A Depiction of the 2001 Rural Agriculture and Fisheries Census*

There is a growing pressure resulted from convertion of agricultural land to higher-value non-agricultural use, particularly for expansion of urbanization and industrial parks). Such conversion has strongly driven an increase of intensive land use in the contexts of cheap labor costs, fertile land in some areas and relatively good climatic conditions.

1.2. Policies/ mechanisms

The Prime Minister issued Decision No. 899/QD-TTg dated June 10, 2013, on approving the

'Plan of restructuring the agricultural sector towards improving value added and sustainable development'. This emphasized three pillars for economic, social, and environmental sustainability in agricultural development and defined three policy issues:

- The first deals directly with green agriculture, including planning and zoning of land use, requirements for environmental assessment, monitoring, and control of use of pesticide fertilizers, food hygiene, and compliance to safety standards, and sanctions for environmental violations.
- The second relates to market instruments to help agricultural producers to implement environmentally-friendly agricultural practices. Policy tools in this group include carbon emission credits, grants for research and application of green technologies, payments for environmental services, establishment of environmental protection funds, and imposition of environment protection fees and resource use taxes.
- The third deals with technology and education for awareness-raising, including development of databases on green agriculture, conducting research and transfer of green technologies, application of technology to planting, announcing cases of environmental harms to communities, training and awareness raising, and forming eco-labels based on environmentally friendly processes (e.g. VietGAP, UTZ Certificate).

MARD set up the Steering Committee on Sustainable Development in 2013 in order to prepare action plans/programs for sustainable development. This aligns with the 'Agricultural Restructuring Plan for the period of 2015-2020' and tries to integrate sustainable development strategies into the policy-making process.

National policy tools

- Price subsidies: The Government offers price subsidies to companies purchasing rice left on fields for temporary storage during the harvest and sets limits for price differences among regions and seasons, aiming at a 30% return for farmers.
- Exemption of irrigation fees: Before 2009, farmers had to pay management and maintainence costs for irrigation works. Exemption of irrigation fees have been applied to most farmers since 2009, resulting in a significant increase in government support to companies specialized in irrigation and drainage management.
- Providing seeds and livestock breeds: There have been many programs providing genetically modified seeds and livestock breeds to farmers at favorable rates. At the national level, such support is often provided as part of bailouts to farmers who have suffered from natural disasters or diseases.
- Credit mechanism: Since 2009, several policy packages have been introduced to provide farmers with cheaper credit to purchase machinery, equipment, and materials.
- Payment by area: In 2012, direct payments per hectare were applied to rice farmers as part of measures to protect and promote paddy land development.
- Insurance: A pilot insurance program was introduced in 2011, supporting insurance premiums for rice production, livestock breeding, and fisheries in 21 provinces.
- Income support: Since 2003, exemption and incentives of agricultural land use taxes have been given to most farm households and organizations.
- Extension services: The central budget for agricultural extension has been allocated through an open auction system since 2001. The allocation nature is the top down approach, driven by actual needs.

1.3. Agricultural performances

According to MARD, crop production contributes 73% of the GDP in agriculture and accounts for more than 50% of agricultural export value via various subsectors and products. Many crop items have large export turnover. Specifically, out of the ten key export categories for which export values are more than USD 1 billion, seven are major crops, notably pepper, cashew and coffee, which ranked highest in the world. The quality of some agricultural products has been significantly improved and some crops (e.g. rice, dragon fruit, lichi, longan, grapefruit, tea and lemon) have successfully penetrated international markets such as the United States, Japan, Australia, Korea and Europe.

According to MARD, the gross output value of animal husbandry (at 2010 comparable prices) reached VND 15,401 billion (+4.1% y/y). A trend observed was population reduction, especially the number of sows, which from 4.2 million heads will be 3 million heads by 2020. Meanwhile, to maintain the productivity of 3 million head to be the as same as that of 4.2 million, it is necessary to increase intensive farming and reduce individual livestock households.

Under the 'Plan for restructuring the agricultural sector by products and regions for the period of 2017-2020', there is to be a review of current plans and strategies by assessing the advantages and market needs for three levels of products:

a) National key products (those with an export values of USD 1 billion or more as well as pork and poultry meat): Review current plans and strategies to then develop intensive, large-scale production areas that are linked to the value chain. This is to be done through cooperation with various partners with the application of science and technology.

b) Provincial-level key products: Based on provincial advantages and market demands, this aims to group those products for planning and investment in the same way as for national key products but at the local level. Adoption of policies and measures to expand production and competitiveness to integrate them into national key products is also envisaged.

c) The third group includes local specialties produced at a small scale and that are associated with specific geographical areas. The strategy for these is in the form of "one commune, one product".

Specific targets are to have the annual rate of growth of agricultural GDP reach 3% by 2020, and that farmers' income is to have increased at least 1.8 times compared with 2015.

1.4. Development of organic agriculture

According to MARD (2018), Viet Nam is one of 170 countries participating in the production of organic agricultural products. There are 33 provinces and cities under central authority that have organic agriculture. So far, many kinds of organic crops (such as rice) and livestock products (such as ducks, pigs, dairy cows, shrimp etc.) have officially arrived in world market such as the United States , Japan, Australia, Korea.

1.5. Establishment of agro-based production procedures under GAP

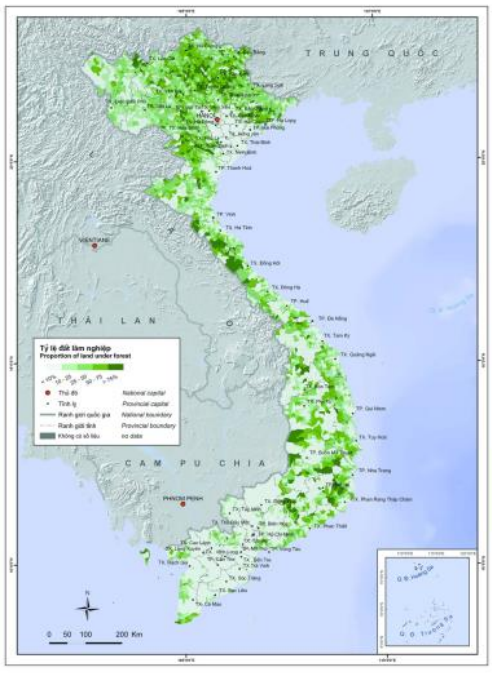
The Vietnamese Academy of Agricultural Sciences (belonging to MARD) has developed hundreds of accredited technology processes, including GAP agricultural production processes, value chain enhancement, safe agricultural production, and protection of appellations of origin. Examples include the process of preventing brown backed rice plant hopper, yellow dwarf,

twisted leaves and black dwarf stripes on rice; Integrated Pest Management (IPM) process for greening on citrus; propagating Cayen pineapple by cuttings; production of vegetables under VietGAP; grafting tomatoes to improve their ability to resist bacterial wilt and increase their ability to resist flooding in the off-season conditions; creating disease-free seedlings by top-grafted micrograss; propagating bananas invitro; technology for plant protection products; and sustainable sloping land cultivation. The process of transferring mushroom production from the household level to a larger farming scale, and from low-to high-grade mushrooms has also been completed, placing mushroom production as a new profession that is included in the National Product Program. High-tech flower growing has also been completed and transferred to more than 50% of provinces in the country

2. Policies and mechanisms for sustainable forestry

2.1. Forestry land

According to MARD (2017), there were 16,033,696 ha of forestry land in the country, of which protection forest land was 5,848,557 ha; special-use forest land equated to 2,228,888 ha; and production forest land 7,956,251 ha. In 2016, the National Assembly issued Resolution No. 134/2016/QH13 dated April 9, 2016, on the adjustment of land use plan to 2020 and the national land use plan for the last period (2016-2020). Accordingly, by 2020, there is a target to have 16,245,250 ha of forest land, of which protected forest land will constitute 4,618,440 ha; special-use forest land 2,358,870 ha; and production forest land 9,267,940 ha.



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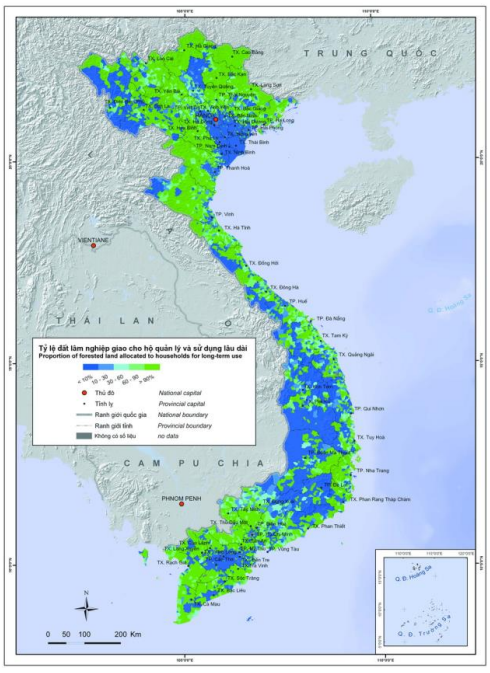
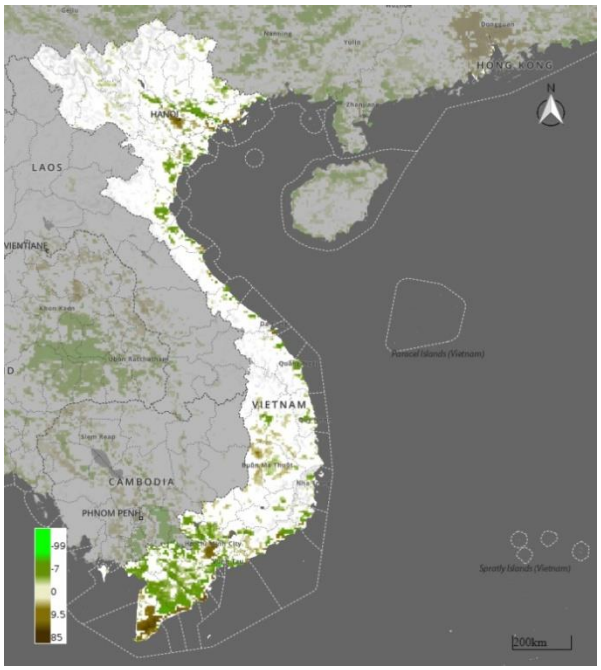


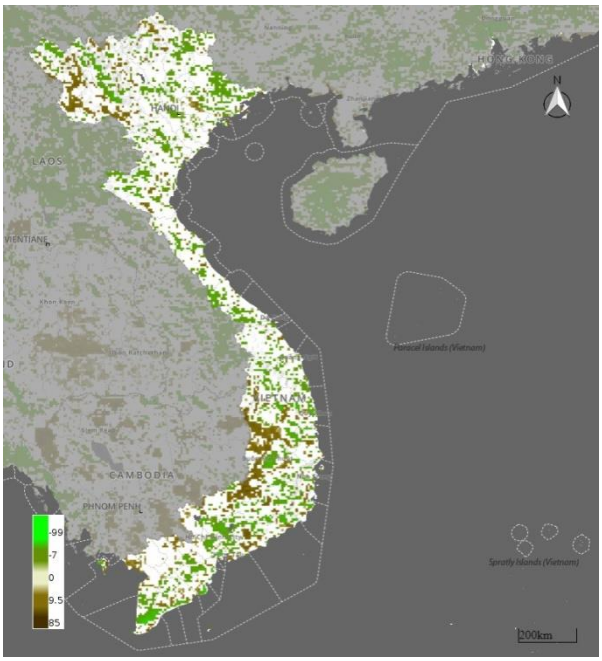
B

Figure 17: Map on proportion of land use for forestry

Source: Epprecht, M. And Robinson, T. P. (Eds.). *Agricultural Atlas of Viet Nam. A Depiction of the 2001 Rural Agriculture and Fisheries Census*



Bare Ground Change (1982 – 2016)



Short Vegetation Change (1982 - 2016)

Figure 18. Correlation between changes in bare-land and vegetation cover from 1982-2016

(source: UN BiodiversityLab, 2018)

2.2. Forest land lease:

According to MARD data (2017): As of December 31, 2015, the forest area allocated or leased to individuals was 14,061,856 ha, of which 10,175,519 ha was natural forests (accounting for 72%) and 3,886,337 ha was planted forests (28%).

2.3. Exploitation and use of forests. According to MARD (2017), in the period of 2011-2015, natural forest timber that was harvested equated to 400,400 m^3 and plantation forest logging equated to 42.5 million m^3.

The timber processing and products sector has developed strongly. Currently, there are about 3,500 enterprises, mainly private and foreign direct investment (FDI) enterprises. Some enterprises have invested in products made from scrap, sawdust, and wood chips. Vietnamese wood products have so far been exported to more than 100 countries and territories, with developed markets such as the United States, the European Union, Japan, Korea and China being the main importers. Export turnover of wood and non-timber forest products increased from USD $2.8 billion in 2009 to USD $5.7 billion in 2013 and reached USD $7.1 billion in 2015.

2.4. Policies and mechanisms for payments for forest environmental services:

In 2008, payments for forest environmental services was implemented in Lam Dong and Son La provinces. Accordingly, water users, including hydro power plants, bottled water

companies and other entities, must pay for environmental services.

Decree No.99/2010/ND-CP dated September 24, 2010 of the Government on payments for forest environmental services. Further to that, many circulars guiding the implementation of Decree 99 and Decision 126 have been issued by MARD, such as Circular No. 80/2011/TT-BNNPTNT dated November 23, 2011, providing guidance on how to determine payments for forest environmental services; Circular No. 20/2012/TT-BNNPTNT dated May 07, 2012, on guiding procedures for checking and collecting payments for forest environmental services; and Circular No. 60/2012/TT-BNNPTNT dated November 09, 2012, stipulating the principles and methods of determining the forest area subject to payments for forest environmental services.

Total payments for forest environmental services for three years until August 2014 were VND 3,329 billion (USD 157 million), most of which came from hydropower plants (97%), clean water facilities (2%) and tourism businesses (less than 1%).

According to a preliminary report regarding eight years of payments for forest environmental services, the total forest environmental services revenues at the national level was VND 5,744.792 billion by June 30, 2016, of which:

- By management levels: The Central Fund collected VND 4,236.558 billion (accounted for 73.7%), provincial funds collected VND 1,508.234 billion (accounted for 26.3%).
- By types of services: Revenues collected from hydropower plants was VND 5,586,497 billion (97.25%), from water treatment facilities were VND 149.680 billion (2.59%), and VND 8.615 billion from tourism services (accounting for 0.16%).
- By years: In 2011, payments received were VND 282,928 billion, in 2012 VND 1,183.915 billion, in 2013 VND 1,096.389 billion, in 2014 VND 1,335.013 billion, in 2015 VND 1,327.779 billion, and in the first half of 2016, VND 518.766 billion.

Out of the fees collected, the amount paid to forest owners and non-forest owners was VND 4,549.620 billion (minus 0.5% for management fee at the central fund, 10% at provincial funds, 5% for reserve and VND 370.571 billion approved by the Prime Minister for other purposes). The disbursement to forest owners and non-forest owners has reached 86.71%. (Source: A brief of 8 years of operation of the Forest Protection and Development Fund (2008-2015) and 5 years of implementing payments for forest environmental services (2011-2015), MARD, 2016).

2.5. Reduce Emissions from Deforestation and Forest Degradation (REDD+) program: Since 2008, Viet Nam has been cooperating with the World Bank, the UN-REDD Program and some international non-government in capacity-building to implement REDD+, to reduce greenhouse gas emissions through efforts to reduce deforestation and forest degradation, and to compensate those implementing REDD+ activities at the local level. Currently, The Netherlands Development Organisation (SNV) is implementing a pilot project to integrate REDD+ into high biodiversity areas to promote biodiversity conservation during the implementation of REDD+ projects. The implementation of REDD+ is an opportunity to mobilize funding for biodiversity conservation and to integrate biodiversity conservation into the overall goal of developing forest ecosystems.

2.6. Implement the Sustainable Forestry Development Program

According to the 2018 draft report authored by the Government on the results of three years of

implementation of the 'Program for Sustainable Forestry Development for the period 2016 – 2020', some targets and tasks have been achieved as following:

- Forest protection: In the 2016-2018 period, the number of violations of law on forest protection and development on average 17,665 cases/year, an average reduction of 9,600 cases/year, when compared to the 2011-2015 period. It is estimated that the 2016-2020 period the number of cases will reduce 39% compared to the 2011-2015 period.
- In 2016-2018, the damaged forest area was 2,430 ha/year, decreasing by 270 ha/year, equivalent to a 10% decrease when compared to the 2011-2015 period. It is estimated that the 2016-2020 period will be 30% lower than in the 2011-2015 period.
- Forest areas allocated to households, individuals and communities increased from 4,944 million ha/year in period 2011-2015, to 6,143 million ha year in period 2016-2018.
- In the period from 2016 to 2018, the total area of plantation was 675,000 ha, equivalent to the annual average area of 225,000 ha, of which the area of production forest was 627,000 ha, the annual average area of 209,000 ha, and 47,000 ha for special use forest and protection forest, the annual average area of 15,800 ha.

Regarding sustainable forest management: As of August 2018, the total area of forest certified under the Forest Stewardship Council (FSC) system was 229,281 ha (147,667 ha of planted forest and 81,604 ha of natural forest) in 17 provinces with 36 certificates granted including four households (in Tuyen Quang, Yen Bai, Quang Tri and Quang Nam province) and 32 forestry companies. Timber production is certified at 2 million m^3. FSC-certified wood and products fetch 10-15% higher than non-FSC certified products.

3. Policies and mechanisms for sustainable aquaculture

3.1. Status of aquaculture in Viet Nam

Viet Nam has a system of dense rivers and long coastline, forming a diverse range of water bodies such as lagoons, bays and tidal flats that are very convenient for fishing and aquaculture. According to the Viet Nam Association of Seafood Exporters and Producers, Viet Nam's seafood production has been growing steadily over the last 17 years at average rate of 9.07% per year. Aquaculture has made great strides and its production has continuously increased at the average rate of 12.77% / year, contributing significantly to the growth of total fisheries production of the country.

According to a report by the Directorate of Fisheries, aquaculture production in 2017 were estimated at 3,858 thousand tons increased by 5.5% compared to 2016 and aquaculture area was 1.1million ha. Aquaculture production accounted for 53% of country's fishery production (compared to 54% in 2016). That reduces the pressure of natural fishing.

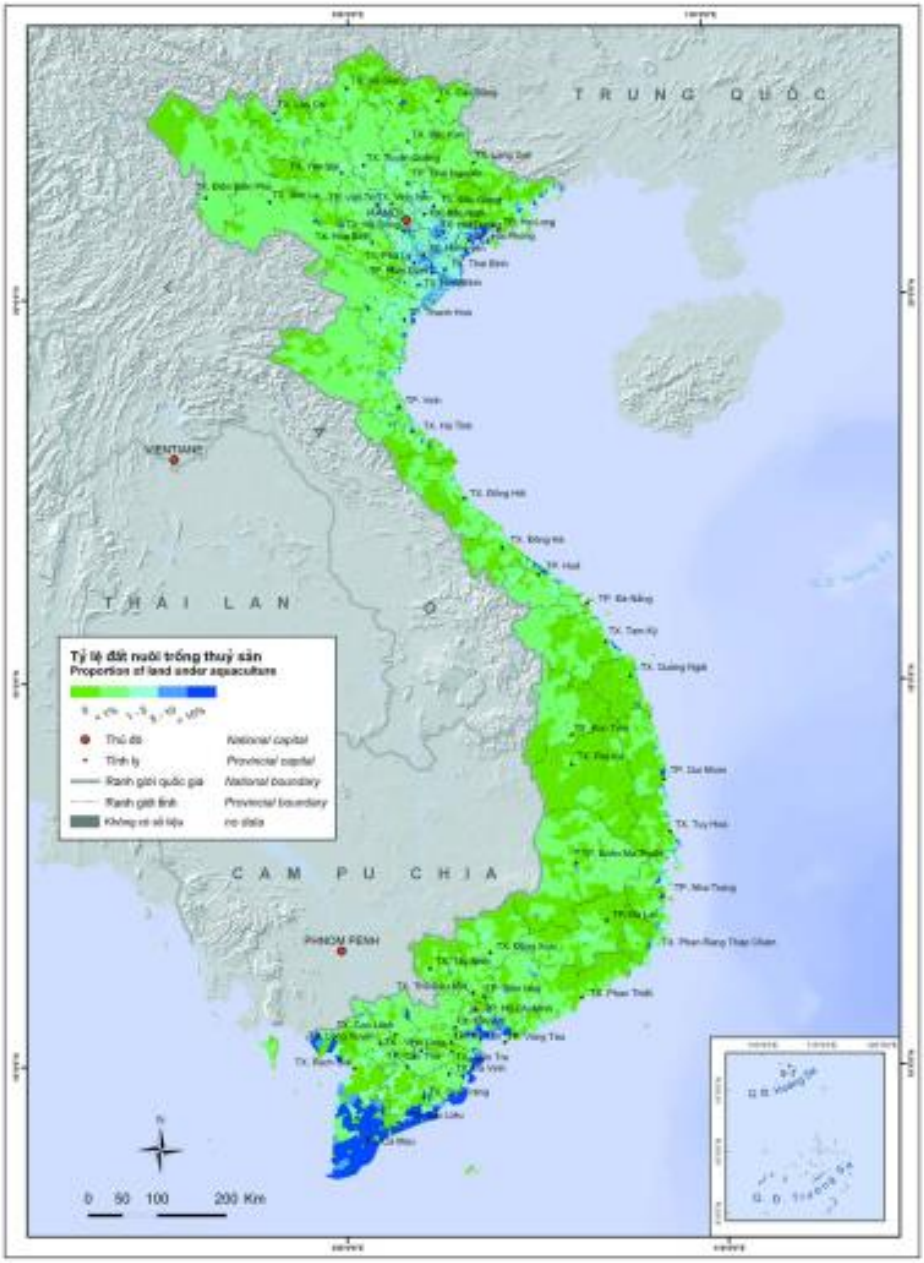


Figure 19: Map on proportion of land use for aquaculture farming

Source: Epprecht, M. And Robinson, T. P. (Eds.). *Agricultural Atlas of Viet Nam. A Depiction of the 2001 Rural Agriculture and Fisheries Census*

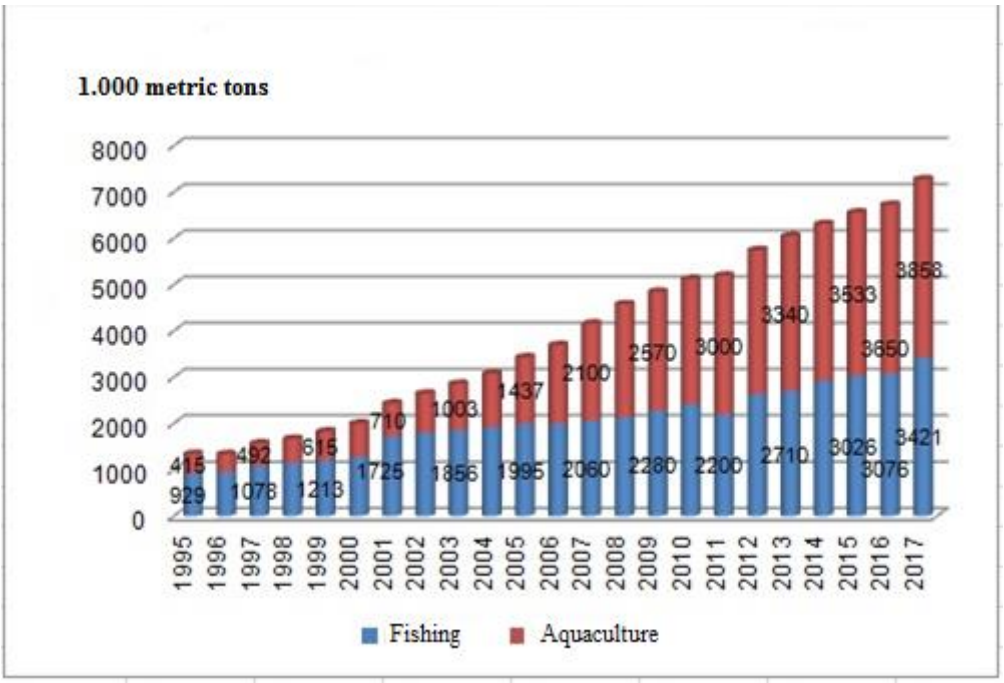


Figure 20. Annual yields from aquaculture farming and fishing in Viet Nam

(Source: Viet Nam Association of Seafood Exporters and Producers (VASEP), 2018)

3.2. Aquaculture planning:

- Decision No. 3529/2016/QD-BNN-TCTS approved revision of the 'Master plan for mollusc culture to 2020, orientation to 2030'. The target is to have an intensive mollusc culture area of 40,200 ha and total production outputs of 384,10 tons. Currently, clam farming area is 23,110 ha; oyster 2,770 ha; sweet snails 1,000 ha; cockle 12,720; geoduck clam 190 ha; abalone 150 ha; and pearl 260 hectares. Orientating to 2030, the aim is to have a mollusc farming area of 42,800 ha, and total output of 514,000 tons.
- In Decision No. 79/2018/QD-TTg, the 'National Action Plan to develop Viet Nam's shrimp industry to 2025' was promulgated with the following specific objectives.

In the 2017 – 2020 period:

To increase yield, outputs, quality and value of Vietnamese shrimp products through the application of scientific and technological advances and production structure; to reform the foundation necessary to promote rapid, sustainable growth to the next stage. Some specific targets are as follows:

+ Shrimp export value to reach USD 5.5 billion (at CAGR of 10.79%), of which export value of brackish shrimp exports is to reach USD 4.5 billion;
+ Total farming area of brackish shrimp to reach 710,000 ha; total area of cultured crayfish to reach 30,000 ha; and lobster farming to reach 1,000,000 m^3 of cages;
+ Total shrimp production outputs to reach 832,500 tons (at CAGR of 5.63%) with 800,000 tons of brackish water shrimp; 30,000 tons of giant river prawn; and 2,500 tons of lobster.

In the 2021-25 period:

A hi-tech shrimp industry and large-sized eco-shrimp farming area will be built. Infrastructure and technical services will be provided in a comprehensive, efficient and sustainable manner.

+ The total export value of shrimp products is to reach USD 10 billion (at CAGR of 12.7%), of which export value of brackish shrimp is to be USD 8.4 billion;
+ Total area of brackish shrimp farming is to reach 750,000 ha with 50,000 ha of crayfish and1.3 million m^3 cages of lobster;
+ Total shrimp production yields are to reach 1,153,000 tons (CAGR of 6.73%) with 1,100,000 tons of brackish water shrimp, 50,000 tons of lobster and 3,000 tons of lobster.

It is planned to develop large-scale production areas and use hi-tech and environmentally friendly scientific achievements that are suitable for the ecological characteristics of each region, and to increase productivity and product quality (organic shrimp certificate, GAP). The use of chemicals and antibiotics in all aquaculture modes and stages of processing of shrimp products will gradually be phased out.

- According to a report by MARD, as of November 2016, the area of commercial pangasius farming reached 4,552 ha with outputs of 1,047,000 tons. Farming area in 2016 was estimated at nearly 5,000 hectares, with outputs of 1,200,000 million tons (+9% y/y). Total export value in 2016 was estimated at USD 1.67 billion (+6.6% y/y). In implementation of Decision No. 899/QD-TTg dated June 10, 2013, approving the 'Plan to restructure the agriculture sector towards enhancing value added and sustainable development', the Minister of Agriculture and Rural Development suggested that pangasius farmers should also follow strict regulations on sustainable farming and operate in association with cooperative chains or cooperatives so as to standardize raising processes towards VietGap or GlobalGap standards. Accordingly, Viet Nam's pangasius industry can develop sustainably.

3.3. Development of ASC certified aquaculture

According to Viet Nam's Association of Seafood Exporters and Producers, in early 2013, Viet Nam had five additional pangasius enterprises certified sustainable aquaculture by the Aquaculture Stewardship Council (ASC).

In 2014, the World Wide Fund for Nature (WWF) supported Quoc Viet Company in Ca Mau province becoming an enterprise with a shrimp production area certified by ASC.

Aichi Biodiversity Target 8: Pollution reduced

1. Environmental pollution in Viet Nam

1.1. Air environment

Nguyen The Chinh (2017) summarized the air pollution in Viet Nam as follows: At traffic intersections and construction sites, air pollution has been increasing, especially in large cities. Along roadsides in Ho Chi Minh City, air pollutant concentrations (mostly CO) has increased by 1.44 times and PM^{10} dust by 1.07 times. In Ha Noi, if no solutions are implemented, annual dust concentration could reach 200mg/m^3 by 2020, ten times higher than the level recommended by the World Health Organization.

According to the National State of the Environment Report 2016 (MONRE), in urban areas, the proportion of Total Suspended Particles (TSP) samples that exceed the national technical

regulation of national monitoring programs is always over 80% of monitoring samples in the year. In urban areas, the origin of NO_2, SO_2 and CO gases is mainly the engines of transport, while SO_2 arises from sources of sulfur and coal. Therefore, in urban areas, sites with traffic always have the highest concentration of polluted gases. Ozone (O_3) is a secondary pollutant produced by the interaction between pollutants such as NOx, HC, VOC and the ultraviolet radiation of the sun. At automatic monitoring stations near roads, O_3 concentrations exceed the Vietnamese Standards on many days of the year. SO_2 and CO are generally within the Vietnamese Standards, but O_3 and NO_2 especially have shown signs of increase in recent years.

Monitoring data for the period of 2012 to 2016 showed that the level of dust pollution (TSP) in urban areas is still high, and there has been no sign of reduction in the last five years.

Table 6. The sampling ratio exceeding the standards of air environment parameters measured from 2012 to 2016

Parameters	2012	2013	2014	2015	2016
TSP (%)	86.73	87.19	89.52	85.36	88.89
SO_2 (%)	1.18	1.88	0.74	0.00	0.00
CO (%)	5.75	1.51	1.65	0.97	1.27
NO_2 (%)	2.21	0.94	1.87	4.24	0.66

Source: General data from national monitoring programs at 37 large cities, VEA (2016), in the Environmental Status Report 2016

1.2. Water Environment

Environmental pollution, especially water pollution, has become increasingly more serious in Viet Nam. Surface water sources in many places are polluted; this is especially the case in urban areas, specifically around industrial parks and in craft villages. In river basins, pollution and degradation of water quality mainly occurs in the middle and lower basins and several places are suffering serious pollution, such as the Nhue-Day river, Cau river and Dong Nai river systems. Most notable is the levels of organic pollution in river basins including the Ngu Huyen Khe (Bac Ninh), Nhue River through Hanoi, and Sai Gon River through Binh Duong, Ho Chi Minh City. There are also issues with heavy metals in ground water in the Northern Delta such as at Ha Dong, Hoai Duc (Hanoi), Y Yen, Truc Ninh (Nam Dinh), and Thai Binh city.

Surface water in rivers, lakes, canals and ditches inside cities in Viet Nam have been mostly polluted by waste from industrial and urbanization activities. Many lakes have become wastewater reservoirs for their surrounding areas. Despite increased rehabilitation efforts, surface water pollution in these areas is still a major problem in most cities. In addition, there are issues with degrading water quality in rivers that flow through urban areas in some provinces and cities.

Table 7. Water quality index of urban rivers in Hanoi

No	River name	2012		2013		2014		2015	
		Dry season	Rainy season	Dry season	Rainy season	Dry season	Rainy season	Dry season	Rainy season
1	To Lich	8	10	7	7	6	11	7	8
2	Set	7	6	6	8	6	7	8	9
3	Lu	6	6	5	7	6	8	9	9
4	Kim Nguu	7	9	5	7	7	8	8	6

Source: *Hanoi Department of Natural Resources and Environment, October 2016, (Environmental Status Report).*

The water environment of coastal urban areas has been directly affected by socio-economic development such as seaport and tourism activities, concentrated urbanization, and the operation of industrial clusters. About 70% to 80% of waste in the marine environment has been generated from inland souces, specifically from factories, industrial zones, and residential areas. Untreated solid waste is discharged into rivers and canals in coastal plains or directly into the sea.

In coastal cities, the quality of seawater is quite good, with most within the parameters set by QCVN 10-MT: 2015/BTNMT. However, an issue facing coastal urban areas is the of pollution of organic compounds in seawater. For example, in 2011-2015, the parameters of compounds such as COD, NH_4^+ in the 2011-2015 period exceeded limits set by QCVN 10-MT: 2015/BTNMT (aquaculture and beaches), especially in urban areas that have seaports. Tho Quang (Da Nang city) is a hotspot of marine pollution in recent years.

Mineral oil content in seawater has tended to increase and is quite common in seaports of coastal urban areas. This can be mainly traced to the operations of vessels that leach oil and grease. However, mineral oil content in all beaches has still been within limits set by QCVN 10-MT: 2015/BTNMT.

1.3. Soil environment

Status of heavy metal pollution

In large urban areas, such as Hanoi and Ho Chi Minh City, and in mining and manufacturing centres, such as Thai Nguyen and Dong Nai, soil pollution has occurred as a result of waste discharged from industrial and contruction activities, and from people's daily activities. The content of heavy metals in soil has been increasing. According to research, by 2020, soil pollution will have increased 2-3 times compared to the current level, and the pollution index will accelerate, resulting from the industrial development and urbanization rate (Nguyen The Chinh, 2017).

According to the National State of the Environment Report 2016 (MONRE), soil quality in waste treatment facilities located in urban areas has been affected by heavy metals. In areas affected by industrial waste within Phu Tho province (Dong Boi, Dong Don, Dong Vac and Thach Son - Lam Thao) and Hanoi (Tam Hiep Thanh Tri), the concentration of heavy metals, such as Cu, Pb, Zn, has exceeded the thresholds defined by QCVN 03-MT: 2015/BTNMT for agricultural land. For example, in the period of 2010-2014, Cu, Pb and Zn content in surface soil measured at three sites of Phu Tho province were higher than those prescribed in QCVN 03-MT: 2015/BTNMT for

agricultural land.

The status of pollution of persistent organic pollutants (POP)

There are currently 240 locations across 15 provinces that contain residues from crop protection chemicals at levels that cause serious and extremely serious environmental pollution. In particular 23 points located in urban areas have not yet received treatment. In Dien Bien province, monitoring conducted in the 2011-2012 period in local pesticide warehouses (such as the Provincial Plant Protection Department based in Tuan Giao town, and the pesticide inventory based in Tua Chua town) determined that the content of DDT (mg/kg) in soil had exceeded the limit set by QCVN 15: 2008/BTNMT by 1.34-3.86 times.

According to the report on 'Ten years of the implementation of the Stockholm Convention on persistent organic pollutants in Viet Nam' (MONRE 2015), thousands of pesticide chemical residues have been discovered in investigated provinces and cities, mainly concentrated in the north and north-central regions. Excluding a number of large drug stores and burial sites (considered polluted hotspots), most detected point source of pollution are small and scattered in rural areas. The concentration of pesticides in the soil at these sites usually ranges from 10 to 50 ppm; however, some places can reach hundreds of ppm. In the period of 2010 - 2014, as a result of the GEF/UNDP project on residual pesticides, more than 400 new point source of pollution across Viet Nam were discovered.

The GEF / World Bank project on PCBs in Viet Nam, conducted between 2012 and 2014, focused on rapid analysis of chlorine in transformer oil. Results showed that among approximately 39,000 transformers, there were 401 machines suspected of having PCB contaminated oil at a content exceeding the thresholds set by the Stockholm Convention (50 ppm). Of these, 112 had concentrations above 200 ppm. For the inventory of PCBs outside the electricity industry, results showed that there are over 35,712 devices suspected of being contaminated with PCBs and the project had conducted inventory of 9,000 machines and stored oil. Inventory results have detected a total of 930 tons of PCB-containing oil.

According to MONRE (2015), there were some urban areas still polluted by dioxin. Areas of pollution are mainly concentrated in southern Viet Nam in areas now designated as military airports and those containing residual toxic chemicals. However, an assessment of dioxin contamination in the environment showed that, due to the environment exposureand cycles (sun, heat, rain, flood, micro-organisms etc.), the amount of dioxin in many areas has dropped below maximum recommended thresholds. Some studies have shown that in many areas that had been sprayed with toxic chemicals in the past, the concentration of dioxin has now fallen below the maximum recommended concentration and in some areas dioxin was not detected. In some areas that were previously sprayed, such as Can Gio in southern Viet Nam, dioxin levels in sediments are quite low compared with other areas in the north and central regions.

Survey results show that Viet Nam has many production activities that can release new POPs (such as HBB, PBDE, PFOS, and HBCD) into the environment, and that these are potentially dangerous to the environment and human health. A number of new POPs have been detected at significant concentrations in solid waste and in sedimentation dust. However, other environmental components are currently only detected at low concentrations.

2. Main sources of environmental pollution

According to a report by MONRE presented in the national conference on environmental

protection (2016), national socio-economic development has inflicted great pressure on the environment. Annually, there are approximately 2,000 projects that are required to conduct an environmental impact assessment (EIA). Notably, there have been 283 industrial zones created nation-wide, with more than 550,000 m^3 of wastewater dischared every day, and 615 industrial clusters, of which only about 5% have concentrated wastewater treatment systems. Out of over existing 500,000 production facilities, many contribute to environment pollution by having out-of-date manufacturing processes and techniques.

There have been now 5,000 mining and construction enterprises established and over 4,500 craft (manufacturing) villages are operating. More than 13,500 medical facilities are discharging more than 47 tons of hazardous waste and 125,000 m^3 of medical wastewater on a daily basic.

There are currently 787 municipalities that are discharging 3,000,000 m^3 of wastewater daily - this is mostly untreated. There are also nearly 43 million motorcycles and over 2 million cars in circulation. More than 100,000 tons of plant protection chemicals are used in the country every year. In addition, more than 23 million tons of domestic waste, 7 million tons of industrial solid waste and 630,000 tons of hazardous waste are being discharged annually. There are 458 landfill sites, including 337 unhygienic ones; and more than 100 small-scale domestic waste incinerators, which have the potential to generate dioxin and furan.

2.1. Sources of urban water pollution

According to the National State of the Environment Report 2016 (MONRE), sources of polluted water flowing into lakes and river of large urbans include:

i. *Domestic wastewater:* As a result of population growth and increased living needs, domestic wastewater generated in urban areas has been continuously increasing. Sewage discharge volumes fluctuate, depending on living standards and habits of people in each urban area. According to water supply standards for urban areas, an average of about 125 liters/ person is to be supplied on a daily basis and wastewater weight is estimated to be about 80% of supplied volume (100 liters/person). Statistical data show that the south-east is the most populated urban area and has the highest amount of domestic wastewater. Main pollutants in domestic wastewater are suspended solids, BOD5, nitrogen of ammonium salts ($N\text{-}NH4^+$), phosphates, chloride (Cl^-) and surfactants. In addition, domestic wastewater contains inorganic components, micro-organisms and other pathogenic micro-organisms.

ii. *Medical wastewater:* In medical wastewater, apart from common pollutants such as organic substances, animal oils and greases, there are also specific organic contaminants and micro-organisms, viruses, drug preparations, disinfectants, chemical solvents, antibiotic residues and possibly radioactive isotopes that are used in the diagnosis and treatment of diseases. The amount of medical wastewater annually generated has been increasing over time. Data show that the total amount of medical waste needing to be handled by 2015 would be about 125,000 m^3/24 hour.

iii. *Other sources:* In addition to domestic and medical wastewater, many industrial zones, industrial plants and urban areas discharge untreated wastewater to rivers and lakes, severely polluting these water sources. In some cities, such as Hanoi, there are still industrial clusters based inside and just outside the city. Wastewater treatment by industrial clusters, and of small production facilities located in residential and urban areas has long been a daunting issue.

Figure 21. Prospect of urban expansion to 2030

(source: UN BiodiversityLab, 2018**)**

2.2. Sources of rural water pollution

In rural areas, pollution main occurrs in craft (manufacturing) villages and in industrial spots that are intermingled with residential areas. There are still many handicraft villages operating in high-risk activities, such as dealing with plastics, metals, lead batteries, livestock, and paper production.

Intensive agricultural cultivation that includes the usage of chemical fertilizers and pesticides produces and increases emissions of CH_4, H_2S and NH^3, especially in specialized areas. Agricultural use of fertilizers and pesticides is not in accordance with technical procedures. For example, there are known issues in the Dong Anh (Hanoi), Hiep Hoa (Bac Giang), Yen Dinh (Thanh Hoa) and Highland (Duc Trong, Da Lat) regions.

Mining activities have been causing numerous negative impacts on the surrounding environment, including through soil pollution and wastewater discharge, discharge of dust, and the release of

slag ore into the water source or the environment.

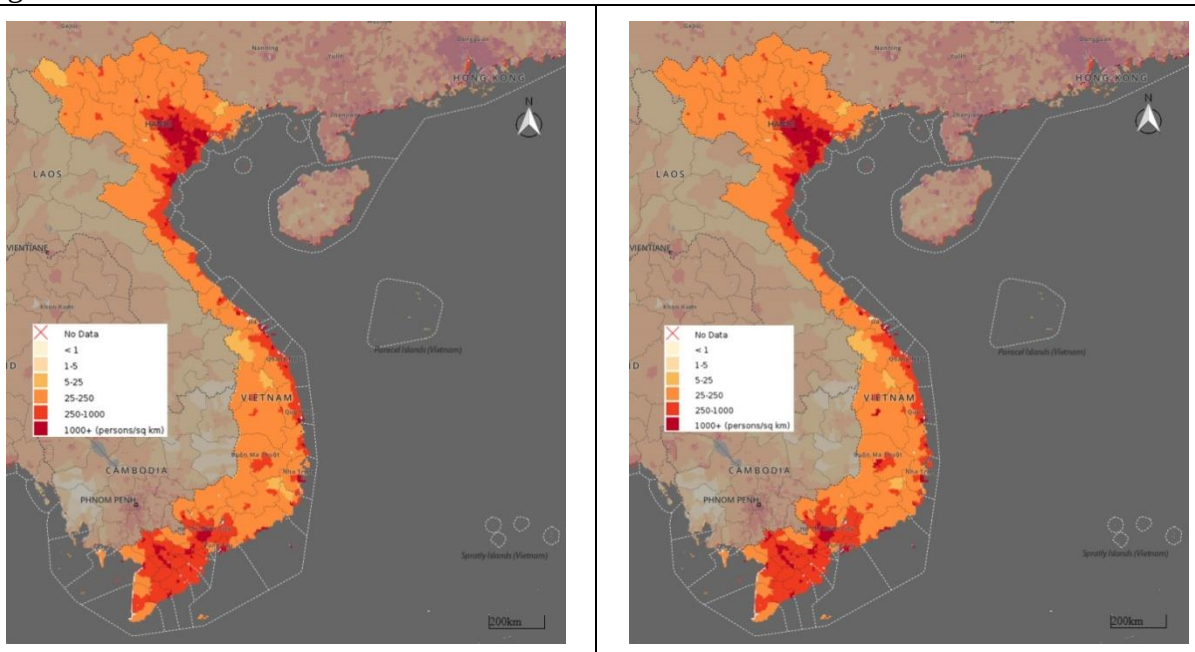


Figure 22: Dynamics of Population Density in Viet Nam
(Source: UN Biodiversity Lab, 2018)

3. Impacts of environmental pollution on biodiversity

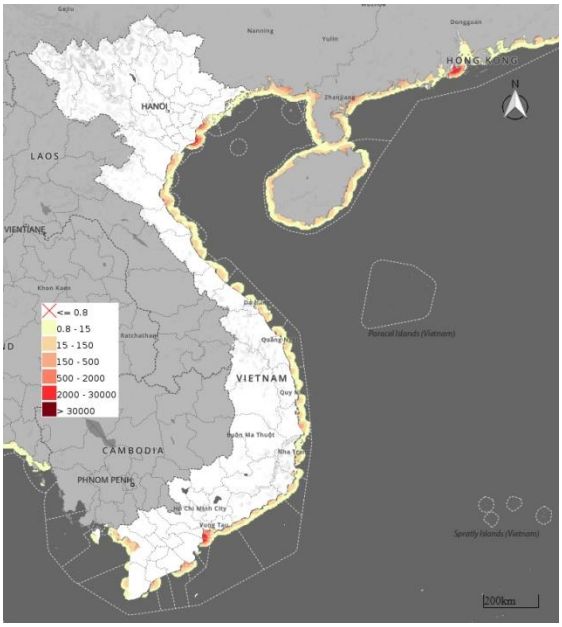
Rapid urbanization and industrialization have seriously affected water quality. Unregulated domestic and industrial wastewater discharges into rivers and lakes have had negative impacts on the biodiversity of those natural ecosystems. Urban lakes, especially lakes in Hanoi, have been suffering eutrophication. This has become very common, causing algae blooms (mostly *Microcystis* spp.), reducing dissolved oxygen, and leading to a mass death of fish in West Lake, Hanoi.

In coastal areas, the red tide phenomenon has been seasonally seen in some areas, such as an outbreak of *Noctiluca scintillans* in Van Phong Bay (Khanh Hoa province) used to result losses for lobster farmers. Similar cases also happened in Binh Thuan province with the outbreak of *Phaecocystis globosa* along the coastal areas in Phan Ri Bay, destroying aquatic species in the area. Research on coastal toxic algae and red tide in Viet Nam shows that some microalgae species tend to grow seasonally every year, especially from March to September, causing damage to the aquaculture in coastal waters.

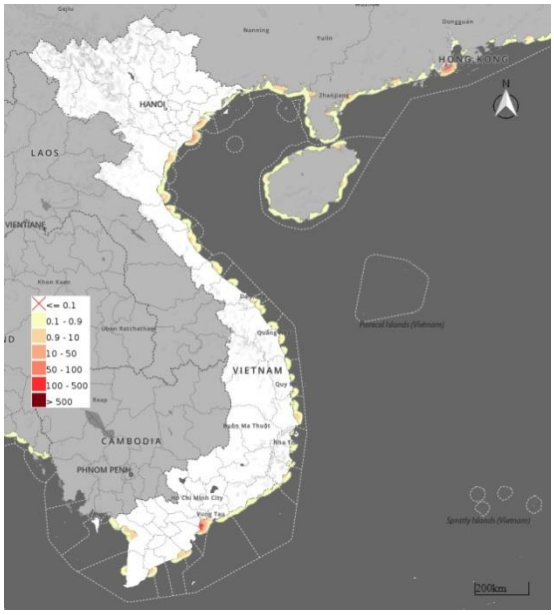
Extensive agricultural intensification, and usage of pesticides from a variety of sources is increasingly common and uncontrollable in Viet Nam, contributing to the degradation of bird and insect populations in villages and suburbs. Many useful bird species that destroy harmful insects have been impacted, leading to disease outbreaks in the field.

Pangasius farming and industrial production of other aquatic species at high density in the Mekong Delta is also contributing to organic pollution, affecting the ecosystems and aquatic communities.

Activities such as mineral exploitation, hydropower, and construction have caused environmental pollution including the discharge of polluted soil, wastewater, slurry, and slag ore into water sources. This has caused degradation and increased soil/water pollution and affected biodiversity. These impacts only add the other effects of these activities, which include decreasing the area of natural ecosystems, dividing ecological landscapes and degrading biodiversity.



Nutrient pollution (fertilizers) 2013



Organic pollution (pestisides) 2013

Figure 23: Map on nutritious and organic pollution (fertilizers, pestisides) 2013

(source: UN BiodiversityLab, 2018)

4. Legal documents on environmental protection

Water management in general and urban water environment management in particular, has been specifically covered in environmental laws and under-law documents. The Environmental Protection Law 2014 sets out regulations on environment management, water quality, and wastewater and defines supporting tools for water pollution management. The Law on Water Resources 2012 stipulates contents for prevention of water pollution, depletion of water resources, water resources monitoring, and water protection corridors.

- Decision No. 1393/QD-TTg dated September 25, 2012 of the Prime Minister, approved the 'National Strategy for Green Growth in the period of 2011-2020, vision to 2050' with the following specific objectives:
    - To restructure and improve economic institutions toward greening existing sectors and encouraging economic sectors to efficiently use energy and resources;
    - To study and apply advanced technologies to make better use of natural resources, reducing greenhouse gas emissions and contributing to effective response to

climate change;

- To improve people's living standard, building an eco-friendly lifestyle by creating jobs from industries, agriculture, green services, and by investing in natural capital and green infrastructure.

The Decision also provided for measures to review and adjust the planning of manufacturing industries; to gradually restrict economic sectors that generate large volumes of waste that pollute and degrade the environment; creating conditions for the development of new green manufacturing industries; and speed up afforestation and reforestation projects, by encouraging enterprises to invest in afforestation to increase forest cover to 42% by 2020 and thus improving forest quality, increasing CO2 absorption capacity, biomass, and guaranting a timber supply for production and consumption.

- Decision No. 1659/QD-TTg dated November 07, 2012 of the Prime Minister, approved *The National Urban Development Program for the period of 2012-2020*.
- Decision No. 2623/QD-TTg dated December 31, 2013 of the Prime Minister, approved the project *'Development of Viet Nam's Cities in Response to Climate Change in the 2013-2020 period'.*
- Decision No. 166/QD-TTg date January 21, 2014 of the Prime Minister, promulgating the *National Strategy for Environmental Protection up to 2020, a vision to 2030* with the following objectives: to mitigate degradation and exhaustion of natural resources and to control the rate of biodiversity decline.

5. Pollution mitigation measures

5.1. Wastewater treatment facilities

In recent years, there has been positive change in wastewater treatment in urban and residential areas, which has contributed to limiting the increase of water pollution. However, the volume of domestic wastewater that is treated is still low. According to data from 2015, 42 out of 787 (5.3%) urban areas nationwide have wastewater treatment facilities that meet prescribed standards. According to the Ministry of Construction, in 2015, 52 urban areas had ODA projects relating to water drainage and wastewater treatment and implementation of those projects led to a total of 77 irrigation systems with a total design capacity of about 2,400,000 m^3/24 hours. Most hospitals in Hanoi and Ho Chi Minh City have built and operate medical wastewater treatment system.

5.2. Classification, collection and treatment of domestic solid waste

In urban areas, the total collected domestic solid waste was about 31,600 tons/day in 2014 and about 32,415 tons/day in 2015. According to the 'National Strategy for Integrated Management of Domestic Solid Wastes to 2025, a vision to 2050', the goal of integrated management of urban domestic solid wastes is to ensure by 2020 that 90% and by 2025 that 100% the amount of urban domestic solid wastes to be properly collected and treated.

By 2015, 35 domestic solid waste facilities have been built and operated nation-wide. The average capacity of those facilities was approximately 100-200 tons/day. Some have very large capacities, including Da Phuoc with 3,000-5,000 tons/day and Cu Chi, Ho Chi Minh with 1,000 tons/day. Others have capacity of over 300 tons/day, including Xuan Son (Son Tay, Hanoi) with 700 tons/day; a facility in Binh Duong Province (Binh Duong province) with 420 tons/day; and Dong Xanh (Dong Nai province) with 300 tons/day.

Aichi Biodiversity Target 9: Invasive alien species prevented and controlled

1. Status of invasive alien species in Viet Nam

There are growing concerns about the potential harms of invasive alien species to biodiversity, human health and the economy, especially after golden snail (*Pomacea canaliculata, P. insunarum*) was introduced into Viet Nam in the late 1980s and has now spread nationwide. As of 1997, yellow snails had damaged 132,000 hectares of rice cultivation, causing millions of VND worth of damage annually due to declining rice yields.

According to statistics, there have been 94 alien species imported into Viet Nam, including 42 known invasive species, with 12 of those known to be fast-growing invasive species such as *Mimosa pigra* and *Eichhornia crassipes*. In particular, the *Mimosa*, which was first discovered in Tram Chim National Park (Dong Thap province) in 1995, has now become widespread and a major threat in many wetlands.

In 2009, MARD announced a list of 48 aquatic aninal alien species that have invaded Viet Nam through different pathways. Of these, 14 species are considered to have adverse impacts on aquatic biodiversity. In addition to the golden snail (*Pomacea canaliculata, P. insunarum*), various other species, such as red-eared slider (*Trachemys scripta elegans*) and freshwater lobsters, which are known invasive species that negatively impact biodiversity, economic sectors and human health have been imported into Viet Nam. For example, in 2010, Can Tho Seafood Import-Export Corporation imported 40 tons of red-eared slider (*Trachemys scripta elegans*) from the United States for raising in Can Tho Aquaculture Breeding Centre in Vinh Long province. Similarly, freshwater lobsters were imported from the Untied States by Phu Thanh Company Limited into Vinh Chau District (Soc Trang province) and then to raised in Tran De district. These species present severe potential impacts if they are released into the wild.

In 2012, MONRE reviewed potential invasive alien species using international sources and issued relevant documents. The list includes 130 species belonging to six different groups, including micro-organisms, invertebrates, birds, reptiles, plants, and animals as well as some species that have not yet appeared in Viet Nam's territory.

2. Documents on management and control of invasive alien species

- In Section 3 of Chapter IV in the Law on Biodiversity 2008, there are five articles on control of invasive alien species.
- In 2012, the Prime Minister issued Decision No. 1896/QD-TTg, approving the project 'Prevention and control of invasive alien species in Viet Nam to 2020'. Accordingly, priority has been given to implementing a program of control and eradication of specific invasive alien species in Viet Nam, including *Pomacea canaliculata, Mimosa pigra* and *Mimosa diplotricha*.
- On December 28, 2018, MONRE issued Circular No. 35/2018/TT-BTNMT regulating the criteria for determining and promulgating the list of invasive alien species (replacing Circular 27/2013/TTLT-BTNMT-BNN issued in 2013).
- To strengthen the management and prevention of regulation violations involving invasive alien species, the Government issued Decree No. 179/2013/ND-TTg dated November 14 2013, on sanctions for administrative violations in environmental protection. Specifically, Article 45 stipulates sanctions for violations on the control of invasive alien species.

- MONRE issued Decision No. 200/BTNMT dated January 29 2015 approving the program for awareness-raising regarding the prevention and control of invasive alien species in Viet Nam for the 2015-2020 period. This provides guidance to localities for developing and implementing communication activities, and for raising awareness about invasive alien species.

3. Management and control of invasive alien species

MONRE have responsibity and carried out activities to manage and control invasive alien species, as following:

+ Assume the prime responsibility for, and coordinate with MARD, other concerned ministries, and ministerial-level agencies to introduce legal regulations and relevant documents.
+ Conduct pilot removal of *Mimosa diplotricha* at Cuc Phuong National Park (2013-2015). Pilot results showed effective removal through a combination of chemical and silvicultural methods.
+ In the 2013-2015 period, within the framework of the 'Project on Prevention and Control of Invasive Alien Species in Production Forests and Protected Forests in Southeast Asia', MONRE carried out investigation and mapping of the distribution of invasive alien species in national parks and nature reserves.

MARD have responsibity and carried out activities to manage and control invasive alien species, as following:

+ Control the quarantine process for import of animals and plants to prevent invasive alien species.
+ Control and eradicate harmful livestock species such as the swamp beaver (*Myocastor coypus)*, hamster, red-eared slider (*Trachemys scripta elegans*).
+ Carry out a review of invasive alien species in plant protection and quarantine. Thus far, MARD has written reports on the disease risks of eight species that are potentially invasive to plant production and quarantine that both do and do not already occur in Viet Nam, and has developed a map of the distribution of seven known pest species.

The Ministry of Finance MONRE have responsibity and carried out activities to manage and control invasive alien species, as following:

+ Allocate funds to execute tasks pursuant to Decision No. 1896/QD-TTg.
+ Organize training for quarantine officers at 47 quarantine stations and customs officers at 18 international border gates. The training is to focus on identifying invasive alien species, quarantine regulations, and border inspection.

At the local level, the control of invasive alien species has only focused on controlling some invasive alien species that have the greatest influence on production, as well as local people's lives (e.g. yellow snails, mimosa and virgin crochet).

Shortcomings:

- There is inconsistency in the management mechanisms for invasive alien species, including duplication of lists identifying invasive alien species among different legal

documents on biodiversity.

- Due to a shortage of financial resources, there has been no comprehensive investigation and assessment of the risks and impacts of invasive alien species in Viet Nam, and little work on measures required to control or eradicate such species.
- Efforts to eradicate invasive alien species are currently sporadic and inconsistent. They are limited to places where invasive alien species have significantly impacted livelihoods, production, and to some national parks and protected areas.
- The allocation of responsibility among management agencies in relation to invasive alien species is unclear and overlapping. There is also no consistency in management and licensing of invasive alien species that are proposed for import, or imported into, Viet Nam.
- Capacity to assess risk and to control invasive alien species remains limited.
- Specialized provincial agencies in the management of invasive alien species are the Departments of Natural Resources and Environment. However, these provincial departments have no full-time staff to carry out management of invasive alien species.

Aichi Biodiversity Target 10: Ecosystems vulnerable to climate change

1. Ecosystems of Viet Nam

Viet Nam's topography and climate have created a variety of natural ecosystems on the continental shelf, with diverse forest ecosystems that include evergreen tropical rainforests, semi-evergreen forests, evergreen broad-leaved limestone forests, coniferous forests, dipterocarp forests (deciduous dipterocarp forests), natural drought forests (plants with thorns), melaleuca freshwater marsh forests, bamboo forests, and mangrove forests. Scientists divide forest ecosystems in Viet Nam into 14 types, based on ecological factors (Thai Van Trung, 1999). Based on climate, terrain, geology, and soil, there are eight forest ecological zones in the continental part of Viet Nam and 47 sub-regions.

In addition to forests, Viet Nam also possess many other types of ecosystems, including grasslands, limestone mountains, inland wetlands (streams, rivers, lakes, reservoirs, caves caverns), and sand dunes.

Viet Nam has a coastline of more than 3,260 km (excluding that of islands) and has more than 3,000 large and small islands within the Hoang Sa and Truong Sa archipelagos. Viet Nam's Exclusive Economic Zone is over 1 million km^2. Vietnamese waters were divided by Nguyen Huy Yet (2000) into six ecological zones, with following specific biodiversity characteristics:

- The Gulf of Tonkin (to the south of Con Co island, Quang Tri province)
- The Central Coast (Con Co island to Cape Dinh in Phan Rang - Cap Varella)
- The South-Central Coast (Cape Dinh to Cape Vung Tau)
- The South-Eastern Coast (Cape Vung Tau to Cape Ca Mau)
- The South-West Coast (Cape Ca Mau to Phu Quoc Island in the Gulf of Thailand)
- High seas (waters around the Hoang Sa and Truong Sa archipelagos).

In of those six zones, 20 marine ecosystems have been identified. Typical marine ecosystems in coastal zones include tidal flats, estuarine mangrove forests, lagoons, bays, coral reefs, coral reefs, and seagrass beds. In addition, there are ecosystems around coastal and offshore islands, especially in deep waters and on the seabed (e.g. around the Hoang Sa and Truong Sa archipelagos).

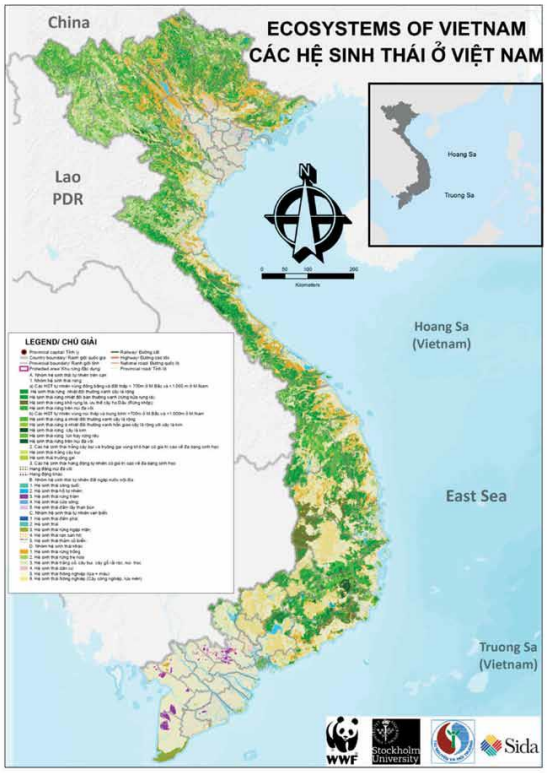


Figure 24: Map on ecosystems in Viet Nam

Source: WWF Viet Nam 2013

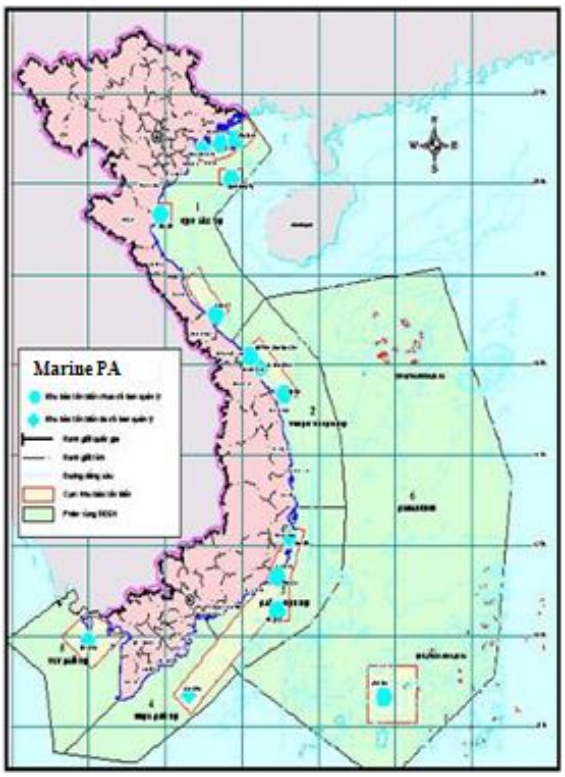


Figure 25: Marine ecological zones and clusters of marine protected areas in Viet Nam

Source: Nguyen Huy Yet, 2000

2. Ecosystems most severely affected by climate change

Viet Nam is one of five countries most affected by climate change. In that context, fragmented natural ecosystems are likely to be most affected by those changes and suffer high rates of loss species. According to climate change and sea level rise scenarios modelled for Viet Nam (MONRE, 2016), the following has been analyzed:

Risk of flooding with 100 cm sea level rise:

- Approximately 16.8% of the Red River Delta area, and 4.79% of Quang Ninh province are at risk of flooding;
- Approximately 1.47% of the land area of the central coastal provinces from Thanh Hoa to Binh Thuan is in danger of being inundated. In particular, Thua Thien - Hue has the highest risk (7.69% of the area);
- Approximately 17.8% of Ho Chi Minh City's area and about 4.79% of the Ba Ria - Vung Tau area is in danger of being inundated;
- The Mekong River Delta is a high-risk area (38.9% of the area);
- The highest-risk islands are Van Don, Con Dao and Phu Quoc. The risk of flooding for the Spratly Islands is not high. Hoang Sa archipelago is at greater risk of flooding, especially for some islands of Crescent Island and Tri Ton Islan.

Table 8. Risks of inundations due to sea level rise caused by climate change to delta and coastal provinces

(Source: MONRE, 2016)

Province/City	Area (ha)	Percentage of inundation (% area) corresponding sea level rise					
		50 cm	60 cm	70 cm	80 cm	90 cm	100 cm
Quang Ninh	967,655	3.33	3.62	3.88	4.10	4.40	4.79
Red River Delta							
Hai Phong	154,052	5.14	7.61	11.7	17.4	24.0	30.2
Thai Binh	158,131	27.0	31.2	35.4	39.9	45.1	50.9
Nam Đinh	159,394	26.0	32.5	39.1	45.8	52.3	58.0
Ninh Binh	134,70	8.29	11.0	14.0	17.1	20.5	23.4
Red River Delta in total	***1,492,739***	***6.93***	***8.55***	***10.4***	***12.5***	***14.7***	***16.8***
From Thanh Hoa to Bình Thuan							
Thanh Hoa	1,111,000	0.51	0.65	0.	0.98	1.2	1.43
Nghe An	1,656,000	0.1	0.17	0.22	0.27	0.32	0.51
Ha Tinh	599,304	0.86	1.00	1.2	1.39	1.81	2.12
Quang Binh	801,200	1.73	1.87	2.01	2.24	2.27	2.64
Quang Tri	463,500	0.71	0.97	1.22	1.49	1.91	2.61
Thua Thien - Hue	503,923	0.93	1.67	2.59	3.46	4.31	7.69
Đa Nang	977,8	0.7	0.78	0.87	0.6	1.04	1.13
Quang Nam	1,043,220	0.18	0.20	0.23	0.26	0.28	0.32
Quang Ngai	514,080	0.43	0.51	0.59	0.66	0.75	0.86
Binh Đinh	609,340	0.55	0.64	0.74	0.84	0.93	1.04
Phu Yen	503,690	0.55	0.63	0.74	0.86	0.97	1.08
Khanh Hoa	519,320	0.72	0.89	1.0	1.19	1.38	1.49
Ninh Thuan	335,630	0.20	0.24	0.28	0.30	0.33	0.37
Binh Thuan	796,833	0.10	0.12	0.13	0.15	0.17	0.17
Total	***9,554,819***	***0.53***	***0.66***	***0.80***	***0.95***	***1.11***	***1.47***

Ho Chi Minh city	209,962	11.4	12.6	13.9	15.2	16.5	17.8
Ba Ria - Vung Tau	190,223	2.13	2.53	3.01	3.52	4.16	4.79
Mekong Delta							
Long An	449,100	0.61	1.36	2.85	7.12	12.89	27.21
Tien Giang	239,470	1.56	2.92	4.54	7.08	12.0	29.7
Ben Tre	235,950	6.21	7.58	9.87	12.8	17.0	22.2
Tra Vinh	234,120	0.80	1.02	1.33	2.38	4.93	21.3
Vinh Long	152,020	6.55	7.49	8.23	8.97	11.27	18.83
Dong Thap	337,860	0.36	0.69	0.96	1.28	1.94	4.64
An Giang	342,400	0.08	0.16	0.29	0.49	0.90	1.82
Kien Giang	573,690	7.77	19.8	36.3	50.8	65.9	76.9
Can Tho	140,900	1.44	1.59	1.90	2.77	6.54	20.52
Hau Giang	160,240	3.41	10.27	20.55	32.05	42.66	80.62
Soc Trang	322,330	2.46	5.88	10.8	16.7	25.8	50.7
Bac Lieu	252,600	3.65	7.65	14.5	23.4	33.8	48.6
Ca Mau	528,870	8.47	13.7	21.9	30.3	40.9	57.7
Mekong Delta in total	***3,969,550***	***4.48***	***8.58***	***14.7***	***21.0***	***28.2***	***38.9***

With these sea level rise scenarios, 78 out of 286 critical habitats (equivalent to 27%), 46 protected areas (equivalent to 33%), nine biodiversity areas of national and international value (23%) and 23 other biodiversity areas in Viet Nam would be severely affected. Many wild fauna and flora will suffer increasing pressure due to changes in habitat, food sources, and natural disasters such as floods, droughts, and storms. Some species of plants and vertebrates may be at risk of extinction in the next century due to climate change. However, there has been limited research on the impacts of climate change on biodiversity in Viet Nam.

The Red River Delta, Ho Chi Minh City and the Mekong Delta and other coastal areas are predicted to be most severely affected by climate change.

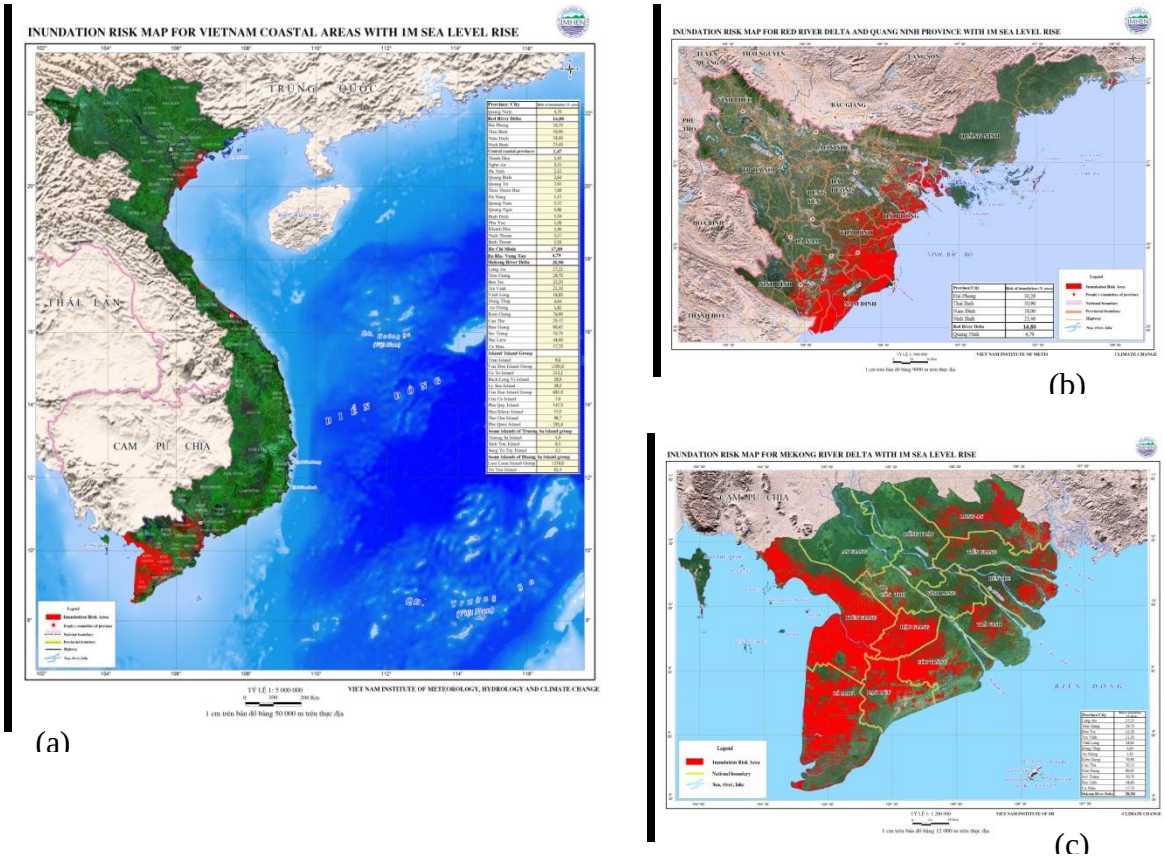
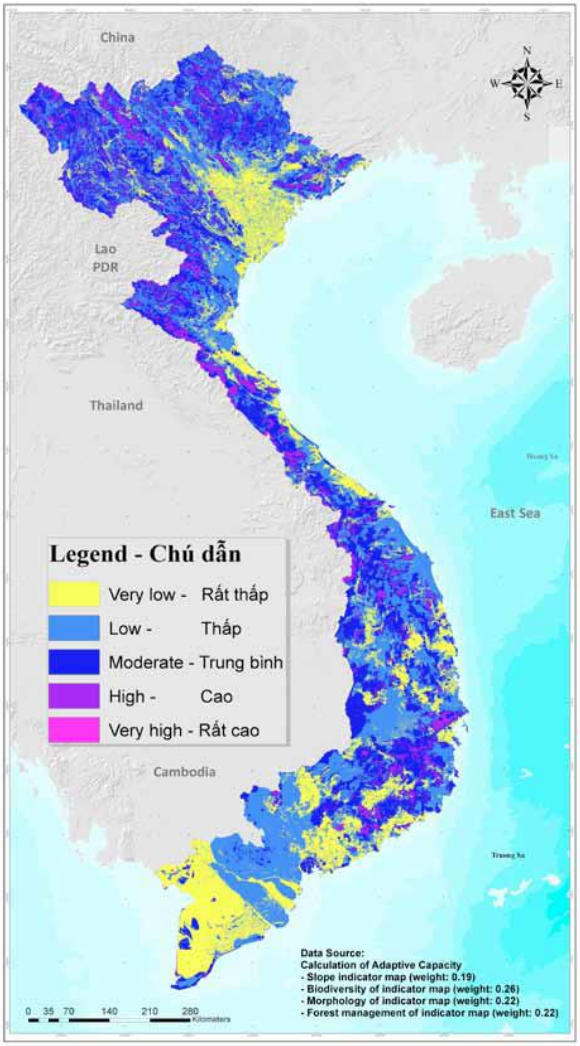


Figure 26. Map on inundation towards a sea level rise by 100 cm
(Source: MONRE, 2016)

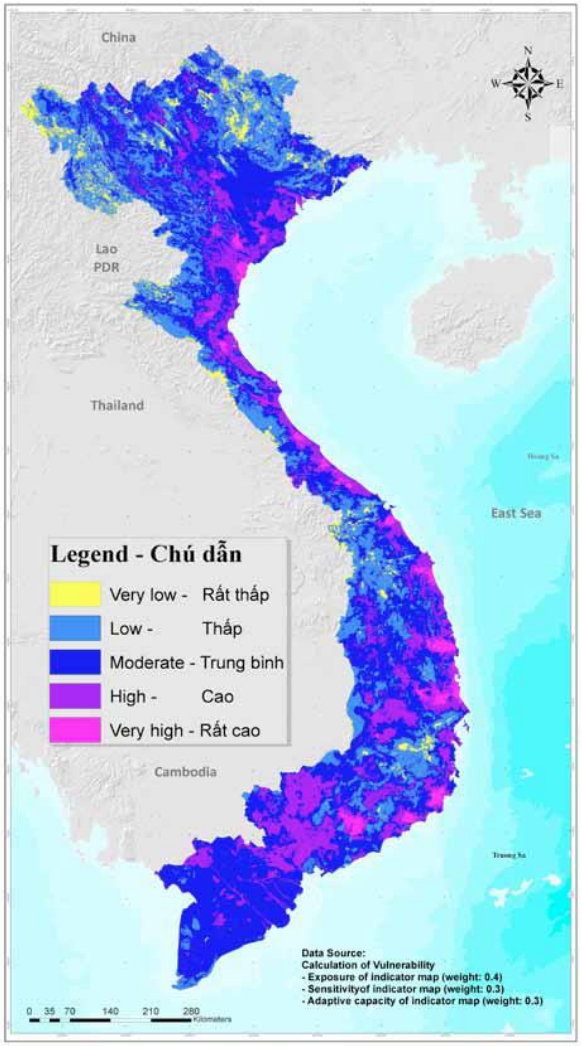
(a) Coastal areas of; (b) Red River Delta and Quang Ninh; (c) Mekong Delta

3. Climate change affecting ecosystems in Viet Nam

Climate change is characterized by factors such as rising temperatures, sea level rise, precipitation, natural disasters etc. All ecosystems and living things are subject to climate change impacts. However, how much each ecosystem is affected depends on the specifics of a particular ecosystem, as well as on their sensitivity. WWF Viet Nam (2003) applied a geographic information system (GIS) to assess the vulnerability of ecosystems in the context of climate change in Viet Nam. From these results, it was predicted that terrestrial forest ecosystems and mangroves will be affected by climate change at different levels.



Comprehensive Adaptability



Map of level of vulnerability

Figure 27. Map on resilience scenarios of ecosystems to climate changes

Source: WWF Viet Nam, 2013

3. Coral reef ecosystems are most vulnerable to climate change

3.1. Impacts on coral reefs

Threats to coral reefs identified include:

- Human impacts: over-exploitation and destructive exploitation of coral reefs and reef animals; uncontrolled development of tourism; environmental pollution leading to blooms of algae (e.g. in Ca Na Bay in 2002); and mainland floods causing sedimentation (e.g. those affecting coral reefs of Cu Lao Cham in 2006) (Vo Si Tuan, Nguyen Huy Yet and Nguyen Van Long, 2005).
- An outbreak of species such as sea-buckthorn *(Acanthaster planci)*, sea urchins, invasion

of porifera (sponges) (e.g. an outbreak of sea urchins in Nha Trang Bay, Van Phong and Cu Lao Cham in 2002 – 2004).

- Natural disasters (e.g. high temperatures and low salinity for a short period of time in Con Dao in 2005 and bleaching of coral in the waters of Phu Quoc in 2010) (Vo Si Tuan *et al.*, 2005, 2013).

3.2. Coral reef ecosystems are most severely affected by climate change

In coastal waters, coral reef ecosystems are most vulnerable to climate change. Research on coral reefs in Viet Nam shows that coral reef bleaching in 2010 could be traced to rising sea temperatures. If the sea temperature is above 29ºC for an extended period of time, coral will lose its symbionts, leading to bleaching and death (Vo Si Tuan, Nguyen Huy Yet and Nguyen Van Long, 2005). After Hurricane Linda and coral bleaching events in 1998, the area of coral reef in the seas around Con Dao and Phu Quoc Islands sharply declined and some coral reefs in Con Dao were so severely degraded that coral cover has declined to almost 0% (Vo Sy Tuan, Nguyen Huy Yet and Nguyen Van Long, 2005).

According to Du Van Toan (2011), if the CO_2 concentration in 2050 would be 560 ppm, the area of coral reefs would be ruined, remaining to an area equivalent to 40% compared to that in 1950.

Table 9. Coral growth rate (%) in the South China Sea and CO2 emission

Year	1950	2000	2030	2050	2100
CO_2 (ppm)	280	380	450	560	750
Coral (%)	100	80	60	40	20

Source: Du Van Toan, 2011

It has been modelled that the South China Sea is likely to suffer tremendous impact. The pH content in many parts of the South China Sea would be reduced by 0.3, which means that the ocean will likely experience high levels of acidification.

Figure 28. Distribution of coral reefs (2010)

(source: UN BiodiversityLab, 2018)

4. Legal documents and actions to mitigate climate change impacts on ecosystems

4.1. Legal documents

- In the Law on Environmental Protection 2014, Chapter IV with 10 articles stipulates Viet Nam's response to climate change.
- In Decision No. 2139/QD-TTg dated December 5, 2011, the Prime Minister approved the National Strategy on Climate Change, including tasks related to biodiversity conservationsuch as: ensuring improvement of forest quality, forest plantation,

reforestation of bare hilllands; securing effective harvesting of forests with maintenance and enhancement of capacity for prevention of natural disasters and desertification as well as soil erosion and depletion; strengthening protection, management and development of mangroves and wetlands; striving for forest cover in 2020 increased by 45%; research and facilitating transformation of agricultural production structure in responses to climate changes and sea level rise, taking considerations of locally ecological contexts and utilizing opportunities for developing sustainable agriculture; conserving biodiversity, focusing on protection and development of ecosystems and species that are resilient to climate change; protecting and conserving genetic resources and varieties being threatened to extinction by climate change; developing and implementing REDD+ programs, sustainable forest management, conservation and enhancement of forest carbon sequestration that integrated with improvement and diversification of community livelihoods and adaptation support; developing and implementing protection and sustainable management of the existing natural forests as protection, special-use and production forests.

- In Viet Nam's NBSAP 2013, Task 5 relates to biodiversity conservation in the context of climate change. Specifically, it aims to identify climate change impacts on biodiversity and promote biodiversity conservation as a means of responding to climate change; to develop biological corridors to increase connectivity among forest ecosystems and critical biodiversity areas; to implement forest regeneration programs using various methods and approaches, such as biodiversity conservation and enhancing carbon stock.
- The Prime Minister issued Decision 120/QD-TTg dated January 22, 2015, to approve the plan on coastal forest protection and development in response to climate change during 2015-2020. The plan sets the targets of: (i) protecting existing coastal forests with an area of 310,695 ha; and (ii) developing 46,058 ha to increase the total area of coastal forests by the year 2020 to 356,753 ha, with an increase in coverage from 16.9% (in 2014) to 19.5% to the year 2020.

4.2. Activities

- In 2010, the Prime Minister approved the planning of Viet Nam's MPA system to 2020 to include 16 marine protected areas. By 2017, 10 of 16 marine protected areas had been established.
- Biodiversity corridors have been planned, linking protected areas. MONRE is implementing the project 'Greater Mekong Subregion Biodiversity Conservation Corridors Project-Phase 2', which is funded by the Asian Development Bank. The project has been implemented since August 2011 and will be finished in 2019 The project covers 35 communes in six districts of Quang Nam, Quang Tri and Thua Thien Hue provinces.
- Some coastal provinces are implementing programs of planting and rehabilitating coastal mangroves in response to climate change.
- Pilot models of coral reef plantation and rehabilitation are being undertaken. These have the participation of communities and enterprises in some islands and protected areas, including Co To, Cu Lao Cham, and Nha Trang Bay.
- Ben Tre province has focused on supporting livelihoods and capacity-building for farmers for climate change adaptation.
- Accelerating the REDD+ program. Since 2008, Viet Nam has been cooperating with the World Bank, the UN-REDD Program, and other international NGOs for capacity-

building to implement REDD+. The project has focused on reducing greenhouse gas emissions by reducing deforestation and forest degradation, and payments for those who carry out REDD+ activities at the local level. Currently, SNV is implementing a pilot project to integrate REDD+ into management of high biodiversity areas.

- IUCN-WCMC collaborated with Viet Nam (2008) to develop a set of carbon and forest maps under the REDD+ program.
- There have been projects on correlations between climate change and biodiversity. .

Aichi Biodiversity Target 11: Protected areas

1. Protected area system in Viet Nam

In Viet Nam, four types of protected areas have been established before the Biodiversity Law, 2008: Special Use Forests (the Law on Forest Protection and Development 2004), MPAs (Decree No. 27/2005/ND-CP of the Fisheries Law 2003), inland protected areas (the Fisheries Law 2003) and wetland reserves according to Decree 109/2003/ND-CP.

In 2010, the Prime Minister approved the planning of a system of MPAs in Viet Nam by 2020, including a plan to have 16 marine protected areas (MPAs). By 2017, ten marine protected areas had been established with a total area of 187,810 ha (out of the 131,647 ha planned). These MPAs account for 0.2% of the sea area and includes Cat Ba, Bach Long Vy, Con Co, Cu Lao Cham, Ly Son, Nha Trang Bay, Nui Chua, Hon Cau, Con Dao and Phu Quoc. There have been plans completed for four additional MPAs and planning approval for them is being finalized (Hon Me, Hai Van - Son Cha, Phu Quy, Nam Yet). Finally, planning is underway for another two MPAs to be established: Co To and Tran Island.

As of 2018, there are 172 protected areas with a total area of 2,493,844 ha: 33 national parks, 65 nature reserves, 18 species and habitat protected areas, and 56 landscape protected areas. According to recent data from MARD (2016), by 2015 there were 2,228,888 ha of special-use forest land, accounting for 7% of the territory.

Table 10. Results of protected areas system review

Types of protected area	Amount	Total area (ha)
National Parks	33	1.147.863,7
Nature Reserve	65	1.150.237,7
Species and habitat conservation	18	100.639,78
Landscape protection areas	56	95.182,49
Total	**172**	**2.493.843,67**

Source: Decision 1107/2015 / QD-BTNMT (updated)

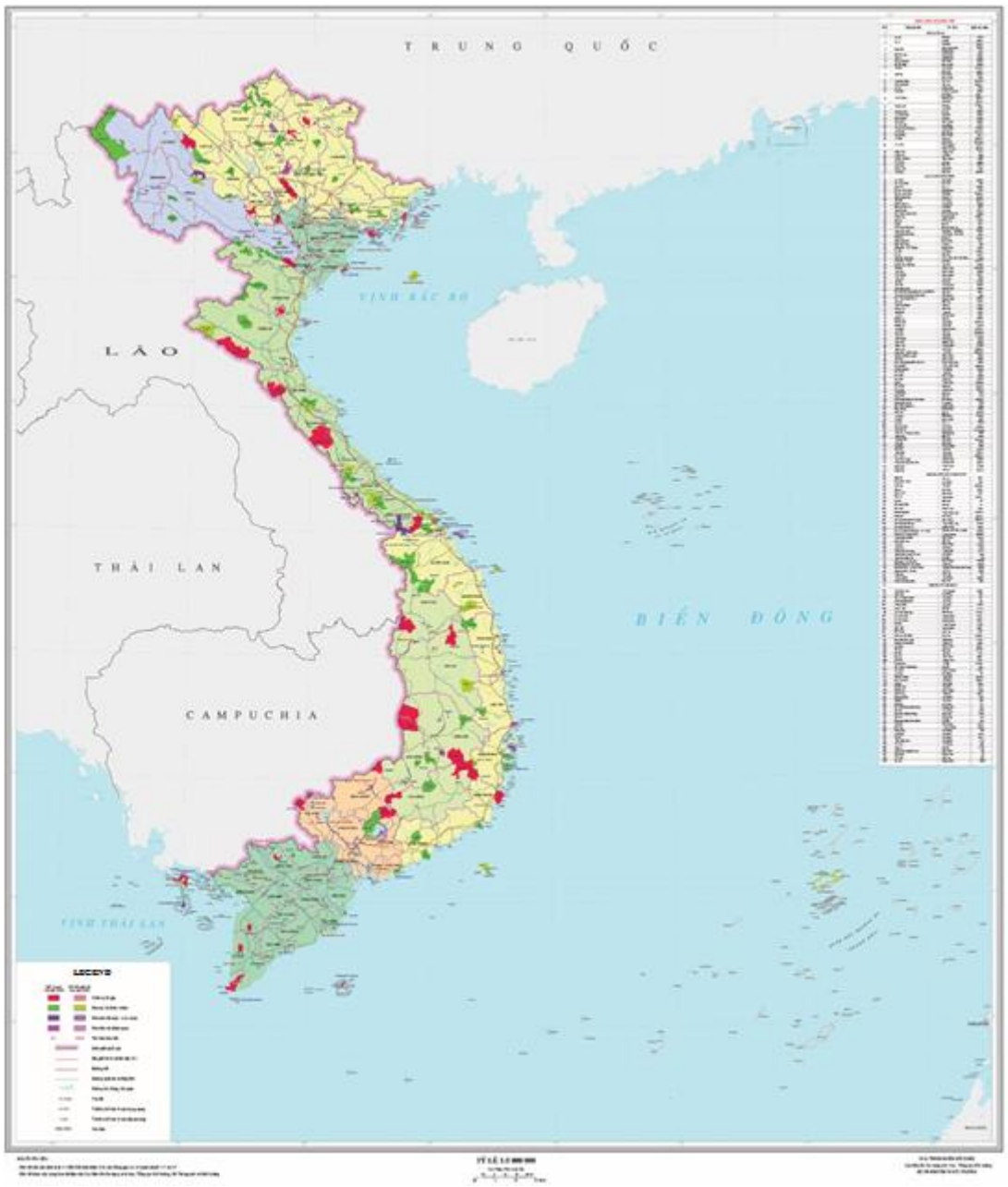


Figure 29. Map on Viet Nam protected areas system in accordance to Biodiversity Law
(Source: VEA, 2014)

In 2014, the 'National master plan on biodiversity conservation to 2020, with orientations toward 2030' was approved. Accordingly, the existing protected area system was mapped. The establishment and installment of 46 new protected areas, with a total area of about 567,000 ha, was planned; raising the number of protected areas in Viet Nam to 219, with these having a total area of about 3,067,000 ha. The protected areas would be distributed in eight geographical/ecological regions on the mainland (Northeast, Northwest, Red River Delta, North-central, South-central, the Central Highlands, Mekong River Delta) and four marine regions (Northern, Central, Southeast and Southwest).

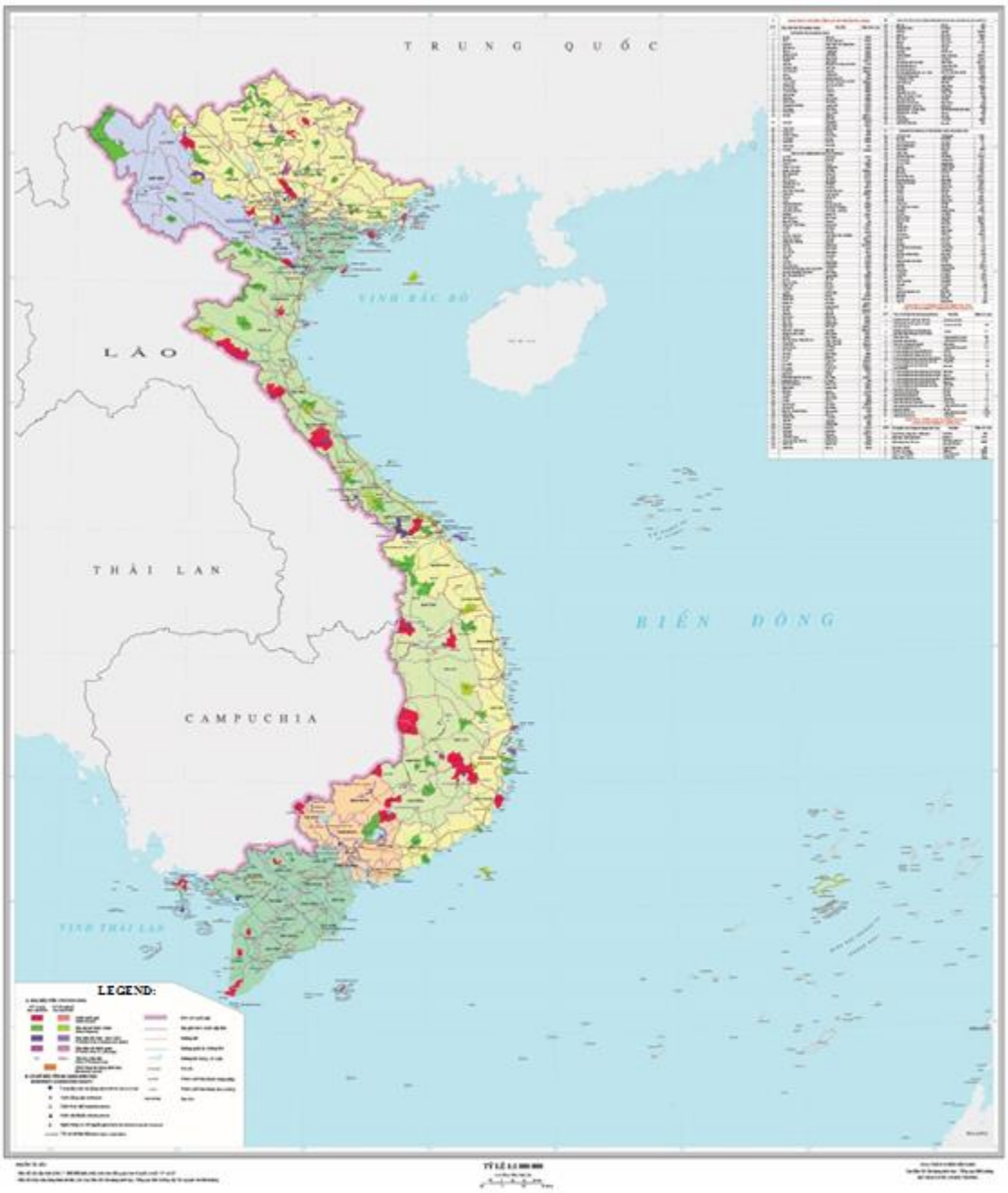


Figure 30. Map on national master planning for biodiversity conservation to 2020

(Source:VEA, 2014)

A number of protected areas and areas with high biodiversity value have been recognized by international or regional organizations, including:

- Six ecoregions have been listed in the Global 200 ecoregions recognized by WWF: rainforests on the Truong Son Range; dry forest of Indochina; the Mekong River basin; northern Indochina sub-tropical rainforests; southeast China – Hainan rainforest; and the Tay Giang river (Bang river - Ky Cung).

- Eight Ramsar Sites: Xuan Thuy National Park - Nam Dinh (1989); Bau Sau in Cat Tien National Park - Dong Nai (2005); Ba Be Lake - Bac Kan (2011); Tram Chim - Dong Thap (2012); Nui Ca Mau National Park (2013); Con Dao National Park (2014); Lang Sen Wetland Reserve - Long An (2015); and U Minh Thuong National Park - Kien Giang (2016).
- Nine Biosphere Reserves: Can Gio - Ho Chi Minh City (2000); Dong Nai (2001); Cat Ba - Hai Phong (2004); Coastal delimitation of the Red River Delta - Thinh Binh, Nam Dinh, Ninh Binh (2004); Kien Giang (2006); Western Nghe An (2007), Mui Ca Mau - Ca Mau (2009); Cu Lao Cham - Quang Nam (2009); Langbiang - Lam Dong (2014). These biosphere reserves have a total area of 4,105,446 ha
- One World Heritage Site: Phong Nha Ke Bang - Quang Binh (2003);
- Six ASEAN Heritage Sites: Ba Be National Park (2003); Kon Ka Kinh National Park (2003); Chu Mom Ray National Park (2003); Hoang Lien National Park (2003); U Minh Thuong National Park (2012); and Bai Tu Long National Park (2016).
- 63 important bird areas, accounting for about 5% of the total land area of the country confirmed by the BirdLife International.
- 104 Key Biodiversity Areas cover an area of 3.35 million ha, accounting for 10% of the land area on the continental part of Viet Nam confirmed by BirdLife and the IUCN in 2013.

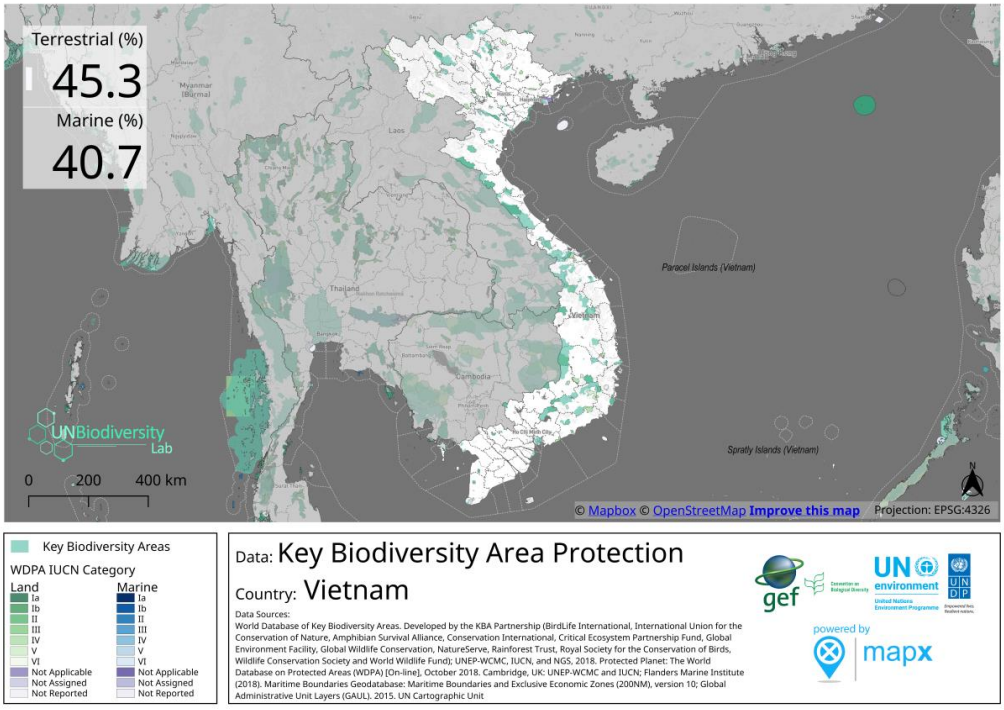


Figure 31. Biodiversity spots in Viet Nam

(source: UN Biodiversity Lab, 2018**)**

Figure 32: Protected Area Coverage (Terrestrial)

Source: UNBiodiversity Lab 2018

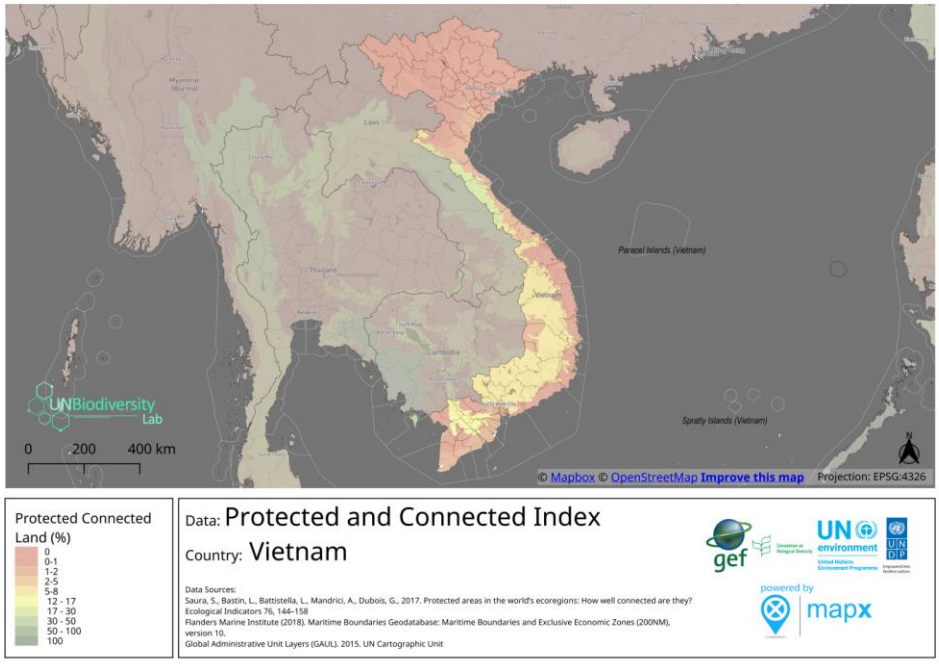


Figure 33. Proteced and Connected index for Viet Nam

(source: UN Biodiversity Lab 2018)

2. Legal documents related to management of nature reserves

In Viet Nam, the Government has paid much attention to biodiversity conservation and has issued several legal documents on this issue. The management strategy for the protected areas system in Viet Nam was been approved by the Prime Minister in Decision No. 192/2003/QD-TTg dated September 17, 2003.

In Decree No. 57/2008/ND-CP, the Government provided regulation on the management of marine protected areas that are of national and international importance.

In 2010, the Prime Minister issued Decree No. 117/2010/ND-CP on the organization and management of special-use forest systems. the Special-use Forest Management Board (VFMB) must establish annual and five-year plans.

In 2014, the *'Strategy for Management of Special-use Forests system, Marine Protected Areas and Inland Water Reserves of Viet Nam to 2020, a vision toward 2030'* was approved. The objectives of the strategy are:

- By 2020, the area of of special-use forests, marine conservation zones and inland water conservation zones shall be raised to 9% of the land area and 0.24% of the sea area of Viet Nam.
- By 2020, special-use forests, marine protected areas and inland water reserves will have access to new management practices such as co-management and benefit sharing.
- -To conserve threatened species in special-use forests, marine protected areas and inland water reserves, and to preserve the number of species in decline.
- To implement international commitments on biodiversity conservation through programs and projects, capacity-building for special-use forests, marine protected areas and inland water reserves.

On May 10, 2017, the Prime Minister approved the 'Scheme on enhancing capacity to manage the protected area system by 2025 with a vision toward 2030'.

3. The status of protected areas

According to data, 80% of special-use forests[3] have established their own management boards (MARD, 2016). Special-use forest management is decentralized, depending on the type of special-use forest, and is managed through the Forest Protection Unit and Special-use Forest Management Boards. Of 33 national parks, there are six managed by MARD while the rest are

[3] Special-use forest is term stipulated in the Law on forest protection and development 2004. In this in this report, this term is used for protected areas, which were estsblished under the Law on forest protection and development 2004.

managed by provincial People's Committees. According to Decree No. 117/2010/ND-CP, a special-use forest management board is a non-productive unit. As well as having investment from, and being financed by, the state budget or supported by domestic and international organizations and individuals, it obtains revenues from the provision of forest environmental services. In addition, according to Le Ha Thu (2007), Viet Nam now has more than 1.06 million ha of natural forest managed by the community. With the consent of the community, these natural forest areas may be developed into community-managed protected areas.

Information on management of protected areas:

According to reports on the implementation of annual management plans, most management activities have been implemented with certain effects.

A number of policy mechanisms have been developed and implemented to facilitate the management of protected areas. Current legal documents on the management of special-use forests that have contributed to the stabilization of the special-use forest system include Decree No. 117/2010 / ND-CP, dated December 24, 2010, on management of special-use forest systems. The Prime Minister's Decision No. 24/2012/QD-TTg dated June 1, 2012, on investment policies for special-use forests in the 2011-2020 period paved the way for the reorganization and improvement of the performance of Management Boards.. These are promising and effective policies for the management and protection of special-use forests as they link the interests and responsibilities of all stakeholders, especially the local community.

The project '*Removing barriers hindering protected area management effectiveness in Viet Nam'* ('the PA project') was implemented by MONRE in the period 2011 – 2015. It had four focused objectives: to i) create a complete and unified policy and legal framework to ensure sustainable financing for PAs; ii) instate clear provisions on the functions and powers of institutions, as well as financial management procedures for protected areas; iii) improve knowledge of sustainable financing options; and iv) improve information on, and mechanisms for, information sharing on the status of biodiversity in protected areas.

During five years of implementation, the PA Project has supported the development of Joint Circular No. 160/2014/TTLT-BTC-BTNMT, which guides the management, use, and provisioning of regular expenditure from the state budget to perform tasks and projects under Viet Nam's NBSAP. During the implementation of the Project, MONRE and MARD organized 35 training courses on management of biodiversity conservation and financial resources for biodiversity; there were more than 850 participants, including managers at central and local levels and protected area officials. In addition, to ensure the sustainability of training activities, five training-of-trainers courses were organized. The project has also provided an effective financial mechanism to increase revenue for protected areas. The project supported the piloting of financial mechanisms to increase revenues at three demonstration sites; namely, Cat Ba, Bidoup - Nui Ba, and Xuan Thuy national parks.

In 2018, MONRE used a management effectiveness tracking tool (METT) with 41 indicators of five groups to evaluate the management effectiveness of six ASEAN Heritage Parks (AHP):Ba Be National Park, Kon Ka Kinh National Park, Chu Mom Ray National Park, Hoang Lien National Park, U Minh Thuong National Park ,and Bai Tu Long National Park. The results showed that the six parks had a total management efficiency score of 65% to 80%. All Vietnamese AHP are being encroached upon, and practices such as illegal logging and hunting of animals have been taking place at differing intensities.

MOST supported the project *'Research and develop a set of criteria and procedures for monitoring and evaluating the management effectiveness of biosphere reserves of Viet Nam*' that was conducted by the Institute of Resources and Environment at Viet Nam's National University in 2017-2018. One output was the creation of a set of 15 criteria that can be used to monitor and evaluate the management effectiveness of the World Biosphere Reserves in Viet Nam. These criteria were trialed in the Biosphere Reserves of Cat Ba and Cu Lao Cham-Hoi An. The process of monitoring and evaluating the management effectiveness of Biosphere Reserves in Viet Nam was developed.

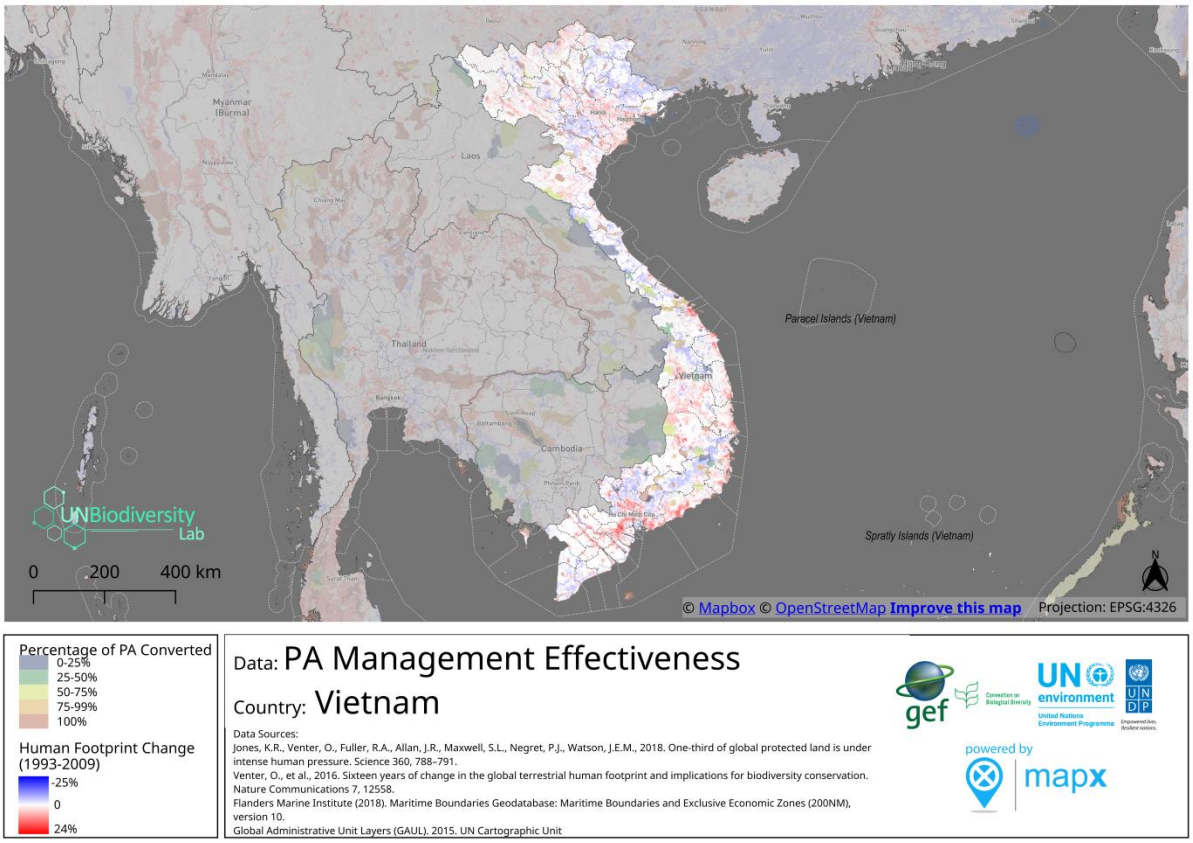


Figure 34. Management effectiveness of protected areas

(source: UN Biodiersity Lab, 2018**)**

Remaining issues in protected area management:

Despite the achievements made, there remain issues pertaining to management of protected areas in Viet Nam, which can be summarised as follows:

- There are inconsistencies in name, classification, and classification criteria for protected areas between the Biodiversity Law 2008, the Forest Law 2017, and the Fisheries Law 2017. This leads to overlapping and conflicting classifications in the protected area system and disagreement on functional areas and buffer zones of the areas. In addition, there are inadequacies in management of protected areas that have mixed ecosystems; for example, the areas that include forests, wetlands and/or seas;

- Inter-sectoral coordination in protected area management and protection is still limited due to lack of consistency and coordination;
- Mechanisms and policies linking local communities to the management of special-use forests remain inadequate;
- Many protected areas are too small and do not protect species well, as many large mammals have wide habitat zones (e.g. Yok Don National Park, Cat Tien National Park, Vu Quang Nature Reserve);
- The establishment of a wetland conservation system has progressed very slowly and, so far, only two wetland reserves have been established: the Dong Xuyen Biosphere Reserve-Bird Sanctuary (Bac Ninh Province) and the Phu My Biosphere Reserve-Bird Sanctuary (Kien Giang Province);.
- There is no regulation on criteria for the functional sub-zones of nature reserves, especially the strictly protected zone and ecological rehabilitation zone;
- Resources, including funds, equipment and management forces, for the conservation of special-use forests are limited in terms of quantity and professional expertise.

There continues loss in protected areas due to following reasons:

- The policy of rapid economic development and management has some limitations;
- Illegal and overexploitation of biological resources;
- Conversion of land and surface watter use;
- Environmental pollution from economic activities;
- The introduction of invasive alien species.

In addition, other indirect causes of biodiversity loss in protected areas include:

- Poverty of local people in most of the buffer zones;
- Lack of arable land;
- Poor awareness by buffer zone communities;
- Lack of alternative livelihood models, which would improve standards of living in buffer zone communities;
- Management boards have limited resources and management capacity.

Figure 35. Human Pressures to Protected Areas

(source: from UN Biodiversity Lab, 2018**)**

4. Protected area management with community participation

4.1 Protected area co-management models

The 'Mekong Wetlands Biodiversity Conservation Program' (2006) and the 'WWF-Coca Cola Project' (2008-2010) were facilitated through support from CARE International. Since 2008,the pilot co-management project has been conducted in Tram Chim National Park and has encouraged participants to develop a Natural Resource Use Management Plan, as guided by the national park's Management Board, and incorporating the use of indigenous knowledge. The Plan is then presented to a council that includes the management board of the national park, local authorities, and community representatives. This provides a forum to discuss and make suggestions. Although the national park's management board is the final decision-making agency, the plan is discussed,

ensuring that local resource users can participate.

Legal access to natural resources in Tram Chim National Park has created an essential source of income for the poor and is a way to counter impoverishment when there are no other sources of income, especially during the flood season when it is impossible to cultivate agriculture. In 2009, after two years of co-management in the park, the participating households received 30,000 to 50,000 VND for one day of fishing. Each participating household earns about 1.3 million VND per month (Re-statistic, 2011). The success of the model encouraged the national park's Management Board to expand the co-management pilot site from 720 ha to 900 ha by 2010. A survey conducted in 2010 found that 63% of the 120 respondents, including non-project participants, supported the model as a means of reducing poverty and controlling pressure on forest resources.

4.2 Tourism companies – co -management of coral reef

This is a model developed and piloted by Vo Si Tuan and his colleagues (2011) in coral reefs in central Viet Nam, including Cu Lao Cham Marine Protected Area (MPA) and Nha Trang Bay MPA. Under this model, the MPA management boards and the environmental management agencies develop policies and mechanisms that allow businesses to use resources for tourism. This is done in a way that contributes to conservation and allows businesses to reasonably use the reef areas for tourism.

During 2016-2020 period, MOST has been implementing a series of research projects to build models for the participation of communities in the management and use of biodiversity resources in Viet Nam's biosphere reserves. This work has occurred within the framework of the project '*Conservation of Important Wetlands and Associated Habitats'* funded by GEF through the UNDP. The project has focussed on the establishment of the Thai Thuy Wetland Nature Reserve (in Thai Binh Province), and the Tam Giang - Cau Hai Wetland Nature Reserve (in Thua Thien - Hue Province).

5. Biodiversity corridors

Since 2004, a number of pilot projects and programs have been proposed in order to establish biodiversity corridors, including:

Green Corridor

This project was conducted in 2004-2008 and planned a green corridor to connect Phong Dien Nature Reserve with Bach Ma National Park in Thua Thien Hue province, a part of the Truong Son ecological zone.

Biodiversity corridor in Lam Dong province

The small-scale project '*The pilot program for a biodiversity corridor in Lam Dong province, Viet Nam'* was conducted in 2005-2006. It selected a part of the extended belt of forest land that occurs in Lam Dong Province from Chu Yang Sin National Park (Dak Lak) to Ta Dung Nature Reserve (Dak Nong) to build a corridor.

Corridor linking Kon Ka Kinh National Park and Kon Chu Rang Nature Reserve

From 2006-2010, the project 'Building corridors for Connection and Sustainable Management of Kon Ka Kinh National Park and Kon Chu Rang Nature Reserve' was studied and proposed for implementation.

Initiative of conservation for a biodiversity corridor in the Greater Mekong sub-region

The Biodiversity Conservation Corridors Initiative (CEP-BCI), was piloted in Quang Tri and Quang Nam in 2006-2011, and expanded into Cao Bang in 2010-2012.The Program proposed the planning of six corridors with a total area of 130,000 ha, in Quang Tri, Quang Nam and Thua Thien - Hue provinces.

Pilot activities in Cao Bang - Quang Tay commenced in 2010 in the transboundary biodiversity corridor and aimed to improve connectivity in the border area between the New Bangliang Nature Reserve of Guangxi, China and Cao Bang, Viet Nam. The primary objective was to protect *Nomascus nasutus* (Eastern Back Crested Gibbon), a threatened species.

Greater Mekong Subregion Conservation Corridor Project – Period 2 (2011-2019)

MONRE cooperated with Quang Tri, Quang Nam and Thua Thien – Hue to implement this project. There are currently three biodiversity corridors that have been officially established, including: 1) the upstream area of the Vu Gia river system, upstream of the Thu Bon river system in Quang Nam; 2) Phong Dien Natural Reserve and Ho Chi Minh roads in the area running along A Luoi district, upstream of Ta Trach river in Nam Dong district of Thua Thien-Hue; and 3) Bac Huong Hoa Nature Reserve and Dak Rong Nature Reserve in Quang Tri province.

Table 11. Development progress of biodiversity corridors to 2020

Ord.	Name of the biodiversity corridor	Planning progress
1.	Thanh River - Sao La	2014 - 2019
2.	Sao La - Phong Dien	2014 - 2019
3.	Dac Rong - Bac Huong Hoa	2014 - 2019
4.	Na Hang - Ba Be	2015 - 2020

Under the national biodiversity master plan, 21 biodiversity corridors have been reviewed and developed.

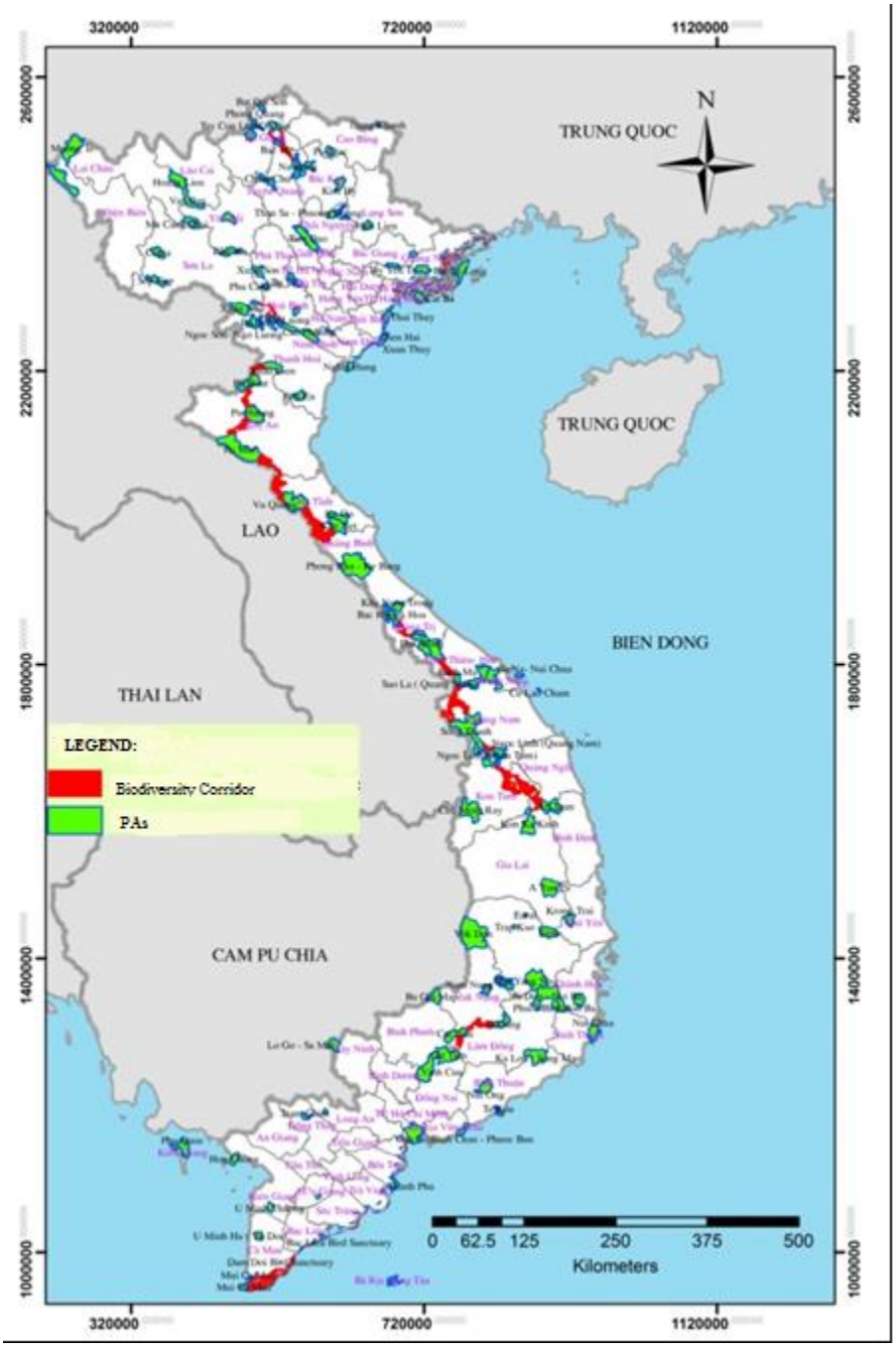


Figure 36: Map on national planning for biodiversity corridors in 2014

(Source: VEA – BCA, 2014**)**

Aichi Biodiversity Target 12: Reducing risk of extinction

1. Species Diversity

Viet Nam is recognized globally as having of high levels of biodiversity . Up to now, approximately 51,400 species have been identified, including about 7,500 species of micro-organisms, about 20,000 plant species on land and in water, about 10,900 species of terrestrial animals, about 2,000 species of invertebrates and fish in freshwater, and over 11,000 species of marine life. The number of endemic species in Viet Nam is high (e.g. about 30% of terrestrial tracheophytas, 27% number of freshwater snails and mussels, and about 58% of freshwater shrimps and crabs). In recent years, approximately 1,023 species have been newly described (Viet Nam Academy of Science and Technology and VNU Hanoi). For the period from 2014 to September 2018, 344 species have been newly described and published in scientific journals (208 species of animals, 136 species of plants).

In addition to having a wide diversity of natural organisms, Viet Nam has a high diversity of cultivated plant and animal genetic resources, including more than 6,000 rice varieties, about 800 plant species, and is the source of approximately 40 varieties of animals. Livestock and crops have been developed for hundreds of years and have valuable genetic traits. These are the precious indigenous genomes of Viet Nam need to be protected, preserved and developed.

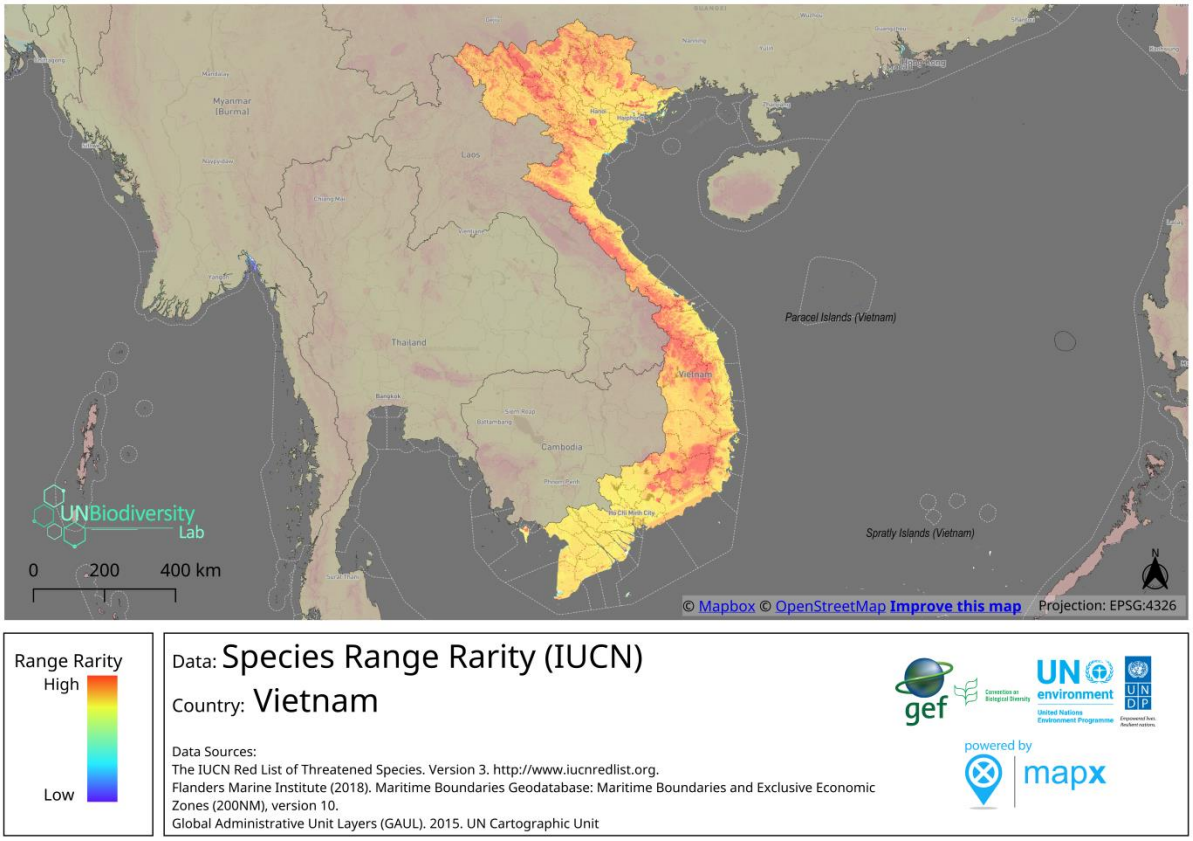


Figure 37. Map on range distribution of threatened species in Viet Nam

(Source: UN BiodiversityLab, 2018)

2. Status of threatened species

According to the Red List of the International Union for Conservation of Nature (IUCN), as of 2014, there were 362 species of animals, and 219 species of plants in Viet Nam listed as threatened. In the Viet Nam Red Book (2007), the total number of threatened species is listed as 882 species, consisting of 418 animal species and 464 plant species. Of the latter figure, nine species are considered extinct in the wild in Viet Nam, namely *Dicerorhynus sumatrensis*, *Bos sauveli*, *Tapirus indicus*, *Cynogale lowei*, *Procypris merus*, *Anguilla japonica*, *Cyprinus multitaeniata*, *Cervus nippon*, and *Crocodylus porosus*.

In terms of the flora, *Paphiopedilum Vietnamese* is extinct in the wild. Many plant species that were previously classified as endangered are now classified as critically endangered, including the *Cypress* species, *Callitropsis Vietnamesis*, *Panax bipinnatifidum*, and *Panax pseudoginseng*.

Monitoring in a number of important bird areas indicates that the number of threatened species, especially of globally threatened migratory birds is declining, and some species have not been seen for a number of years.

According to a survey conducted by WWF in 2003, Phu Quoc and Con Dao are two of Viet Nam's last marine areas to have (*Dugong dugon*), but the population numbers are no more than 100. However, according to the management board of Phu Quoc Nature Reserve (2016), *Dugong dugon* has not been recently seen in the reserve's seagrass beds, most likely due to hunting and degradation of habitat. The *Dugong dugon* population in Phu Quoc is closely related to the dugong populations living in neighboring Cambodia.

(Source: Geographic Atlas of Viet Nam)

A project conducted in 2014-2017 entitled *'Survey and assessment of endangered species should be prioritized for the protection aimed at amending the Viet Nam Red Data Book'*, that was conducted by the Institute of Ecology and Biological Resources of the Viet Nam Academy of Science and Technology had the following results:

a) Evaluating and compiling information profiles for 2,119 threatened plant and animal species
b) Proposed to update in the next version of the Red Data Book of Viet Nam 1,211 species with new classifications

Thus, compared to the Red Data Book of Viet Nam 2007, in which the total number of threatened species is 882 species, consisting of 418 species of animals and 464 species of plants, the number of species proposed for the next version of the Red Data Book is much higher.

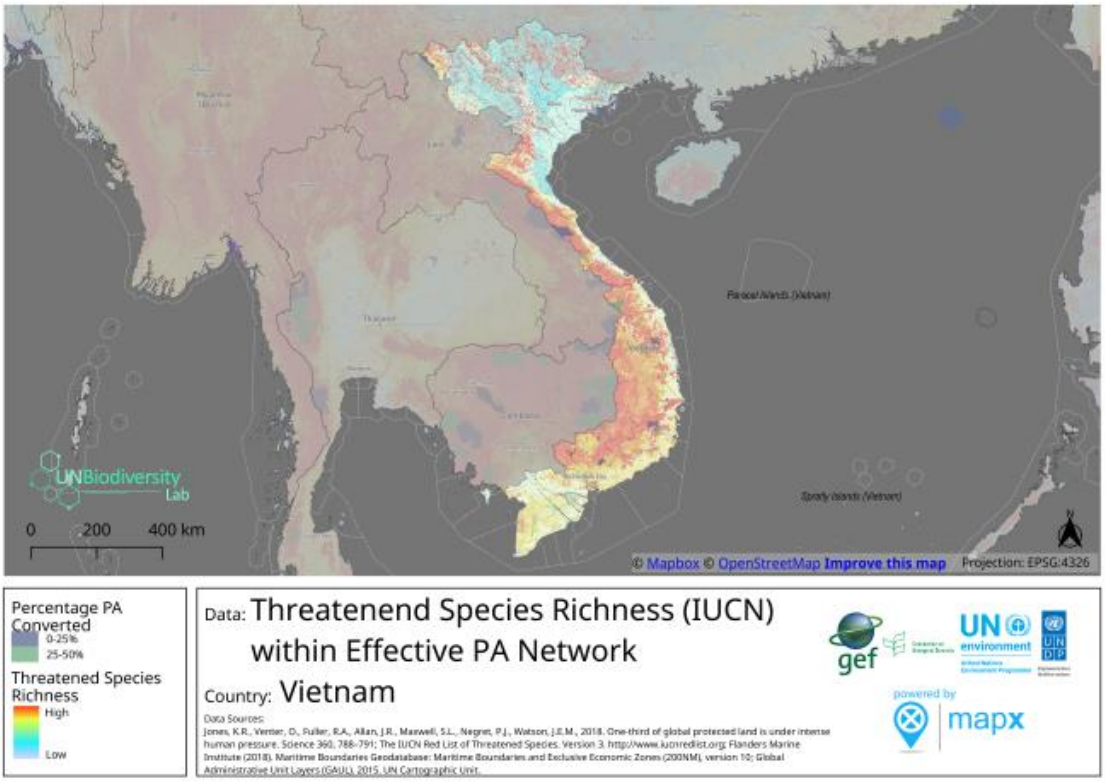


Figure 38. Threatened Species Richness (IUCN)

(Source: UN Biodiversity Lab, 2018)

3. Threats to threatened species

Major threats to species have been identified as following:

3.1 Illegal exploitation and over-exploitation of biological resources

Illegal hunting of wildlife as a source of income, recreation or trade has pushed many of Viet Nam's species to the brink of extinction in nature. According to a report by the Forest Protection Department, from 2010 to 2016, forest rangers nationwide detected and processed over 174,000 cases of violations of the law on forest management, development, and forest products. The number of violations of regulations relating to wildlife in this period was 4,305 cases. Thousands of kilograms of wildlife products were confiscated, and more than 60,000 individuals of various wildlife species were intercepted, of which 3,418 were individuals of threatened species. By 2016, customs had detected and intercepted 26 shipments of ivory and ivory products, totaling nearly five tons, along with tons of pangolins, pangolin scales, turtles, bear hands, rhinoceros' horn etc. These items are smuggled for consumption in Viet Nam or transited to third countries.

The status associated with consumption and use of wildlife and their products has tended to increase. Consumption of wildlife has become commonplace in restaurants and is sold publicly in markets, despite this being prohibited by law. This is the cause of endangerment to many animals and plants.

In northern mountainous provinces, medicinal plants are commonly exploited to the point of local extinction, to smuggle across borders. For example, in Cao Bang, Chinese traders have set up many

stations to buy and process local medicinal herbs. Many medicinal plants are illegally exported to China but the economic value of this trade is currently unknown.

Overexploitation of plant species not only affects biodiversity, but also affects the livelihoods of the households that are dependent on forest products. A lack of data limits the assessment of the extent of this threat. However, overexploitation of many groups of plants, for example orchids, is known to be very serious. Species that have high economic value are often at high risk of overexploitation, most notably timber species. The forests of Viet Nam provide a large number of commercially valuable timber species, including *Erythrophleum fordii*, *Dalbergia* spp., *Dipterocarpus* spp., *Shorea* spp., *Hopea* spp., and other coniferous species, such as *Fokienia hodginsii*. The abundance of species used for timber have declined considerably in recent decades; however, the impact of this decline on the long-term viability of these populations is not well known. Other species that are over-exploited include *Aquilaria crassna*, a species of agarwood, and *Panax Vietnamesis*, used to produce tonic. It is noteworthy that in areas with high forest cover such as in the North East, North West, Central Coast and Central Highlands, there is high rates of poverty which contributes to the illegal over-exploitation of forest resources, impacting biodiversity.

With an increasing population, leading to an increase in consumption, combined with ineffective fishing manage, the over-exploitation of aquatic resources in inland and coastal waters has been recorded. Many high-value aquatic species are severely affected by over-exploitation, such as the *Semilabeo notabilis*, *Hemibagrus*, *Bagarius bagarius*, lobsters, abalones, and scallops. Illegal exploitation using destructive techniques such as explosives, toxins and electric shocks is rampant in both inland waters and the seas.

3.2 Degradation and fragmentation of natura ecosystems and habitats

Deforestation for commercial purposes: In Viet Nam, forests are the dominant habitat of most plant and animal species that are threatened at the global level. However, the forests in Viet Nam have been cleared for decades, leading to a sharp decline in area and quality, with very little primary forest remaining. Annually, the Forest Protection Department intercepts tens of thousands of cubic meters of rare roundwood and lumber. There are cases of poaching occurring in the core zone of protected areas.

Conversion of forest to other purposes: The conversion of forest to industrial or agricultural land is one of the main causes contributing to theloss of natural forest. Many natural forest areas have been converted to agricultural land, for products such as sugarcane, tea, coffee, cocoa, rubber, pepper and, most recently, cassava (exported to China as raw materials for biofuel production). In 2008, 150,000 ha of dipterocarpaceae forest in the Tay Nguyen province that was considered to be of high biodiversity value was allowed to be converted to rubber plantation. The area of natural forest has been seriously reduced; it is estimated that there are only about 0.5 million ha of primary forest in Viet Nam, scattered in the Tay Nguyen and North Central Areas. Due to demand for the domestic and international markets, the remaining forests are increasingly at risk of being converted into industrial or agricultural land.

As of November 2016, 37,578 hectares as off-set plantation has been implemented nation-wide, accounting for 55% of the total forest area which were already converted to other non-forestry uses.

Regarding hydropower projects, the country currently has more than 1,020 hydropower projects (total capacity of 24,246 MW) planned, of which 138 have been planned and approved for the main

streams of large rivers. Dams and reservoirs of hydropower plants are mostly located in upland areas that have high biodiversity value. They not only cause floods in valleys that are often covered by natural forests, but also present barriers to migratory fish, and impacting these species' lifecycles. They also cause impacts to the river behind the dam, and to the river' estuaries. A number of existing hydropower reservoirs do not operate properly, leading to inappropriate flood discharge and watter flow, etc., which has caused both human and economic losses, and substantially affecting ecological processes.

Deforestation due to shifting cultivation: This is a direct cause of deforestation or forest degradation. However, there is also some evidence that in some areas that have populations of ethnic minority people and where shifting cultivation is occurring, the impact to biodiversity is negligible.

Expansion of intensive agro-business production: Economic development and population growth have resulted in extensive agricultural intensification in many deltas. In the Mekong Delta, especially in the Plain of Reeds and the Long Xuyen Quadrangle, most natural grasslands have been converted into rice-growing areas. This has decreased the habitat of some threatened species and reduced the number of wild genetic resources in Viet Nam.

Conversion of coastal habitats:

Many mangrove forests, lagoons, and coastal tidal flats have been rapidly converted to intensive aquaculture, including to shrimp ponds and clam enterprises. This has led to a near-complete loss of mangrove forests in many provinces. Thousands of hectares of coral reefs and seagrasses have also been lost due to exploitation and/or the use of aquaculture cages. Due to the drive to generate profits, most of the coastal and inland aquaculture activities have shifted from extensive farming to less sustainable farming, resulting in the depletion of mangrove forests, the loss of habitat for many water birds and pollution of the environment.

3.3. Environmental pollution

Rapid urbanization and industrialization have seriously affected water quality. Untreated domestic and industrial waste water is not being controlled, and is discharged into rivers and lakes, badly affecting the biodiversity of these ecosystems. Agricultural intensification and unregulated use of pesticides is increasingly common in Viet Nam, adding to the degradation of bird and insect populations in rural areas and suburbs. Many beneficial bird species that feed on harmful insects have been destroyed, leading to disease outbreaks in the field. Pangasius production in the Mekong Delta is also a cause of organic pollution in many water areas, affecting the aquatic communities there.

3.4. The introduction of invasive alien species

To date, there has been no comprehensive assessment of invasive alien species in Viet Nam. However, concerns about the risk of harm to biodiversity, human health, and the economy from invasive alien species is increasing, especially after the yellow snail (*Pomacea canaliculata*) was introduced into Viet Nam in the late 1980s and has now spread to the whole country. As of 1997, yellow snails had damaged 132,000 hectares of rice cultivation, causing millions of dollars (USD) in damage each year due to declining rice yields.

According to existing information, 94 exotic species have been imported into Viet Nam, including 42 species that are known to be invasive and 12 of which are fast-growing invasive species, such as *Mimosa pigra* and *Eichhornia crassipes*. *Mimosa* was first discovered in Tram Chim National Park

(Dong Thap province) in 1995 but is now widespread and has become a major threat in many wetlands throughout the country. In 2009, MARD released a list of 48 exotic aquatic species that are known to occur in Viet Nam, of which 14 species are considered to have adverse impacts on aquatic biodiversity. In 2013, MONRE and MARD released a list of invasive alien species that are already found within Viet Nam, or could potentially appear in Viet Nam.In December 2018, MONRE released an updated list of invasive alien species and potentially invasive alien species.

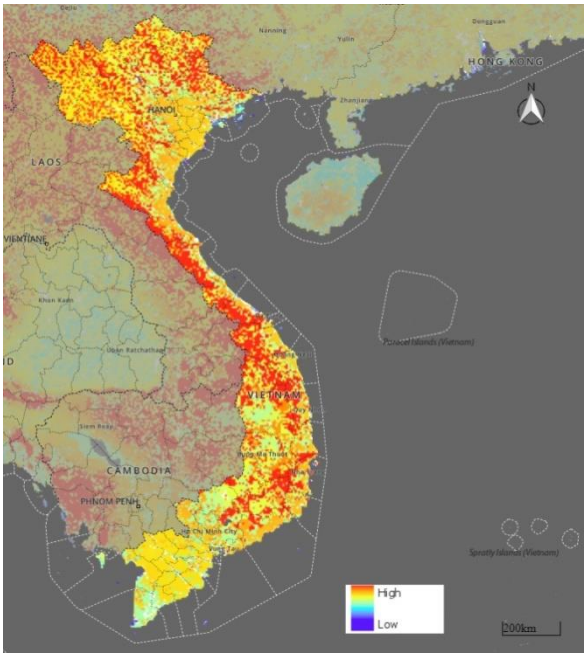
3.4. Climate Change

Viet Nam is one of five countries that are most likely to be affected by global climate change. In that context, fragmented natural ecosystems are more likely to be affected by these changes and lose high numbers of species. Under climate change scenarios, sea level rise projections for Viet Nam (MONRE, 2012) are as follows: if sea level rises from 75 cm to 1 m, about 20 - 38% of the Mekong River Delta and about 11% of the Red River Delta area will be flooded, affecting 78 out of 286 ‘critical habitats' (27%), 46 nature reserves (33%), nine nationally and internationally significant biodiversity areas (23%), and 23 other biodiversity areas. Many fauna and flora will be under increasing pressure due to changes in habitat, altered food resources, and natural disasters such as floods, droughts, and storms. Some species of plants and vertebrates may become extinct in the next century due to the effects of climate change. However, knowledge of the impacts of climate change on biodiversity in Viet Nam is still insufficient.

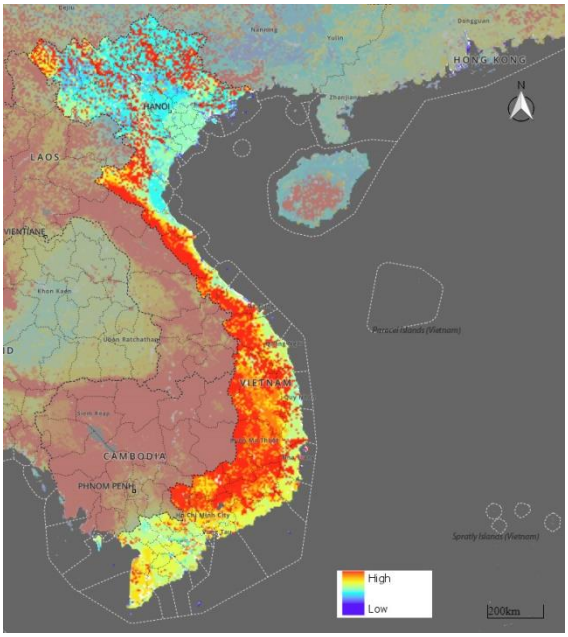
3.5. Forest fires

Annually, incidents of forest fire in Viet Nam destroy hundreds of thousands of hectares of forest, causing hundreds of billions VND worth of damage, and seriously affecting terrestrial habitat. According to the General Statistics Office, in 2014, forest fires in Viet Nam affected 1775 ha; in 2016, this figure was 3321 ha. According to the Forest Protection Department (12/2018), in 2018, 10,318 locations of forest-firing were observed and/or reported nation-wide while this =figure in 2014 and 2016 were 11,386 and 12,043 respectively.

Viet Nam lacks modern fire fighting equipment at an appropriate resource level, making it increasingly difficult to fight forest fires, especially in mountainous areas like Hoang Lien National Park. In addition to investing in more modern fire fighting equipment, it is necessary to increase awareness and management of people's activities when they go into the forest for the purposes of cultivation or exploitation of resources.



Extent of suitable habitat - Species Richness



Extent of suitable habitat - Threatened Species Richness

Figure 39. Maps on extent of suitable habitat (species richness and endangered species richness)

(source: UN Biodiversity Lab, 2018)

4. Legal documents on the management of threatened species

In order to conserve threatened species, the Government, as well as a number of ministries and branches, have promulgated various legal documents and approved multiple programs and projects:

- In the Biodiversity Law 2008, Chapter IV covers the conservation and sustainable development of species.
- In the Forest Law 2017, Article 38 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 to the IUCN Red List categories), and as wild plant and animal species listed under CITES.
- Decision 485/2008/QD/TTg. of the Prime Minister approved a project on protection of endangered precious and rare aquatic species up to 2015, with a vision to 2020. Accordingly, the Minister of Agriculture and Rural Development signed Decision No. 82/2008/QD-BNN promulgated a list of aquatic species that need to be protected, rehabilitated, and developed. In general, aquatic species listed in this Decision are also in the Viet Nam Red Book.
- Decision 940/2012/QD/TTg. of the Prime Minister approving the 'Emergency Action Plan to 2020 for the Conservation of Elephants in Viet Nam'.
- Decision 763/2013/QD/TTg. of the Prime Minister approving the 'Master Plan for Elephant Conservation in Viet Nam for the period 2013-2020'.

- Decision No. 11/2013/QD-TTg of the Prime Minister on January 24, 2013, prohibits the export, import, sale, or transportation of specimens of certain animal species that are under CITES.
- Decision No. 188/QD-TTg dated 13/02/2013 of the Prime Minister, approved the program for protection and development of aquatic resources up to 2020.
- Decision No. 1250/QD-TTg dated July 31st, 2013, approving the NPSAP Viet Nam. This contains two specific targets: Improving the quality and number of populations of endangered, precious, and rare species prioritized for protection; and preserving indigenous, endangered, precious and rare gene sources (livestock, plants, micro-organisms).
- On November 12, 2013, the Government issued Decree No. 160/2013/ND-CP on the management of species on the list of endangered, precious, and rare species prioritized for protection.
- - Decision 539/2014/QD/TTg. of the Prime Minister, on the approval of the National Tiger Protection Program for the period 2014-2022
- - Directive 03/CT/TTg on February 20, 2014, the Prime Minister strengthened the direction and implementation of measures for controlling and protecting endangered, rare, and precious wild animals.
- Decision No. 294/QDTCLN-VP dated August 17, 2017 regulating the functions, powers, and organizational structure of the Forest Protection Department under the Directorate of Forestry.

On the basis of legal documents, conservation activities of threatened species is site-specific. Most national parks and reserves are large enough to have plans for monitoring threatened species, but only within the park area.

5. Activities for the conservation of threatened species

5.1. Surveying, inventory and evaluation of threatened species

From 2010 to 2016, the Viet Nam Academy of Science and Technology collaborated with other institutes under the Institute of Scientific and Industrial Research and MARD to implement the Viet Nam Red Data Survey, Research, and Amendment Project. This project led to data on threatened wildlife species being updated as the basis for the development of a new Red Book of Viet Nam. Objectives included:

- Compile and update information on threatened wildlife species;
- Develop guidelines for biodiversity surveys, assessments, and reporting on the status of threatened species;
- Issue technical guidelines for the development of reports on protected areas at provincial and national levels; provide technical guidance on baseline biodiversity surveys for seven taxonomic groups, including vegetation, fish, amphibians, reptiles, birds, and mammals (in Official Dispatch No. 2149/TCMT-BTĐDSH, 14 September 2016);
- Pilot a mechanism of sharing information on the control of trade and consumption of threatened species to law enforcement agencies such as Customs, the Environmental Police, and Forest Protection Department.

5.2. In-situ conservation

To date, there are 167 protected areas in Viet Nam with a total area of 2,453,306 ha, including 33 national parks, 62 nature reserves, 17 species and habitat protected areas and 55 landscape protected areas.

With the financial and technical support of international organizations, a number of new projects that manage and monitor threatened species have been established such as, the establishment of a protected area for saola in Quang Nam and Thua Thien Hue provinces, and the establishment of a reserve in Quang Nam for Ngoc Linh ginseng. Furthermore, in 2015, the project '*Urgent conservation of elephants in Viet Nam'* commenced and a reserve was established in Phuoc Ninh commune (Nong Son district, Quang Nam province) There is also some monitoring of primate species in Cat Ba National Park and Na Hang Nature Reserve, as well as monitoring of the black-faced spoonbills in Xuan Thuy National Park and sarus cranes in Tram Chim National Park and the Phu My Reservoir Nature Reserve, Kien Giang. Some mollusc species in national parks and marine parks in the central, east and south-west coasts of Viet Nam are also being monitored, as are some coral reefs and seagrass beds in Con Dao and Phu Quoc Islands. However, monitoring and reporting of threatened species has not been implemented continuously, mainly due to a lack of resources, (primarily financial resources).

5.3. Development of species

In 2013, MONRE carried out a review of *ex-situ* conservation facilies in Viet Nam. The review assessed two zoos, nine animal rescue centers, seven botanical gardens, and some repositories of genes, seeds, and genetic specimens.

In addition, relevant ministries/sectors have executed their management of endangered species:

- Since 2014, MONRE has provided feedback for nine cases of import and export of specimens that are in CITES Appendices. Viet Nam's CITES Management Authority has granted permission to import specimens of tiger species (*Panthera tigris*), bison (*Bos gaurus gaurua*) and small-clawed otter (*Anoyx cinerea*); export specimens of *Trachypithecus hatinhensis*, red-shanked douc langur (*Pygathrix nemaeus*), gray-shanked douc langur (*Pygathrix cinerea*), white-cheeked gibbon (*Nomascus leucogenys*), white-cheeked crested gibbon (*Trachypithecus francoisi*), Delacour's langur (*Trachypithecus delacouri*) and bears (*Ursus thibatenus*).
- According to a report by FFI (2016), the conservation activities in recent years have led to achievements such as some increase in restoration area of protected ecosystems; newly discovered species to science, and conservation, restoration and development of valuablegenetic 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.
- Regulations on raising and planting of species that are on the list of priority protection species are specified in Article 13 of Decree No.160./2013/ND-CP. Priority protected species shall be raised and/or planted at biodiversity conservation facilities, and provincial People's Committees are responsible for reviewing and issuing permits for such facilities.

On September 22, 2016, MONRE issued Circular No. 25/2016/TT-BTNMT providing guidelines

on the administrative forms required for breeding facilities (termed as ‘biodiversity conservation facilities’ in the Decree, but actually currently also covers enterprises that breed threatened species for commercial gain). The guidelines aim to support provincial-level People's Committees in providing advice to organizations and individuals in their registration and application to establish such facilities.

Aichi Biodiversity Target 13: Safeguarding genetic diversity

1. Status of plant and animal genetic resources

As well as having approximately 51,300 known species, Viet Nam is one of the world's most diverse sources of indigenous plant and animal genetic resources, and has more than 6,000 rice varieties, approximately 800 agricultural plant species, and is the source of about 40 poultry breeds. Livestock and crops have been developed for hundreds of years and have valuable genetic traits.

2. Legal documents related to the protection of genetic diversity

- The NBSAP of Viet Nam includes targets relating to the inventory and conservation of indigenous, endangered, precious, and rare genetic resources (livestock, plants, micro-organisms).
- Resolution No. 17/NQ-CP dated March 17, 2014, of the Government relates to the Nagoya Protocol.
- Decision No. 1671/QD-TTg dated September 28, 2015, of the Prime Minister relates to the 'Program for the Conservation and Sustainable Use of Genetic Resources by 2025, orientation to 2030'.
- Decision No. 1141/QD-TTg dated June 27 2016, approves the '*Scheme on Capacity Building for Management of Access to Genetic Resources and the Equitable and Reasonable Sharing of Benefits arising from the Use of Genetic Resources for the Period of 2016 – 2025'*.
- Decree No. 59/2017/ND-CP dated May 12 2017, is on '*Access to Genetic Resources Management and Benefit Sharing from the Use of Genetic Resources'*.

3. Activities to protect the genetic diversity of plants and animals

3.1 Establishment of biodiversity conservation facilities

In addition to the in-situ conservation of species as species and habitat protected areas, the development of *ex-situ* conservation facilities is also expanded, consisting of 11 wildlife rescue centers, 03 zoos andbotanical parks (Thu Le; Bach Thao, Thao Cam Vien), 15 botanical gardens within protected areas (about 8,000 ha), and 05 medicinal-hurb gardens (about 300 ha).

3.2 Preservation and storage of genetic specimens, evaluation of genetic resources, management of information on genetic resources, copyright of traditional knowledge on genetic resources

In Viet Nam, conservation of genetic resources has been carried out since the early 1960s and information has been used in agriculture, forestry, industry, health, aquaculture and other fields. However, the Program for Conservation and Restoration of Animals, Plants and Micro-organisms Genetic Resources was initiated in 1987, and carried on through until 2015. In 2010, the Ministry of Science and Technology issued Circular 18, regulating the management of scientific and technological tasks of genetic management. The Gene Funding Program has three main tasks: conservation of genetic resources, exploiting and developing genetic resources, and evaluation of genetic resources.

In 2015, the Prime Minister issued Decision 1671/QD-TTg, approving the '*Program for the Conservation and Sustainable Use of Genetic Resources by 2025, with orientation to 2030'*. This is considered an important legal document for the conservation of genetic resources. According to this Decision, the targets for 2020 are: (i) collecting, importing, and safely storing at least

70,000 biological genetic resources; (ii) evaluating and determining the value of genetic resources, with initial evaluation of at least 20,000 (about 30%) collected biological genetic resources of potential economic, environmental, and medical use; evaluation of at least 10% of the total number of biogenetic resources assessed; (iii) evaluating the potential of at least 300 biological genetic resources of potential scientific and economic value; decoding and building a genetic map of at least five endemic or high economic value gene sources or those which are key products of Viet Nam; (iv) documenting genetic resources, initially setting up a database for state management, scientific research, and information exchange about national genetic resources (National Gene Funding Network); and (v) exploiting and developing at least 100 valuable genes for use in agriculture, industry, medicine, culture, environmental protection, security and defense.

The targets for 2025 are: (i) continuing to collect, import, store, preserve, and maintain at least 90,000 biological genetic resources; (ii) evaluating genetic resources, with initial evaluation of at least 30,000 (about 40%) of the collected genetic resources of potential scientific, pharmaceutical, and economic value, and with potential for development of seeds for production. This is to be coupled with a detailed evaluation of at least 10% the total number of genetic resources already evaluated; (iii) evaluating the genetic potential of at least 500,000 biological genetic resource of potential scientific and economic value; decoding and building a genetic map of at least ten endemic species of high economic value or those which are key products of Viet Nam; (iv) improving the national information system for gene sources for public administration and information exchange using the National Gene Funding Network; and (v) exploiting and developing at least 200 of the most valuable genes for use in agriculture, industry, medicine and pharmacy, culture, environmental protection, and national defense.

At present, a network of agencies has been established; this consists of a number of focal agencies and 68 units from six ministries that are involved in the implementation of the program of conservation and storage of gene sources. In 2016, MOST issued Circular No. 17/2016/TT-BKHCN regulating the conservation and use of genetic resources to 2025, orientation to 2030.

The system of preserving genetic specimens in Viet Nam is quite varied:

(i) Medicinal plant genetic resources: The Ministry of Health has 12 units involved, with the Institute of Pharmacy as the lead organization. The Ministry of Defence has three units involved, with the Military Institute of Traditional Medicine as the lead organization.

- Medicinal plant gardens: Viet Nam has 3,948 species of plants and large fungi belonging to 307 families that are being used as medicines. Over ten medicinal plant research centers 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 by *in-situ* conservation and 630 species of medicinal plants by *ex-situ* conservation, of which 26 species are threatened.

(ii) Agriculture crop genetic resources:

- Genetic bank and genetic specimens: At present, four organizations in Viet Nam have cold storage warehouses for seed preservation: the Viet Nam Academy of Agricultural Sciences, the Institute of Agricultural Sciences, Can Tho University, and the Field Crop Research Institute. However, these cold storage warehouses are relatively small in size

and are only suitable for short- and medium-term storage.

- The Plant Resources Center of the Viet Nam Academy of Agricultural Sciences has stored more than 20,000 varieties of nearly 250 species of plants in cold storage, and preserved about 2,300 seedlings of 32 plant species. There has been a particular focus on conserving rice species, including wild rice varieties that are resistant to insects and pests.
- 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 plant various 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' project conducted from 2012-2015, as well as a plant varieties project conducted from 2010-2015. –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. All these genetic resources were initially assessed for their suitability for long-term storage using seed depots of the National Research Institute of Seed and Forestry Biotechnology. The storage was also computerized by the seed management program from the Australian International Seed Center. The genealogy of each seed lot is detailed on the computer. Periodic inspection of the germination rate of each seed lot is also conducted. Furthermore, a room to store of the seeds of 89 species of native and imported plants was also built.
- The Rubber Research Institute has collected and is preserving 3,340 genotypes and 200 seed specimens; it has also documented 2,000 genotypes of rubber trees.

(iii) Livestock group genetic resources:

- From 1989 to now, 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; Recently, MARD has prioritized conservation of genetic resources as an important part of promoting production.

(*iv) Aquatic groups:*

The fisheries sector has preserved and stored 43 aquatic genetic resources with a total of 4039 individuals, including imported species (original seeds), and rare and valuable native species. All stored genetic resources have been evaluated for basic criteria, including morphological characteristics, biological characteristics, and fertility, and sexual development in storage conditions. Some genetic resources are assessed for population characteristics. In 2015, 11 species of microalgae as food for aquatic seed production were stored. To facilitate research and information exchange, genetic data is updated at the website http://gca.ria1.org.

(v) Micro-organism genetic resource:

- The Center for Microbiology in Hanoi National University has classified and maintained

2,016 strains of fungi, bacteria, and micro-organisms that are used in the food , medicine, animal husbandry, veterinary medicine, aquaculture and agriculture industries.

- From 2015 onwards, the task of preserving, protecting and storing the micro-organisms of cultivation was undertaken by the Soils and Fertilizers Research Institute and the Institute of Soil and Agriculture Chemistry both under MARD. 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 protecton microbial genetic resources, including 803 plant pathogen microbial genetic resources and 67 useful microbial genetic resources.

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.

3.2.1. Results of exploitation and development of genetic resources

Nearly 200 genetic resources have been selected as having good market potential to develop into valuable commodities. Among them, more than 20 genetic resources have been successfully researched and developed to scale up and process the product. There has been some experiment in relation to the participation of enterprises, which may be able to generate stable revenue which then can be reinvested for conservation.

- Agricultural and forestry crops: Over 80 genetic resources have been researched. The Center of Plant Resources provides about 1,000 seed samples; these seed samples have been used in research projects. For example, the Center has provided local rice varieties to the Institute of Agricultural Genetics to decode genes.
- Medicinal plants: based on the directory of 40 valuable medical hurbs issued by Ministry of Health, different material areas of medical hurbs have been developed, providing materials for medicine processing.
- Livestock: Many gene sources have been developed in localities throughout the country, such as cattle, pig, chicken, duck, and gene sources of professional dog for security.
- Aquaculture: Exploited and developed 10 rare, endangered, and high economic value genetic resources. Using genetic resources of aquaculture for hybridization, breed selection, and for breeding carp, tilapia, catfish, and giant river prawn. Aquatic genetic data is updated at the website http://gca.ria1.org.
- Micro-organisms: Many strains of micro-organisms have been studied, isolated, selected and utilized as yeast strains to produce IAA and GA3 growth promoters to produce growth promoters, increase crop yield; Micro-organisms strains resistant to green wilt in some plants such as peanut, sesame, chilli, tomato etc.; Highly pathogenic strains of the virus, such as Gumboro, Newcastle; Some Micro-organism strains have been used industrially for the production of protease, xylannase, phytase, biological insecticides etc.

3.2.2. Documentation Results - Database of Genetic Resources

- Agricultural crops: Website: *www.pgrViet Nam.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 has been updated and posted on the website *www.vafs.gov.vn.;*

- Medicinal plants: an software for genetic resources management has been developed and applied by the Institute of Medicinal Materials;
- Livestock: The Institute of Animal Husbandry has developed 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 catalog.

3.3. Limitations to conservation and sustainable use of genetic resources

During the implementation of the 'Program for the Conservation and Sustainable Use of Genetic Resources in Viet Nam', MOST (2018) identified the limitations of conservation and use of genetic resources and their causes as follows:

Limit:

- Lack of strategic approach in conserving genetic resources has not been identified;
- Lack of research to improve conservation methods;
- The process of genetic resource assessment is very slow;
- Research on, and utilization and development of, genetic resources are still limited.

Reason:

- Lack of scientific and technological human resources and funding for gene conservation (officials working on conservation and storage of genes are mostly part-time);
- Increased climate change, coupled with widespread international integration, has also led to increased erosion of the genetic resources;
- Awareness of research on genetic diversity is still limited so it has not been properly considered;
- Equipment and technical facilities are lacking or not synchronized, so the efficiency is low.
- Dissemination of documents and professional training has not been carried out regularly,
- Some genetic resources of Viet Nam have been lost through gene exchange with foreign countries.

3.4. Solutions to implement genetic resources conservation in the period 2016-2025

According to MARD (2016), in order to implement the 'Program on conservation and sustainable use of genetic resources to 2025, orientation towards 2030', it is requested implementation as the following:

Microbial genetic resources:

- Increasing resources for the conservation of microbial gene sources, especially facilities, equipment, and funding;
- Expanding training and retraining of human resources, especially focusing on young scientific and technological staff; intensifying international cooperation, learning and sharing experiences and techniques in microbial genetic resource management.

Plant genetic resources:

- Improving scientific exchange in the field of conservation of genetic resources, especially minimizing the possibility of native genetic resources erosion; assessing and sustainable

us of genetic resources.

Livestock genetic resources:

- It is reasonable to initially do *in-situ* conservation for the newly collected and discovered genetic resources. Given the number of high number of livestock breeds, only economically valuable varieties that can be developed into production should be preserved longer-term.
- Livestock genetic resources need to be more fully incorporated into databases, focusing on both phenotypes and genotypes.

Aquatic genetic resource:

- For aquacultural gene sources, in the period of 2016-2020, priority given to the conservation and storage of fish species such as *Epinephelus lanceolatus*, *Sinilabeo lemassoni*, *Spinibarbus hollandi*, *Bagarius yarrelli*, *Mastacembelus armatus* and *Epinephelus malabaricus*, which are of high economic value but that have been overfished and are threatened in the wild.

Aichi Biodiversity Target 14: Ecosystem Services

1. The ecosystem of Viet Nam

Viet Nam's topography and climate have created a variety of natural ecosystems on the land, which include such forest ecosystems, including tropical evergreen rainforest, tropical humid semi-evergreen forest; evergreen broad-leaved limestone forest; coniferous forest, deciduous dipterocarp forest; Melaleuca freshwater swamp forest; bamboo forest; and mangrove forest. In addition to eight types of forest ecosystems, forest scientists have also divided 14 types of forest vegetation cover according to their ecological factors (Thai Van Trung, 1999). Based on the natural factors of climate, terrain, geology, and soil, the continental part of Viet Nam is divided into eight forest ecological zones with 47 sub-regions that have specific characteristics of vegetation type and landscape.

In addition to forest ecosystems, Viet Nam also has diverse ecosystems on the continent, such as grasslands, limestone mountains, inland wetlands (streams, rivers, lakes, reservoirs, cave caverns), and sand dunes.

Viet Nam has a coastline of more than 3,260 km (excluding the coast of islands) with more than 3,000 large and small islands along the coast, including the Spratly and Paracel archipelagos. Viet Nam's exclusive economic sea zone is over 1 million km^2. On the basis of natural conditions, marine environment and marine life, especially with the diversity of coral reefs, Nguyen Huy Yet (2000) divides Vietnamese waters into six ecological zones with specific characteristics of biodiversity which are:

- Gulf of Tonkin (to the South of Con Co Island, Quang Tri province)
- The Central Coast (Con Co Island to Dinh Cape in Phan Rang - Varella Cape)
- The South-Central Coast (Dinh Cape to Vung Tau Cape)
- The Southeastern coastal waters (Vung Tau Cape to Ca Mau Cape)
- The South West Coast (Ca Mau to Phu Quoc Island in the Gulf of Thailand)

- The high seas (waters around the Spratly and Paracel Islands).

In the six marine ecological zones of Viet Nam mentioned above, there are 20 types of marine ecosystems. Typical marine ecosystems in coastal zones include tidal flats, estuaries, lagoons, bays, coral reefs, coral reefs, seagrass beds, etc.

2. Economic assessment of ecosystem services in Viet Nam

To evaluate the total economic value of natural resources (environmental assets), several projects were implemented in the late twentieth century, including *'Quantifying economic value of the first mangroves ecosystem'* by Nguyen Hoang Tri *et al*. in 1996; an estimation of the total economic value of Can Gio mangrove forest by Nguyen Hoang Tri *et al.* in 2000; a study on the tourism value of Cuc Phuong National Park by Nguyen Duc Thanh in 1996; a study on Bach Ma National Park by Le Minh Ngoc and Dinh Duc Truong in 2006; and an assessment of the tourism value of Hon Mun Reserve by Pham Khanh Nam in 2003.

In recent years, there have been an increasing number of studies and applications of economic valuation methods for natural ecosystems in Viet Nam, including forests, mangroves, coral reefs, and seagrass beds. Research shows that the services of natural ecosystems have contributed significantly to economic development, livelihoods, and human life. Nguyen Minh Huyen *et al.* (2010) and Nguyen Quang Hung *et al.* (2013) estimated that the economic value of mangrove ecosystems varied from 0.204 to 1.67 billion VND/ha/year, while coral reef ecosystems provided from 1.71 to 11.42 billion VND/ha/year, and seagrass ecosystems from is 0.656 billion VND/ha/year.

During the project "Economic evaluating of typical marine island ecosystems to serve as basis for sustainable development of farthest islands along coastal zone in Viet Nam" Tran Dinh Lan *et al.* (2015) evaluated the services of marine ecosystems in Bach Long Vi, Con Co and Tho Chu Island. The total economic value of marine ecosystems in the Bach Long Vi was estimated at approximately 599 billion VND/year (26.62 million USD), which was equivalent to 94.3 million VND/ha/year. The total economic value of the marine ecosystem in Con Co island reached 267.5 billion VND/year (approximately USD 12 million), which was equivalent to 307 VND million/ha/year, and the marine ecosystem in the area of Tho Chu Island was estimated at 565.2 billion VND/year (approximately 25 million USD) or 125.47 million VND/ha/year.

In the project "Overcoming barriers in order to improve management in conservation areas in Viet Nam" (2013), Bidoup-Nui Ba National Park in Lam Dong province was considered to have the value of its goods and services in 2013 at 25,747 billion VND/year. Meanwhile, total funding for the national park was about 40 billion VND/year, equal to 0.16% of the national park's resources.

Many studies have evaluated the value of Thai Thuy wetland of Thai Binh province. The Center of Nature Conservancy Viet and Merriman and Murata, (2016) estimated the wetland's economic value through rapid assessment of coastal ecosystem services and showed that exploiting the natural aquatic resources reaped 49.7 billion VND/year (2.23 million USD), and aquaculture, brackish water, and salt production reaped 259,917 billion VND/year (11.66 million USD). Total economic value of Thai Thuy district was estimated at 14.94 million USD per year, plus 60.26 million USD from carbon accumulation.

The Wetlands Project (ISPONRE, 2017) also assessed the economic benefits of the Thai Thuy wetland area and estimated the economic value at 23,034 million USD per year (with initial assumptions that the probability of a typhoon was 10% per year and only Thai Thuy residents were willing to contribute to conservation in Thai Thuy wetland district).

3. Comments on ecosystem services

3.1. Ecosystems with high service values

Terrestrial ecosystems, coastal mangrove forests, tidal flats without mangroves, coral reefs, and sea grass beds are considered the most valuable ecosystems. These ecosystems are, however, affected by human activities and climate change. In particular, the reef ecosystems and seagrass beds are highly sensitive to anthropogenic activities such as over- and illegal exploitation of seagrasses and animals living among coral reefs, environmental pollution, and climate change.

Areas of coral reefs and seagrass beds have been substantially reduced in Viet Nam, which leads to reduction in related support services; including lower quantities of marine animals sourced from these areas and travelling into outer waters. On the continent, there has only been an increase of area of plantation forest, which implies low biodiversity and indirectly reduces value of non-profit services.

3.2. Coastal estuarine ecosystems provide important services to local communities

Mangrove forests and estuaries without mangroves are ecosystems in which local communities, especially mostly female workers, use manual methods to exploit crustaceans and soft snails for daily food or for sale in the market. Mud crabs exploited in mangroves forest and tidal flats are sold to crab farm owners. In fact, under one wetland project (GEF-UNDP-VEA, MONRE 2016-2018), the construction of some resorts in Thai Thuy has taken into account the use of the wetlands for resources and the construction was undertaken in harmony with conservation and development.

3.3. Factors reducing the value of ecosystem services

Factors that cause loss or degradation of ecosystem services include illegal exploitation of biological resources, such as: illegal logging for commercial purposes; destruction of coral reefs, seagrass beds and their creatures, shifting cultivation; conversion of land use for construction of infrastructure, road, development of hydropower dams and for agriculture development; environmental pollution; natural disasters; and climate change.

4. Activities to maintain and develop ecosystem services

4.1. Rehabilitation and development of forests

In the period of 2011-2015, afforestation, including reforestation, totalled 1,088,700 ha; area zoned for regeneration totalled 361,000 ha/year on average; contracted forest area for protection totalled 4,900,000 ha; and rehabilitation and restoration totalled 11,800 ha, at an average of 2,360 ha per year. Many localities have implemented forest seed management; large-sized timber forestation has moved towards intensive farming and conversion of small-sized into large-sized timber (up to nearly 20,000 ha); at the grassroots level, new varieties, mainly of acacia and eucalyptus, have been planted; and technical advances were initially deployed in intensive forest cultivation, such that growth of production forest afforestation has increased from 7-8m3/ha/year to 12-15m3/ha/year, notably up to 30m3/ha/year.

As of November 2015, 1,968 ha of coastal areas were newly planted with 'protection forests' (of which 1,103 ha were mangrove forests, 301 ha of wind and sand-shielding protection forests, and 564 ha of general protection forests); 1,105 ha of forest regeneration (763 ha of mangrove forests, 343 ha of sand-shielding forests); and 12,681 ha of existing forest had forest protection contracts placed on them (12,326 ha of protection forest and 355 ha of production forest).

According to the 2018 draft report of the Government, on the results of three years of implementation of the Program for Sustainable Forestry Development for the period 2016 - 2020, some targets and tasks have been achieved and exceeded as following:

- Forest protection: Between 2016-2018, the number of violations of law on forest protection and development on average 17,665 cases / year, an average reduction of 9,600 cases / year compared to the period 2011-2015. It is estimated that the period 2016-2020 will reduce by 39% of cases compared to the 2011-2015 period.
- Between2016-2018, the damaged forest area was 2,430 ha / year, decreasing by 270 ha / year, equivalent to 10% decrease compared to 2011-2015. It is estimated that the period 2016-2020 will be 30% lower than in the 2011-2015 period.
- Forest areas allocated to households, individuals, and communities increased from 4,944 million ha / year in 2011-2015 to 6,143 million ha / year.
- In the 2016-2018 period, the concentrated forestation will be 675,000 ha with an average of 225,000 ha / year. To plant production forests of 627,000 hectares, an average of 209,000 hectares / year. Special-use forests, protection of 47,400 ha, average 15,800 ha / year.

4.2. Payment for forest environmental services

Payment for forest environmental services (PFES) is considered a financial contribution mechanism and a breakthrough policy for the socialization of investment sources. It also contributes to sustainable financing for forest resource conservation. At least 80 terrestrial protected areas as special use forest have been directly benefiting from this payment, adding more finance for preventing forests and wildlife from illegal activities.

Decree No.99/2010/ND-CP dated September 24, 2010 of the Government, relates to payment for forest environment services. MARD has issued circulars guiding the implementation of Decree 99, including Circular No. 80/2011/TT-BNNPTNT dated November 23, 2011 guiding the method of determining PFES; Circular No. 20/2012/TT-BNNPTNT dated May 7, 2012, guiding the procedures for checking and collecting PFES; and Circular No.60/2012/TT-BNNPTNT dated November 9, 2012, stipulating the principles and methods of determining the area of forests in the basin for PFES.

The total amount of PFES in the three years until August 2014 was 3,329 billion VND (~ 157 million USD), most of which came from hydropower (97%), water sanitation (2%) and tourism agencies (less than 1%). According to a preliminary report on 8 years of PFES, the total forest environmental services revenue to June 30, 2016, was 5,700 billion VND, which were allocated as follows:

- According to the management level: the central fund collected 4,236.558 billion VND (accounted for 73.7%) while the provincial fund collected 1,508.234 billion (accounted for 26.3%).
- By type of services: Revenue from hydropower production was 5,586.497 billion VND

(97.25%), and revenue from water production and supply was 149.680 billion VND (2.59%). Income from tourism services was 8.615 billion VND (accounting for 0.16%).

Of the total amount collected for forest environmental services (5,744,792 billion VND), the amount of money paid to forest owners and non-forest owners was 4,549,620 billion VND (minus 0.5% for central management fund, 10% for provincial management fund, 5% for reserve fund and 370.571 billion VND that was approved by the Prime Minister for other purposes). So far, disbursement to forest owners and non-forest owners has reached 87%

After nearly five years of implementation, PFES policy is considered one of the most remarkable policies in Viet Nam. At a conference on 70 years of agriculture and rural development in Viet Nam in November 2015, the policy was recognized as a positive achievement for the forest sector in the period of 2011-2015.

4.3. Developing and piloting coral reef recovery model

A number of studies on coral reef restoration techniques 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.

4.4. Water supply for people's daily life

Viet Nam has low average surface water resources compared with the world. For domestic water resources per capita, the amount of water is only 3,600 m^3 / person / year. If water coming from outside the territory is included, Viet Nam reaches 9,650 m^3 / person / year (greater than 7,400 m^3 / person / year - world average).

According to Viet Nam's '*Voluntary National Review on the Implementation of the Sustainable Development Goals'* (2018), the Law on Water Resources and the National Strategy on Water Resources are two of important policies for achieving Sustainable Development Goal Six. As of June 2017, the proportion of the urban population supplied with water through centralized water supply systems was estimated to be about 84.5% (an increase of 1% compared to the end of 2016) and the rate of loss was about 23% (0.5% decrease compared to the end of 2016). Although the urban water supply capacity has increased 1.6 times compared to 10 years ago, the water supply system has not met the demand for urban water use; this has mainly been due to increasing urbanization, and the establishment of many industrial zones.

From 2010-2016, the percentage of households with hygienic water sources in the whole country increased by 2.9%, from 90.5% to 93.4%. The average annual increase was 0.4% and, with this rate, it is estimated to reach 100% of households being supplied hygienic water sources by 2032.

The National Environment Program for new rural construction in the period 2016-2020 is an example of the implementation of this goal, especially for groups experiencing poverty, ethnic minorities, and/or those living in remote areas. For many years, rural water supply has been prioritized for investment, through many programs and projects from different funding sources.

The proportion of the rural population that is supplied with water through centralized water supply systems is about 43.5%.

To ensure efficient and sustainable use of water, investigation of surface water and groundwater resources has been focused and intensified over time. The Government has focused on finding domestic water sources to combat drought for highland areas, to alleviate water scarcity, for drought prevention, to manage saline intrusion and to respond to climate change. In addition, water resource planning for cities and provinces for the period of 2020-2035 is also being developed.

Viet Nam has shifted its approach from single sector management to integrated water resource management with the proposal of establishing four river basin committees (Red-Thai Binh river system, North Central river system, Nam Trung Bo river system and Dong Nai river system) and implemented cooperation activities with member countries of the International Mekong River Commission.

Aichi Biodiversity Target 15: Climate resilience

1. Restoration and development of ecosystems is an effective response to climate change

Afforestation and sustainable forest management are important measures to reduce greenhouse gas emissions because tropical forest ecosystems absorb CO_2 emissions. Planting mangroves forest also develops mudflats that work against rising sea levels and typhoons. Therefore, effective rehabilitation and management of ecosystems, especially forest ecosystems, is of great significance in responding to climate change, and is an important way to help vulnerable communities. Ecosystem-based adaptation to climate change is an integrated approach that links the use of biodiversity and ecosystem services. Integrated management of biodiversity and climate change in the context of poverty reduction strategies and food security planning will be critical to the achievement of the country's Millennium Development Goals.

Viet Nam's terrestrial ecosystem contains about 5.4 Gt of carbon (UNEP-WCMC, 2008). Studies show that average carbon intensity is highest in areas that have growing forest vegetation; as such, there is high biomass in special use, protection, and production forests. Research shows that much of Viet Nam's vegetation with high biodiversity value (58%) has high carbon content, and 19% of the area with the highest carbon stocks is also very important to threatened species. Thus, actions to reduce emissions from land use change in Viet Nam can bring significant biodiversity benefits. In total, 0.4 Gt of carbon is stored in areas that have high value in terms of both carbon and biodiversity (UNEP-WCMC, 2008).

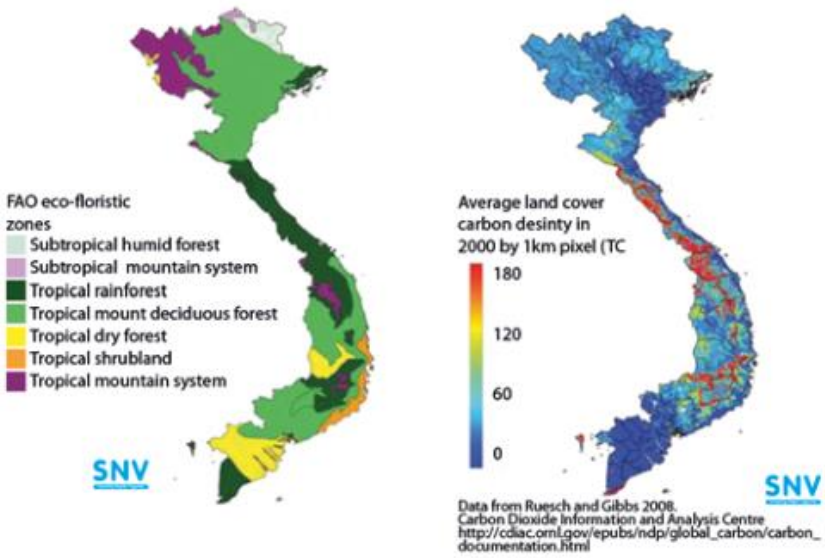
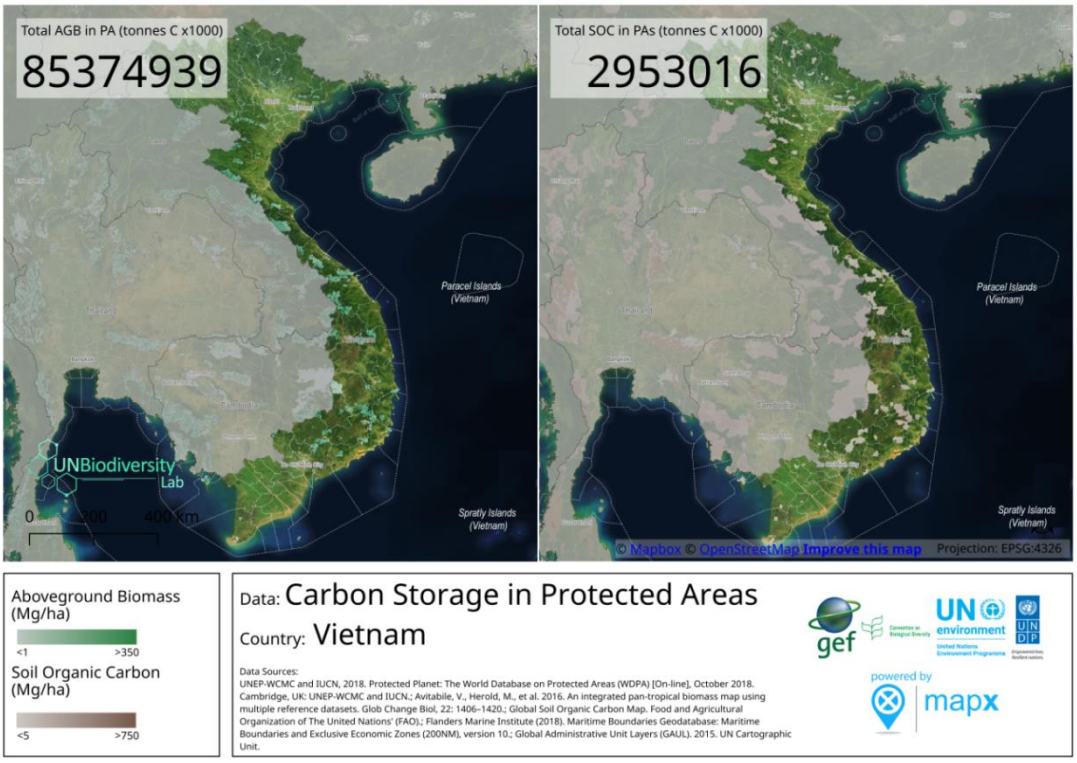


Figure 40: Carbon stocks in Viet Nam

(Source: SNV Trong Pham, T.T, Moeliono M., M. Nguyen, T.H., Nguyen H.T., Vu T.H., 2012, Background of REDD+ in Viet Nam, Causes, Objectives and Institutions arrangement, CIFOR Special Report)



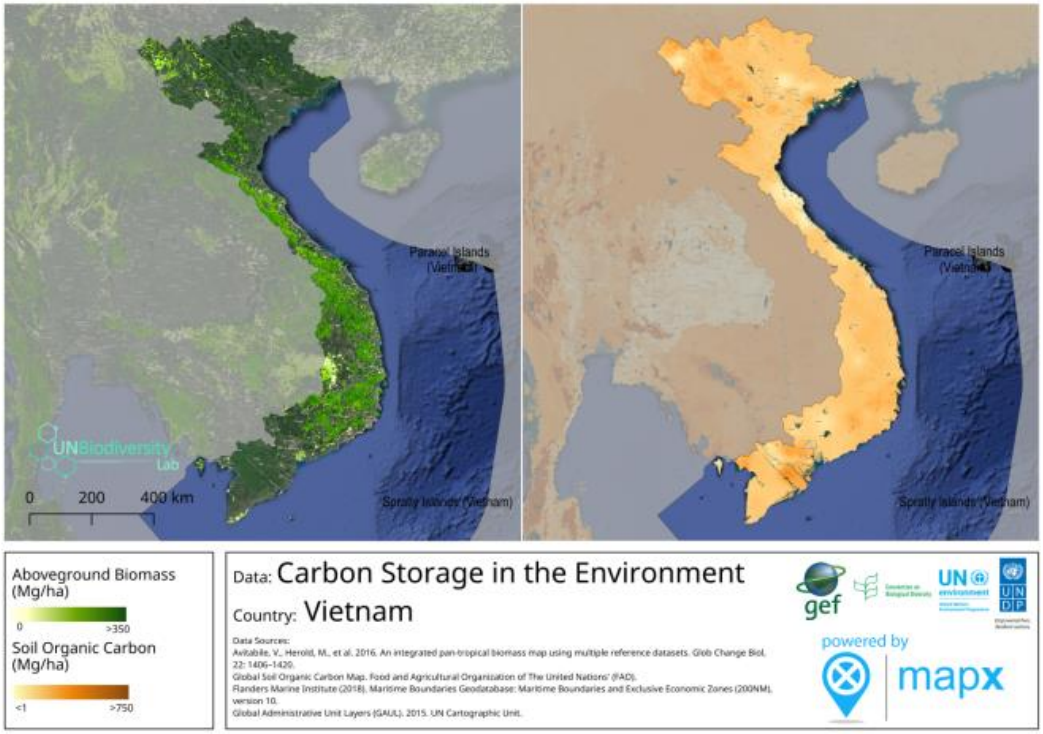


Figure 41. Carbon Storage in protected area and in the environment
(source: UN Biodiversity Lab, 2018)

2. Legislation related to restoration of ecosystems

In order to have a legal basis for implementing measures to restore forest ecosystems in the context of climate change, the Government of Viet Nam has issued the following documents:

- Decision 799/QD-TTg dated June 27, 2012, on the approval of the National Program of Action on REDD+ in the period of 2011-2020.
- Decision No.1570/QD-TTg dated September 6, 2013, on the approval of the strategy for sustainable exploitation and use of natural resources and environmental protection until 2020, vision to 2030.
- Decision No.120/QD-TTg dated January 22, 2015, on the approval of the Coastal Protection and Development Plan to cope with climate change in the period of 2015-2020 with the following contents: (i) 310,695 ha; and (ii) newly planted area of 46,058 ha, bringing the total area of coastal forest to 2020 to 356,753 ha and the coverage of closed forest from 16.9% in 2014 to 19.5% by 2020.
- Decision No.419/QD-TTg dated April 5, 2017, on the approval of the national program on reducing greenhouse gas emissions through forest loss and degradation and conservation and enhancement of carbon stocks and sustainable management of forest resources by 2030. By 2020, Viet Nam aims to reduce greenhouse gas emissions through REDD+ activities, and by increasing national forest cover to 42% and the area of forest to 14.4 million ha. In the period of 2021-2030, the natural forest area will be stabilized to at least equal to that in 2020 and the national forest coverage will be to 45%, contributing to the achievement of the national objective of reducing greenhouse gas emissions by 8%

compared to the conventional development scenario (BAU) unconditionally. This would increase up to 25% upon receipt of international assistance, as committed to in the Paris Agreement on Climate Change.

- Decision No.886/QD-TTg dated June 16, 2017, approving the National Target Program for Sustainable Forest Development for the period of 2016-2020.
- Government Resolution No.120/NQ-CP dated November 17, 2017 by the Government, on Sustainable Development of the Mekong River Delta with adaption to climate change.

3. Ecosystem Restoration Activities in Viet Nam

3.1. Forest restoration and development

According to a report by MARD (2016), in 2011-2015, afforestation and reforestation reached 1,088,700 ha, while 361,000 ha of forest was regenerated on average; 4,900,000 ha was set aside for forest protection and rehabilitation.

To implement the Decision of the Prime Minister, some coastal provinces are carrying out a program of planting and rehabilitating coastal mangroves to adapt to climate change. According to a report by MARD (2016), by 30 November 2015, plantation forest was 1,968 ha including 1,103 ha of mangroves, 301 ha of sand-shielding forests and 564 ha of protection forests, regeneration forest was 1,105 ha including 763 ha of mangrove forests, 343 ha of sand-shielding forests, and protection forest was 12,681 ha (including 12,326 ha of protection forest, and 355 ha of production forest).

According to the 2018 report of three years of implementation of the Program for Sustainable Forestry Development for the period 2016 - 2020, some targets and tasks have been achieved and exceeded as following:

- Forest protection: Between 2016-2018, the number of violations of law on forest protection and development on average 17,665 cases/year, an average reduction of 9,600 cases/year compared to the period 2011-2015. It is estimated that the period 2016-2020 will reduce by 39% of cases compared to the 2011-2015 period.
- Between 2016-2018, the damaged forest area was 2,430 ha/year, decreasing by 270 ha/year, equivalent to a 10% decrease compared to 2011-2015. It is estimated that the 2016-2020 period will be 30% lower than in the 2011-2015 period.
- Forest areas allocated to households, individuals and communities increased from 4,944 million ha/year in 2011-2015 to 6,143 million ha/year.
- In the 2016-2018 period, plantation forest is 675,000 ha, with an average of 225,000 ha/year; production forest is 627,000 hectares with an average of 209,000 hectares/year; Special-use forestsis 47,400 ha, average 15,800 ha/year.

These figures show that the resilience of forest ecosystems can be improved in Viet Nam in order to increase the value of forest ecosystem services, as well as increase carbon capture and storage capacity, and reduce greenhouse gas emissions in the context of climate change. However, new plantations are usually focused on monoculture so the value for biodiversity is not high. Meanwhile, valuable natural forest has been reduced annually: according to the above figure, the natural forest area has decreased by 68,401 ha in the period of 2010-2017.

Program to reduce greenhouse gas emissions from efforts to reduce deforestation and forest degradation (REDD+):

Since 2008, Viet Nam has been working with the World Bank, the UN-REDD program, and several international NGOs to build capacity for REDD+ implementation, including focusing on reducing deforestation and forest degradation, and payment for local people participating REDD+ activities. Currently, SNV is conducting a pilot to integrate REDD+ into areas that have high biodiversity value. Implementation of REDD+ is an opportunity to mobilize funding for biodiversity conservation and, if done well, provides an opportunity to integrate biodiversity conservation objectives into the overall goal of developing forest ecosystems.

According to Pham Quoc Hung (Bulletin No.2/2015, UN-REDD Program phase II), Viet Nam has achieved results in the implementation of REDD+ by implementing pilot activities in many localities across the country. By December 2014, 44 REDD+ projects were implemented in 21 provinces. The organizational structure of REDD+ implementation has also gradually established from the central to the local levels.

According to information from Akiko Inoguchi (Bulletin No.2/2015, UN-REDD Program in Viet Nam Phase II), the second phase of the UN-REDD Viet Nam Program is supporting the development of the REDD+ Viet Nam Geographical Information Portal. It aims to provide stakeholders with access to information on the progress of REDD+ implementation in Viet Nam. One of the key features of the portal is that the mapping interface displays information on REDD+ planning (for example NRAP, PRAP, or grassroots REDD+ action plan) and the change in forest cover, based on Measures - Report - Verification (MRV) data. REDD+ Viet Nam's Geographic Information Portal is available at http://redd.vnforest.gov.vn/portal/index.html.

3.3. Build and test coral reef recovery model

There are a number of studies on coral reef restoration techniques that have been applied in some marine protected areas, such as Cu Lao Cham, Nha Trang Bay, and Phu Quoc as mentioned in part "4.3. Developing and piloting coral reef recovery model".

3.4. Establishing biodiversity corridors

Since 2004, with international support, a number of pilot projects and programs have worked towards establishing biodiversity corridors in Viet Nam, including:

The green corridor between Phong Dien Nature Reserve and Bach Ma National Park in Thua Thien Hue province; a corridor in Lam Dong province from Chu Yang Sin National Park (Dak Lak province) to Ta Dung Nature Reserve (Dak Nong province); a corridor connecting Kon Ka Kinh National Park and Kon Chu Rang Nature Reserve; a cross-border corridor in Cao Bang - Guangxi between the newly established nature reserve of Guangxi, China and Cao Bang, Viet Nam to protect the Eastern black-crested gibbon *(Nomascus nasutus).* Recently, biodiversity corridors were also officially established in three pilot provinces during the Greater Mekong Subregion biodiversity conservation project - Phase 2 (2011-2019); specifically, a biodiversity conservation corridor connecting Sao La Species and Habitat Conservation Area, the Thanh River Nature Reserve, and the Elephant Conservation Area of Quang Nam Province. A biodiversity corridor connecting Sao La conservation area and Phong Dien Nature Reserve, Thua Thien-Hue province, as well as between Dak Rong Nature Reserve and Bac Huong Hoa Nature Reserve in Quang Tri Province, has been established.

The role of stakeholders in restoring ecosystems

In the context of climate change, restoration of ecosystems, especially forest ecosystems, plays

an important role in increasing services and environmental protection. The subjects that use and manage the ecosystems are very broad, including the central and local levels of Government, communities, professional organizations, enterprises and organizations, and domestic and international NGOs. Such stakeholders provide diverse contributions to ensure the effective restoration of ecosystems in response to climate change, as well as increasing the livelihoods of the community.

Aichi Biodiversity Target 16: The Nagoya Protocol on Access and Benefit Sharing

Viet Nam has joined the Nagoya Protocol

MONRE has issued two key documents relating to the Nagoya Protocol: Resolution No.10/NQ-CP dated February 12, 2014, relates to the accession to the Nagoya Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety, and the Government's Resolution 17/NQ-CP of March 17, 2014, relates to accession to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits.

Participating the Nagoya Protocol assists Viet Nam with such activities as: (i) creating a solid legal basis for the protection of the rights and legitimate interests of the supplier on traditional knowledge on genetic resources in Viet Nam; (ii) contributing to the fulfillment of obligations towards international commitments to which Viet Nam is a party, in particular, the Biodiversity Convention and the Rio Declaration on Environment and Development; (iii) providing opportunities for Viet Nam to access international resources in support of capacity-building on this issue; and (iv) raising awareness on genetic resources management, promoting applications of genetic resources, and managing traditional knowledge on genetic resources, as well as improving the living standards of local communities and biodiversity conservation.

Genetic resource conservation has provided thousands of genetic materials for breeding, agriculture, fisheries and medicinal plants. This in turn has a role in restoration of indigenous genetic resources and to create products for consumption and export (e.g. sika deer, crocodiles, Ngoc Linh ginseng, cardamom, agarwood etc.). This contributes to socio-economic development as well as security. In parallel with the study of genetically modified animals with desirable characteristics, measures to manage biosafety have been established in order to minimize the potential risks to biodiversity and human health.

Legal documents on management, access to genetic resources and benefit sharing from genetic resources

Clause 1 of Article 55 of the Biodiversity Law states that "the Government unifies management of all genetic resources in Viet Nam’s territory"; as such, the Government assigns the right to manage genetic resources to conservation area managers that include management boards, organizations and individuals. In detail, the responsibilities are: (i) The management boards are assigned to manage gene resources within the protected areas; (ii) Owners of biodiversity conservation facilities, scientific research, and technological institutes that are involved in preserving and storing genetic resources are to take charge of managing their own resources; (iii) Organizations, households, and individuals that have been given land use, forests, and water surface are to manage gene resources within the scope of their management and use; and (iv) Commune People's Committees manage local gene resources.

Organizations, households, and individuals assigned to manage genetic resources have the right

to investigate, collect, exchange, transfer, and provide genetic resources in accordance with the laws and to benefit from organizations and individuals that share genetic resources (Article 56).

Article 61 of the Biodiversity Law regulates sharing benefits arising from access to genetic resources. The benefits are to be shared by all three parties: The Government; organizations, households, and individuals assigned to manage gene sources; and Organizations and individuals granted access permits, as well as any other related specified parties in the permits.

The regulation demonstrates Viet Nam's intent to implement the third objective of the Biodiversity Convention. However, the issue is very new and difficult. In recent years, state management agencies (namely MONRE) has tried to conduct pilots in some protected areas, such as Bach Ma, Ba Vi, Cat Ba, Con Dao, Bidoup, Nui Ba, and Van Long Nature Reserve. Communities living around these reserves have improved their quality of life through increased employment and through biodiversity conservation.

Although the 2008 Law on Biodiversity has created a basic legal framework, there is a lack of specific regulations on the procedures for issuing licenses for access to genetic resources. There is also uncertainty about the competent authority of state management agencies to grant/withdraw permits related to monetary and non-monetary terms of negotiation, as well as procedures for signing contracts on access to genetic resources and sharing benefits among stakeholders etc. Therefore, the issuance of a new document to improve the legal system for the Nagoya Protocol is an urgent requirement for Viet Nam.

To further clarify the provisions of Sections 1 and 2 of Chapter V of the Law on Biodiversity, legal documents guiding the implementation of this issue have submitted to Government, including:

- Decision No.1141/QD-TTg dated June 27, 2016, approving the scheme on capacity building for management of access to genetic resources, fair and equitable access, and sharing of benefits arising from the use of genetic resources in the period of 2016 - 2025;
- Decree No.59/2017/ND-CP dated May 12, 2017, on the management of access to genetic resources and benefit sharing arising from their utilization**.** This decree clarifies concepts in the Law on Biodiversity. Decree 59 also regulates the state management of access to genetic resources and the sharing of benefits from the use of genetic resources for ministries, sectors, and local levels. In particular, MONRE is responsible for developing a national database on genetic resources, on traditional knowledge of genetic resources and on benefit sharing from the use of genetic resources. MARD is responsible for developing a database on genetic resources under its management and providing information to MONRE. The Ministry of Health and other relevant ministries and localities have the responsibility to provide, exchange, and share information and data on genetic resources. Moreover, Decree 59 issued templates, contracts, and decisions related to access to genetic resources.

Regarding the registration procedures and the application for licenses to access to genetic resources, the Decree specifies steps for organizations and enterprises to follow. Registration of access to genetic resources is to occur with competent state agencies; agreement and signing the contracts is to occur with the suppliers; permission sought from Commune People's Committee to confirm the contract; and dossiers of application for access permits for genetic resources submitted to competent state agencies.

In relation to subjects who have to register and apply for licenses to access genetic resources, Decree 59 stipulates requirements for Vietnamese organizations and individuals who need to access genetic resources for research or for commercial purposes; for foreign organizations and individuals who would like to access genetic resources in Viet Nam; and for organizations and individuals aiming to provide gene resources abroad, except for non-commercial research purposes.

Decree 59 also provides licenses for gene transfers abroad for study and research for non-commercial purposes. This provision is intended to facilitate the promotion of scientific research in genetic resources and is in accordance with the provisions of the Nagoya Protocol.

The activities in fact

MONRE has developed and implemented the project '*Promoting the application of Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in Viet Nam'*, which is sponsored by GEF/UNDP and was implemented from January 2016 to December 2019. The objective of the project is to contribute to the conservation and sustainable use of biodiversity globally through the strengthening of national capacity in the application of the Nagoya Protocol, ensuring fair and reasonable sharing of benefits from genetic resources.

- Implement capacity-building and awareness raising activities: MONRE has coordinated with national and international organizations to organize training courses and seminars for capacity-building on access to genetic resources and benefit sharing and to raise awareness on the importance of conservation and sustainable use of genetic resources.
- Conducting surveys, working with conservation institutions (research institutes, universities), management boards of national parks, and conservation areas on access and collection of genetic resources on site. Basic application documents about access to genetic resources and benefit sharing have also been created and disseminated.
- Apply guidelines on access to genetic resources and benefit sharing after Viet Nam joined the Nagoya Protocol, but before a valid Decree 59/2017/ND-CP. As the national focal point, MONRE has received documents from domestic and foreign agencies and organizations to guide the implementation of regulations on access to genetic resources and benefit sharing. The majority of dossiers requesting guidance on access to genetic resources are research cooperation activities between domestic universities, research institutions, and foreign partners. Approaches include both commercial and non-commercial purposes with clear benefit sharing provisions. MONRE has provided guidelines for access to genetic resources by foreign organizations that comply with Vietnamese regulations, plus are in accordance with the provisions of the Nagoya Protocol.
- To receive, evaluate, and issue permits for dossiers of registration of access to genetic resources after the effective date of Decree No.59/2017/ND-CP: As of August 2018, there are 18 permits verified and issued for bringing gene resources abroad to serve non-commercial purposes (i.e. as study and research); and three dossiers of application for licenses to access genetic resources have completed the registration step (step 1).

Aichi Biodiversity Target 17: Biodiversity Strategy and Action Plan

1. The legal system on biodiversity is developed and improved

Viet Nam is a member of the CBD. Moreover, Viet Nam is a member of international treaties related to biodiversity conservation, such as the UNESCO Convention, the Convention on Wetlands of International Importance (Ramsar); CITES; the Cartagena Protocol on Biosafety; and the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing etc.

To follow up the Biodiversity Law that passed in 2008 at the National Assembly and took effective from 2009, Vietnam has developed and promulgated the National Strategy on Biodiversity to 2020 and Vision to 2030 which is indicated at the Prime Minister's Decision No1250/QD-TTg dated July 13, 2013, and lately the National Master Plan for Biodiversity Conservation to 2020 and Orientations to 2030 indicated by the Prime Minister Decision 45/QD-TTg dated January 8, 2014. To implement this law, in the period, the Government has also promulgated regulations on access to genetic resources and benefit-sharing which are framed by Decree 59/2017/ND-CP dated May 12, 2017. In addition, many other laws and regulations supporting to biodiversity conservation by sectors are also developed, amended and/or renewed in the period of reporting, such as:

- Forestry Law passed in 2017 as an amendment for Forest Protection and Development Law 2004; and its implementation regulations issued within 2018 such as Decree 156/2018/ND-CP;
- Fishery Law (Amendment) passed in 2017
- Decree 147/2016/ND-CP dated November 2, 2016 by the Prime Minister supplementing the national policy on payment of forest environmental services
- Decision 419/QD-TTg dated April 5, 2017 by the Prime Minister approving the National Action Plan on REDD+ to 2030
- Other national action plans to protect endangered species such as tigers, primates, elephants

2. Viet Nam NBSAP

The National Strategy on Biodiversity to 2020, with a vision to 2030 was adopted in 2013.

The objective of the strategy was developed in accordance with the Aichi goals, which emphasized the targets by 2020: the area of terrestrial nature reserves reaches 9% of the territory, the areas of the areas marine conservation reaches 0.24% of the sea area, 45% of the forest cover is maintained at 0.57 million ha and there is an effective protection plan, 15% of the natural ecosystem area. With significant degradation being restored, the number of internationally recognized nature reserves of Vietnam reaches 10 Ramsar sites, 10 biosphere reserve zones, and 10 ASEAN heritage parks.

By 2030, 25% of the area of natural ecosystems of international importance will be restored, biodiversity will be conserved and sustainably used, bringing essential benefits to people. People and make important contributions to the socio-economic development of the country.

The strategy includes the following tasks: Conservation of natural ecosystems, Conservation of wild species and livestock species, endangered precious and rare plants, Sustainable use and implementation of sharing mechanisms rational benefits from ecosystem services and biodiversity, Control of activities that adversely impact biodiversity, Conserve biodiversity in the context of climate change. The Strategy also approved in principle 07 national-level priority programs and schemes to implement the Strategy.

The process of drafting the Strategy

As mentioned in previous section, the process of drafting the Strategy was conducted with participation of various stakeholders, including state agencies at central and local levels, NGOs, Scientists, international development partners …

3. Integrating biodiversity conservation into sectoral and cross cutting policies and programs

3.1. Integrate biodiversity conservation into cross cutting sectors and regional development plans, programs and policies.

The concepts of environmental protection and biodiversity conservation have been integrated by the Government of Viet Nam into national plans, programs and policies as follows:

- Strategy for hunger eradication and poverty reduction: objectives for environmental protection in general and biodiversity, in particular, include the program of planting five million ha of forest and increasing the forest cover from 33% in 2000 to 41% by 2017.
- The National Strategy on Climate Change relates to issues of to improving the quality of forests, afforestation, greening vacant land and bare hills, ensuring efficient exploitation of forests to maintain and improve their preventive capacity against natural disasters, desertification, erosion, land degradation. It also aims to enhance the protection, management, and development of mangrove forests and wetlands, and to increase forest coverage to 45% by 2020.
- Viet Nam's Sustainable Development Strategy 2011-2020 aims for rational use and sustainable development of natural resources, including biological and biodiversity resources.
- The Green Growth Strategy aims to accelerate the process of restructuring and perfecting economic institutions towards more efficient use of natural resources and enhancing the competitiveness of the economy through increased investment in technological innovation, natural capital, and economic instruments to cope with climate change, reduce poverty, and ensure sustainable economic development.

3.3. Integrate the protection of biodiversity into related sectors

The integration of biodiversity conservation into the policies, strategies, plans, and programs of relevant sectors, even interdisciplinary ones, is reflected through a set of decisions by the Government or Ministries. For example, based on Circular No.29/2014/TT-BTNMT dated June 2, 2014, MONRE has developed the document '*Methodology and guidelines for integrating biodiversity conservation into provincial land use planning'*. Under the NBSAP project implemented by MONRE in 2015, a pilot of integrating biodiversity conservation into land use planning was carried out in Lang Son and Son La provinces.

In 2015, MONRE, supported by the Asian Development Bank conducted the project 'Applying and improving the national environmental safety system - Integrating biodiversity considerations into environmental safety system of Viet Nam'. This project developed a technical guideline on integrating biodiversity impacts into Environmental Impact Assessments.

3.4. Some results:

The integration of biodiversity conservation into sectoral and inter-sectoral development policies has led to certain successes, especially into economic sectors that now consider biodiversity conservation as a development strategy. Examples of key results are: a plan on afforestation of five million ha forest, working to increase the annual forest cover; cultivating valuable species, by planting indigenous trees and creating commercial products, to reduce the pressure from exploitation; and the creation of education, training and raising awareness on biodiversity conservation among the public, especially the local communities.

Incorporating concepts of biodiversity conservation into provincial land use planning also creates the opportunity for compatibility. Lastly, development of livelihoods models for communities living in the buffer zones of protected areas, under hunger eradication and poverty reduction programs, has enhanced the community's life and reduced the exploitive pressure onresources.

4. Other strategies, planning and plans related to biodiversity conservation

Apart from the "National Strategy on Biodiversity up to 2020, vision to 2030" (Viet Nam NBSAP), the Government of Viet Nam has also issued a number of national strategies, plans, programs, and projects, all of which have goals and contents consistent with the goals of Viet Nam NBSAP and Aichi targets. These include:

- Decision No.1216/2012/QD-TTg dated September 5, 2012 of the Prime Minister, approving the National Strategy for Environmental Protection up to 2010 and vision to 2020.
- Decision No.57/QD-TTg dated January 9, 2012 of the Prime Minister, approving the forest protection and development plan during 2011-2020.
- Decision 126/QD-TTg dated February 2, 2012 of the Prime Minister, promulgating the piloting benefit sharing mechanism of management, protection and development for special- use forests.
- Decision No. 940/QD-TTg of July 19, 2012, approved the urgent action plan for elephant conservation in Viet Nam through 2020.
- Decision 799/QD-TTg dated June 27, 2012 of the Prime Minister, approving the national REDD+ action programme in the period of 2011 – 2020.
- Decision No.1896/2012/QD-TTg dated December 17, 2012 approving the project 'Prevention and control of invasive alien species in Viet Nam by 2020'.
- -Decision 11/2013/QD-TTg dated January 24, 2013 by the Prime Minister, on Prohibiting Import, Export, Trade of Wildlife Specimen in CITES appendices.
- Decision No.188/QD-TTg dated February 13, 2013 of the Prime Minister, approving the program on protection and development of aquatic resources through 2020.
- Decision No.763/QD-TTg dated May 21, 2013 of the Prime Minister, approving the Viet Nam Elephant Conservation Project for the period of 2013-2020.

- Decision No.539/QD-TTg dated April 16, 2014 of the Prime Minister, approving the National Program for Tiger Conservation in the period of 2014-2022.
- Decision No.45/QD-TTg dated January 8, 2014, approving the master plan on biodiversity conservation through to 2020, with orientation toward 2030.
- Decision No. 1976/QD-TTg dated October 30, 2014, approving the master plan on the national special-use forest system through 2020, with a vision toward 2030.
- Decision 218/QD-TTg dated February 7, 2014 of the Prime Minister, approving the Strategy to manage systems of special use forests, marine reserves, and wetland areas towards 2020, with a vision towards 2030;
- Decision No.120/QD-TTg dated January 22, 2015, approving the protection and development of coastal forests to cope with climate change in 2015-2020 period
- Decision No.1671/QD-TTg dated September 28, 2015, of the Prime Minister on the program for genetic resources conservation and sustainable use to 2025, vision to 2030.
- Decision No.1141/QD-TTg dated June 27, 2016, approving the scheme on capacity building for management of access to genetic resources and fair, reasonable sharing of benefits arising from the use of gene resources in the period of 2016 – 2025.
- Decision 419/QD-TTg dated April 5, 2017, on the Approval of the National Action Programme on the Reduction of Greenhouse Gas Emissions through the reduction of Deforestation and Forest Degradation, Sustainable Management of Forest Resources, and Conservation and Enhancement of Forest Carbon Stocks (REDD+) by 2030.
- Decision No.628/QD-TTg dated May 10, 2017 of the Prime Minister, approving the Emergency Action Plan for the Conservation of Viet Nam's Primate Species to 2025, vision to 2030.
- Decision No.626/QD-TTg dated May 10, 2017 of the Prime Minister, approving the Scheme on strengthening the management capacity of the conservation area system up to 2025, vision to 2030.
- Decision No.886/QD-TTg dated June 16, 2017, approving the National Target Program for Sustainable Forest Development for the 2016-2020 period.
- Decision No.78/2018/QD-TTg dated January 16, 2018 approving the National Action Plan to prevent, reduce and eliminate illegal, unreported and unregulated fishing by 2025.
- Decree 59/2017/ND-CP dated May 12, 2017, on the management of access to genetic resources and benefit sharing from the use of genetic resources.

Aichi Biodiversity Target 18: Traditional Knowledge

1. Traditional, indigenous knowledge on exploitation and use of biological resources

In Viet Nam, traditional knowledge has played a key role in solving local livelihood issues. During the process, protection of biological resources has also been taken up ethnic minorities. In recent years, there has been research on indigenous knowledge in many areas relevant to the use of natural resources, such as agriculture (intercropping, animal husbandry, pest management, crop diversity, animal health care, crop breeding); biology (botany, fish farming); human health care (by traditional remedies made from herbal medicines); use and management of natural resources (land and water conservation and other forms of water management); education (verbal, local languages) and poverty reduction in general.

Exploitation and use of medicinal plants: various institutes have conducted research on ethnic botany for many years, focusing on the indigenous knowledge of mountainous ethnic groups in conservation and use of natural resources. As a result, hundreds of medicinal plants and traditional herbs have been collected from the Dao, Nung, Tay and H'Mong ethnic minority groups.

The Institute of Medicinal Materials has conducted surveys on indigenous knowledge, collecting medicinal plants and experience of ethnic minorities such as H'Mong (Lao Cai province), Muong (Thanh Hoa, Hoa Binh, Yen Bai, Nghe An province), Dao (Ba Vi, Lao Cai, Hoa Binh, Vinh Phuc province), Co Tu (Thua Thien-Hue province), Van Kieu (Tay Nguyen highland), Tay (Ha Giang, Cao Bang, Bac Can, Lang Son, Thai Nguyen province), Nung (Lang Son province), San Diu (Vinh Phuc province), and Khmer (An Giang province). A list of medicinal plants of 15 ethnic groups has been developed. The Institute has also collected and preserved 1,296 folk medicine remedies; these drugs have served as a mean to study the screening, research, and development of disease prevention products.

Knowledge/ experience in cultivation and husbandry: Pham Quoc Hung and Hoang Ngoc Y (2009) identified that indigenous knowledge of the H'mong people in Hang Kia and Pa Co, Son La province was passed verbally inter-generationally. This knowledge is focused on species, forest animals, cultivation and breeding, the cycle of the weather and other characteristics of nature. Regarding forest management, indigenous knowledge of local people is promoted, including knowledge on cultivation, identification of forest trees, forest resources, harvesting and using forest products. Forests are important to community life. Interviews with local people indicate that most of them want to participate in forest protection and development; this is also important for the development of community-based organizations and regulations on forest management and protection.

Local customary law for forest and fishery protection: Some practices of ethnic minority groups, such as protection of sacred forests and water bodies (habitats and breeding of many wildlife and fish species), have been maintained and developed by the authorities. According to Tran Cong Khanh and Nguyen Ngoc Sinh (2016), Ede ethnic customs in the Central Highlands have 236 regulations defining the responsibility of each individual and of individuals with the community, with aims of creating equality between people. This prevents discrimination, preference for the upper classes, and maltreatment of the lower classes in all aspects of the village life. For example:

In addition, many folk festivals are carried out each year, such as the fish-seeking festival of the coastal fishermen community. In recent times, organizations, researchers and managers have become interested in the indigenous knowledge of ethnic minorities and the issue of forest management and protection. There are projects that bring new experiences and knowledge to the people for the purpose of changing living conditions and improving the effectiveness of forest protection. However, there is not much information on the results of these projects.

Legal documents regulate the protection and sharing of traditional knowledge in Viet Nam

The Law on Biodiversity mentions the concept that traditional knowledge of genetic resources is the understanding, experience and initiative of local people on the conservation and use of genetic resources.

Clause 2 of Article 55 of the 2008 Law on Biodiversity, states that the organizations, households, and individuals assigned to manage and use land, forests, and water surface shall manage gene resources within the scope of their use;

Paragraph 3, Article 58 provides that contracts for access to genetic resources and benefit sharing shall have provision on sharing benefits with the Government and other involved parties, including the division of intellectual property rights on the basis of access to genetic resources and traditional knowledge;

Clause 1 of Article 61, provides that Benefits derived from access to genetic resources shall be shared among the following parties:

a) The Government;

b) Organizations, households, and individuals assigned to manage genetic resources;

c) Organizations and individuals with granted access to genetic resources and other related parties defined in the licenses of access to genetic resources.

The above provisions of the Law on Biodiversity have basically fulfilled the Nagoya Protocol on the Access to Genetic Resources and the Fair and Equitable Sharing of Genetic Resources.

Regarding the origin of innovative materials, Circular No.01/2007/TT-BKHCN dated February 14, 2007, guides the implementation of Decree No.103/2006/ND-CP on detailing and implementing articles of the Law on Intellectual Property, including industrial property. At Point 23.11, it is stated that: An application for registration of a patent relating to a gene resource or a traditional knowledge shall also contain documentation demonstrating the origin of the genetic resources and/or traditional knowledge that the inventor or applicant has received, if the invention is directly based on that genetic resources and/or traditional knowledge.

In Viet Nam, there is no separate national action plan to protect, conserve and promote the knowledge and practices of indigenous and local communities and to encourage the sustainable use of biodiversity. However, the issues of research, investigation, preservation, and promotion of indigenous knowledge of the community, especially ethnic minorities, on exploiting and protecting biological resources are integrated in strategies and action plans on biodiversity, hunger eradication, and poverty reduction.

Aichi Biodiversity Target 19: Sharing Information and Knowledge

1. Global Biodiversity Information Facility

Vietnam became member of the GBIF since 2018 and continue to collaborate with GBIF to update its data to the facility. In 2009, when Viet Nam was not yet a member of GBIF, it provided more than 100,000 records on 13,000 animals to GBIF.

2. Database and information on biodiversity of Viet Nam

Over the last two decades, data and information on Viet Nam's biodiversity have been improved considerably. Biodiversity surveys and studies conducted in many parts of the country have documented hundreds of species that are new to science, especially terrestrial plants, invertebrates living in soil and freshwater, insects, reptiles, and frogs. Monitoring of some critically endangered species has been established at several sites. Information on Viet Nam's biodiversity in general, as well as that in protected areas particularly, is updated by scientists from research institutes of the Viet Nam Academy of Science and Technology, as well as from research institutions and universities. However, while there are databases on biodiversity dispersed across many research and management agencies, there are large inconsistencies in quality and there are substantial limitations in sharing and using information. The following are considered as important developments:

a) Developing a database on biodiversity:

A National Biodiversity Database System of biodiversity (NBDS) was officially launched in 2015. To date, NBDS focus on species data in protected areas (http://nbds.vea.gov.vn).

b) The biodiversity indicator set to evaluate the effectiveness of conservation management: Within the scope of the NBSAP, a set of 36 indicators has been developed; these aim to evaluate biodiversity at all levels. There are also 31 indicators collected at the provincial level (being piloted in Son La and Lang Son provinces) and 30 indicators collected at the level of protected areas.

The technical documents from the above project have been used for training managers, DARD and DONRE officials, and protected area staff on biodiversity indicators, biodiversity monitoring, biodiversity reporting for protected areas and biodiversity database management.

In 2018, MONRE used the management effectiveness tracking tool (METT) with 41 indicators of five groups (to evaluate the management effectiveness of the six ASEAN Heritage Parks (AHP).

In 2017-2018, the project 'Research and develop a set of criteria and procedures for monitoring and evaluating management the effectiveness of biosphere reserves in Viet Nam' was conducted by the Institute of Resources and Environment at the Viet Nam National University. As a result, a set of 15 criteria in six groups was developed to monitor and evaluate the management effectiveness of biosphere reserves in Viet Nam. The criteria were experimentally applied in Cat Ba, Cu Lao, And Cham-Hoi An.

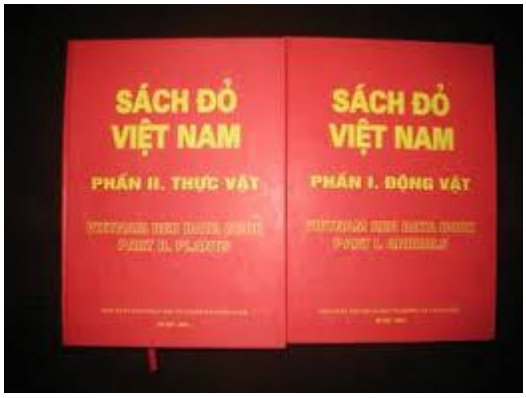
c) Forest information management: MARD is currently developing a forest information management system (see previous section).

d) Database of genetic resources conservation: MOST and MARD have set up a database on

breeds and gene resources of plants and animals. The Viet Nam Science and Technology Academy has developed a database on Viet Nam's marine environment, including marine biodiversity.

e) Developing fauna and flora books: There has been research on the flora and fauna of Viet Nam organized by the Institute of Ecology and Biological Resources, by institutes in the Viet Nam Academy of Science and Technology, and by institutes outside the Academy since 1995. From 2000 to date, 31 volumes on the fauna and 21 volumes on the flora of Viet Nam have been published.

g) Developing Red books: To date, about 51,400 species of organisms have been identified as occurring in Viet Nam. Among them, about 362 species of animals and 219 species of plants are listed in the IUCN Red List (2014). The Viet Nam Red Book and Red List was published in 2007. From 2010-2015, the Vietnamese Academy of Science and Technology coordinated with other institutes to implement a project that aims to culminate in a future revision of Viet Nam's Red Book.

Fauna Books of Viet Nam	 Viet Nam Red Data Books

Aichi Biodiversity Target 20: Mobilize resources from all sources

Financial resources for biodiversity conservation

1. Budget for biodiversity conservation

According to the Law on Biodiversity (2008), the Government of Viet Nam has committed to allocating state budget funds for conservation and sustainable development of biodiversity, from the following sources:

a) State budget;
b) Investment and contributions of domestic and foreign organizations and individuals;
c) Revenues from payment of environmental services related to biodiversity and other sources by law.

The budget for biodiversity conservation at the central level is mainly concentrated at MONRE, MARD and MOST.

a) The budget for biodiversity conservation at central level

The budget for biodiversity conservation coordinated by the MONRE

According to the Decree No.36/2017/ND-CP dated April 4, 2017 of the Government, regulating the functions, powers and organizational structure of MONRE, nature conservation and biodiversity is one of ten main areas of the natural resources and environment sector. However, investment in this area was limited.

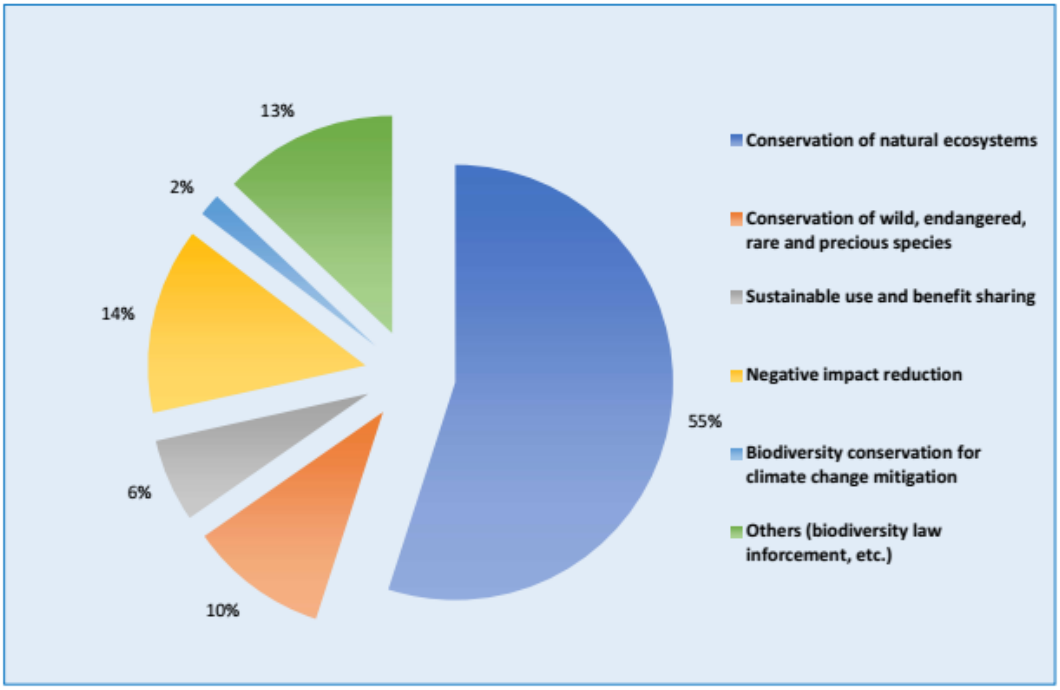


Figure 42: VEA Expenditure Per Share for NBSAP objectives in the period of 2011-2015

The budget for biodiversity conservation coordinated by MARD

According to MARD (2013), investment sources for protected areas and the special-use forest system came from different sources, including state budget, international support, and contribution from private sectors and communities. Among those sources, the state budget and international support are the main funding sources for nature reserves, while outside investments include payment for environment and ecosystem services, including tourism. Sources from the community and individuals are low level and there are no statistics to evaluate effectiveness.

The state budget has to obtain permission from MARD and localities. The budget for regular costs relating to protected areas in the period of 2003-2010 was 410.6 billion VND, with a 13% annual increase. Of this, the cost for central level activities was twice that of the provincial-level. The fact that budget for protected areas is based on the number of its staff instead of its conservation objectives leads to ineffective management of protected areas.

In addition to direct funding for protection and management of forests (reforestation, protection, inventory) provided to the forestry sector and funding for fishery sector (eg: management, development of aquatic resources), there is another revenue source for biodiversity activities.

MARD has implemented a pilot policy on benefit sharing in special-use forests. MARD has undertaken related activities in a number of national parks, including Bach Ma, Xuan Thuy, and Hoang Lien. It has also implemented a pilot of payment for ecosystem services and raised awareness and responsibilities of related stakeholders.

According to a draft report (2018) of the Government on the results of three years of implementation of the 'Target Program for Sustainable Forestry Development in the period of 2016-2020', from 2016-2018, VND 21,527 billion was used for the Program. In particular, VND 5,323 billion was sourced from payments for forest environmental services.

Budget for biodiversity conservation coordinated by MOST

Between 2011 and 2015, the Genetic resources conservation program was financed from the state budget (MOST, 2014). Of financing allocated, 40% was spent on genetic resources conservation activities implemented by different
ministries – by MARD for conserving genetic resources in fishery, agriculture, forestry and seeds; by MOH for conserving pharmaceutical genetic resources; by the Ministry of Industry and Trade (MOIT) for conserving plants and microorganisms used in industry and food processing, etc.; 55% was spent on the targeted exploitation and development of genetic resources – annually around 20 national level assignments for the exploitation and development of genetic resources are issued, with on average VND 2,8 billion (USD 124,000) allocated per assignment; while 5% was spent on the evaluation of genetic resources.

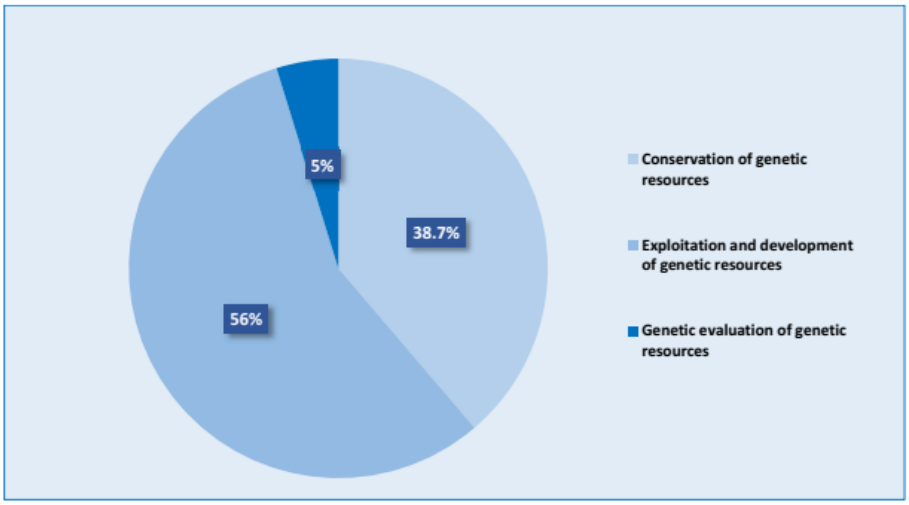


Figure 43. Expenditure share for implementing objectives of the genetic resources program

Source: Tran Thi Thu Ha, BER report, 2018, Viet Nam BIOFIN Project

b) Budget for biodiversity conservation in localities

According to the Joint Circular 160 and 45, the budget for biodiversity conservation at the local level is taken from such local sources as the budget for environmental activities, for business activities, for science and technology activities, for administration, and for investment and development. However, the budget for local biodiversity conservation is quite limited and depends on each local budget. Based on reports from of localities, financial resources are mainly derived from the budget for environment activities, for business activities, and for science and technology activities. The funds allocated towards biodiversity activities are focused on:

- Raising awareness on biodiversity on International Biodiversity Day, Environment Day and other days related to biodiversity;
- Building a provincial plan for biodiversity conservation;
- Deploying a number of local actions on biodiversity.

In general, the local budget is limited, which leads to difficulties with implementation of plans from the central level. Some local authorities do not even have a biodiversity conservation budget and only set expenditure for protected areas. However, there are several provinces that invest more heavily in biodiversity.

As of March 2018, based on information collected from 30 conservation areas (including one marine protected area, 12 national parks, 13 nature reserves, and four protected areas of species and habitats), of the total 730,987 ha that is in 30 conservation areas (accounting for 32% area of 164 protected areas and national parks in the country), 611,936 ha is forest land (equal to 31% area of 164 protected areas and national parks). Expenditure for the 30 conservation areas is as below:

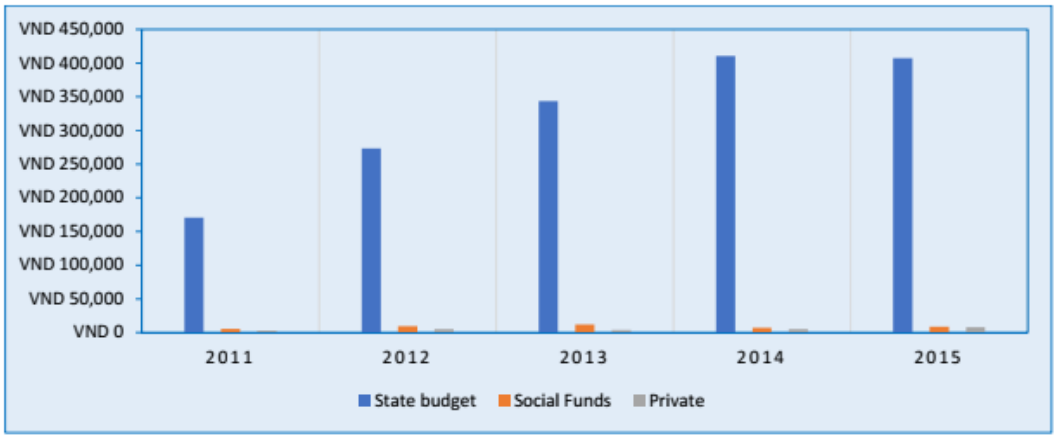


Figure 44. Expenditure for biodiversity conservation recorderd from 30 protected areas

Source: Tran Thi Thu Ha, Report BER 2018, Viet Nam BIOFIN project

c) Expenditure from ODA source

According to an analysis by OECD (2015), fields such as environment protection, forestry, agriculture, water sanitation, trade policies and regulations have received the most biodiversity-related ODA funding (91%). Of this, environmental protection utilized 65% of the total biodiversity-related ODA funding, while next highest categories were forestry (10%), agriculture (9%), water supply and sanitation (5%), and trade policies and regulations (2%) (OECD, 2015). Figure 27 displays the percentage of sector prioritizes biodiversity as main or important objective, during 2011-2015.

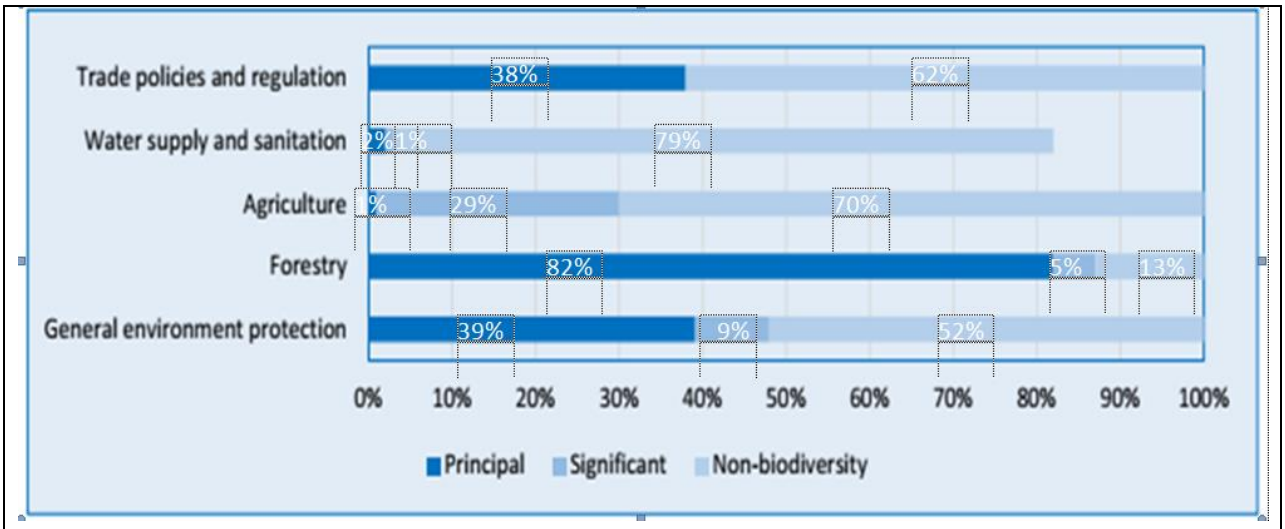


Figure 45. Annual proportion of ODA projects for biodiversity devided by sector from 2011 to 2015

Source: OECD (2015)

One in the key sources of ODA funding in Viet Nam in the field of biodiversity is GEF. GEF projects for biodiversity are listed in the following table:

Table 12. GEF funded biodiversity related projects implemented in Viet Nam from 2000 to 2017

No.	Projects/programmes name	Partner	Implementation agency	Phrase/Time	GEF Funding (USD)
1.	Developing Protected Areas for Resources Conservation (PARC) in Viet Nam Using a Landscape Ecology Approach	UNDP	UNDP	GEF1	6,011,840
2.	The Biodiversity Action Plan and Conservation Training	UNDP	MONRE	GEF1	2,999,959
3.	Building a Clearing-House Mechanism of the Convention on Biological Diversity	UNDP	MONRE	GEF1	12,000
4.	Onsite conservation of Landraces pig	UNDP	Gene and Agriculture Institute	GEF2	904,000

5.	Hon Mun protected area pilot project	World Bank	IUCN	GEF2	972,447
6.	Conservation of Cuc Phuong-Pu Luong Limestone Landscape	World Bank	FFI	GEF2	724,885
7.	Creating the connection and sustainable management of Kon Ka Kinh National Park and Kon Cha Rang Nature Reserve	UNDP	Gia Lai People's Committee	GEF3	875,000
8.	Conservation and sustainable use of the marine resources at Con Dao National Park	UNDP	WWF	GEF3	970,450
9.	Green Corridor Project	World Bank	WWF Indo China	GEF3	998,634
10.	Forestry development project	World Bank	MARD	GEF3	9,000,000
11.	Integrating Watershed and Biodiversity Management in Chu Yang Sin National Park	World Bank	BirdLife International	GEF3	973,000
12.	Implementing a national safeguard framework	UNDP	MONRE	GEF3	997,800
13.	Removing barriers hindering protected area management effectiveness in Viet Nam			GEF 4	3,536,360
14.	Promotion of Sustainable Forest and Land Management in the Viet Nam Uplands			GEF 4	654,545
15.	Sustainable management of forest land according to national framework	World Bank	MARD	GEF 4	4,195,000
16.	Wildlife consumption	World Bank	MARD	GEF 4	1,000,000

17.	Removing Barriers to Invasive Species Management in Production and Protection Forests in SE Asia			GEF 4	854,000
18.	Coastal resources for sustainable development: integrated spatial planning for coastal areas and sustainable use	World Bank	MARD	GEF 5	6,500,000
19.	Conservation of Critical Wetland Protected Areas and Linked Landscapes	UNDP	MONRE	GEF 5	3,180,287
20.	National Biodiversity Strategies and Action Plans (NBSAPs)	UNDP	MONRE	GEF 5	909,091
21.	Integration of biodiversity conservation and recovery of habitat before climate change and sustainable forest management of Central Truong Son area	ADB	MONRE	GEF 5	3,794,954
22.	Capacity building on implementation of the Nagoya Protocol in	UNDP	MONRE	GEF 5	2,000,000
23.	Biosphere reserves	UNDP	MONRE	GEF 6	6,660,000
24.	Integrated approaches to sustainable cities in	ADB	MONRE	GEF 6	8,256,881
25.	Wetland project	UNDP	MONRE	GEF 6	3,180,287
	TOTAL GEF FUND				**70,161,420**

Source: www.thegef.org

Aside from GEF, Viet Nam also attracts official development aid from other development partners, as shown in the following table:

Table 13. Projects and programmes from other development donors for biodiversity

Donor	Sector granted with ODA	Time
Japan International Cooperation Agency (JICA)	National biodiversity database system in (NBDS)	7/2011- 03/2015
Japan International Cooperation Agency (JICA)	Sustainable Nature Reserve Management (SNRM)	2015 - 2020
Japan International Cooperation Agency (JICA)	Recovery and management of protection forest restoration and sustainable management	2012 - 2021
Asian Development Bank (ADB)	Biodiveristy Conservation Corridor in Greater Mekong subregion – Component (loan)	7/2011- 12/2019
United Nations Environment Programme UNEP/CaBi	Managing invasive species in selected forest ecosystems of South East Asia (IAS)	12/2011-11/2015
Sweden International Development Agency (SIDA)	Integrating approaches based on ecosystems to adapt to climate change on the planning process of biodiversity conservation (EBA)	6/2012-12/2013
Sweden International Development Agency (SIDA)	Developing a pilot model on payments for coastal wetland ecosystem services in Mui Ca Mau National Park (PES)	2012 - 2013
ASEAN Center of Biodiversity (ACB)	Building Capacity for Regionally Harmonized National Processes for Implementing CBD Provision on Access to Genetic Resources and sharing of Benefits	2015 - 2016

1.2. Payment for environment services related to biodiversity

a) Mechanism of payment for environmental services (PES):

In the period of 2011-2015, central and provincial funds collected 5,226,025 million VND (equal to 232,26 million USD) from users of PES (MARD, 2017). The collected money was used for:

- Payments to more than 5,000 forest owners (households, communities and other legal forest owners), which created motivation for better management and protection of 5.87 million ha of forest.
- Investment in infrastructure to protect forest (for example: buying fire hydrants, building watchtowers).
- Afforestation of forest in specific areas.

- Support of activities and events related to PES (for instance conferences and workshops, training and capacity building, media and raising awareness).

According to VNFF (2017), in the period of 2011-2015, the rate of reimbursement of PES reached 75%, including 47.5% of incomes being from forest land use changes. Based on this data, the expenditure level of VNFF in the period of 2011-2015 was as per the table below:

Table 14: Estimated annual expenditure of VNFF by objectives during the period of 2011-2015

Unit: million VND

Objectives	2011	2012	2013	2014	2015	Total
Payment for forest owners	171,739	958,975	835,373	1,043,978	1,047,618	**4,057,683**
Enhancing facilities for forest protection	16,410	68,667	63,585	77,431	77,011	**303,104**
Reforestation				127	101	**227**
Financial support for PFES	375	450	680	918	5,640	**8,063**
Total	**188,523**	**1,028,093**	**899,638**	**1,122,453**	**1,130,370**	**4,369,077**

Source: Tran Thi Thu Ha, BER 2018 report, BIOFIN Viet Nam project based on current implementation of PES in year VNFF các năm 2011, 2012, 2013, 2014, 2015 và 2016

Using rates of reimbursement and incomes of VNFF, the expenditure for biodiversity according to the objectives of the NBSAP is as follows:

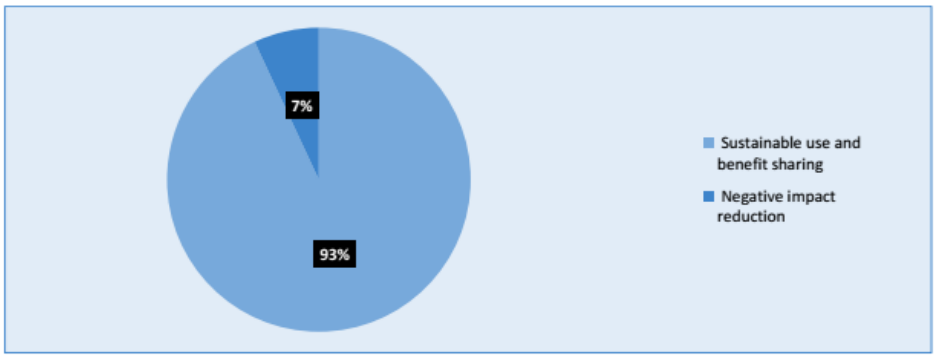


Figure 46: Expenditure share for biodiversity by VNFF with reference to NBSAP objectives

Source: Tran Thi Thu Ha, BER 2018 report, BIOFIN Viet Nam project based on current implementation of PES in year VNFF các năm 2011, 2012, 2013, 2014, 2015 và 2016

During 2011-2015, VNFF paid 4,369,077 million VND (194.2 million USD) for biodiversity, including 4,065,475 million VND (93%) for sustainable use and benefits from ecosystem and

biodiversity, as well as 303,331 million VND (7% total expenditure) to control impacts to biodiversity (fire, land use change).

b) Carbon Finance: Up to now, there has been a lack of projects relating to carbon and concerned with biodiversity. Of 50 projects of the Clean Development Mechanism that were domestically registered, only one, on reforestation in Cao Phong, was related to land use and forestry.

c) Reducing emissions from deforestation and forest degradation (REDD+): Since 2008, Viet Nam has been cooperating with the World Bank, the UN-REDD program, and other international NGOs to build capacity for REDD+. As part of this, payment is paid for implementation of REDD+ at the local level. Currently, SNV is carrying out a pilot integration of REDD+ into areas with high biodiversity value to serve as a basis for promotion of biodiversity conservation in REDD+ projects. The implementation of REDD+ is a chance to mobilize fund for biodiversity.

d) Biodiversity offsets: The legal framework and policy for biodiversity offsets is based on Article 75 of the Law on Biodiversity, however, no programs on biodiversity offsets have yet been conducted.

1.3. Investment and contributions of domestic as well as international organizations and individuals

a) Expenditures from entrepreneurs: Many enterprises are ready to contribute financial support to biodiversity conservation. In Kien Giang, international cement company Holcim has committed to donate 1 million USD to conserve limestone landscape and endangered species, including cactus and red-crowned crane. The staff of Holcim as well as the local community has been trained on environmental protection.

b) Support funds to conserve biodiversity

- The Viet Nam Conservation Fund (VCF) is a mandated financial mechanism sourced from international support that was established in 2005 with total budget up to 15 million USD, granted by the World Bank, GEF and The Netherlands' Government. The propose of the VCF is to deliver technical and financial support for projects on management of special-use forest in Viet Nam. The Fund has helped 50 special-use forest management boards to implement conservation-related activities. The fund is considered a positive support, especially for small protected areas and localities that have difficulties in asking for funds.
- Trust Fund (TFF), VCF and REDD+: These funds were established to support the Strategy on Forestry Development and are sponsored with official development aid sources. From 2016, the funds were combined into VNFF.
- Viet Nam Fund for Aquatic Resources Reproduction (VIFARR) was founded in 2007 in order to provide support for biodiversity conservation projects in the aquatic sector but not yet under operation.
- Viet Nam Environment Protection Fund (VNEPF) was formed in 2014. It was a Government finance agency under the supervision of MONRE. In 2015, the Government spent 500 billion VND as the fund capital. VNEPF supports three sectors: (i) environmental pollution; (ii) environmental education; and (iii) waste management.
- Community Development Fund (CDF): This is a small grant that is under the support of

development projects by FAO, IFAD, ADB and JICA. It aims to help local people with poverty reduction, environmental protection and capacity building. Active projects include those in Cat Ba, Xuan Thuy, Ba Be, Na Hang, and Bidoup-Nui Ba national parks, where CDF has been set up to focus on biodiversity conservation.

According to data (albeit incomplete) from 2011 to 2015, there were about 20 biodiversity-related projects conducted by NGOs (including organizations as IUCN, WWF, Birdlife International) that provided support for protected areas and other communities in the buffer zones of protected areas. Figures below provide expenditure for biodiversity from the private sector in of 2011-2015.

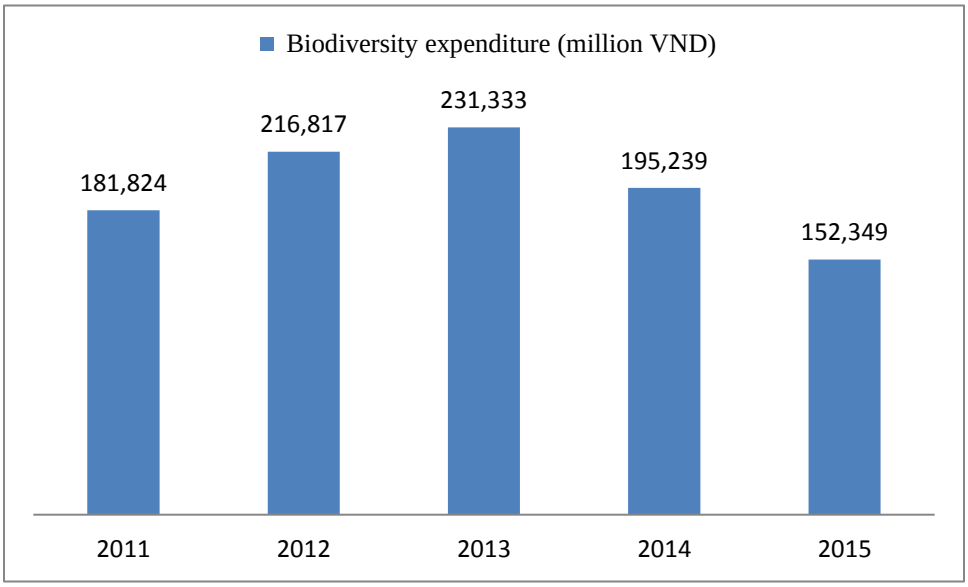


Figure 47: Private financing for biodiversity in the period of 2011-2015

Source: Tran Thi Thu Ha, BER 2018 report, BIOFIN Viet Nam

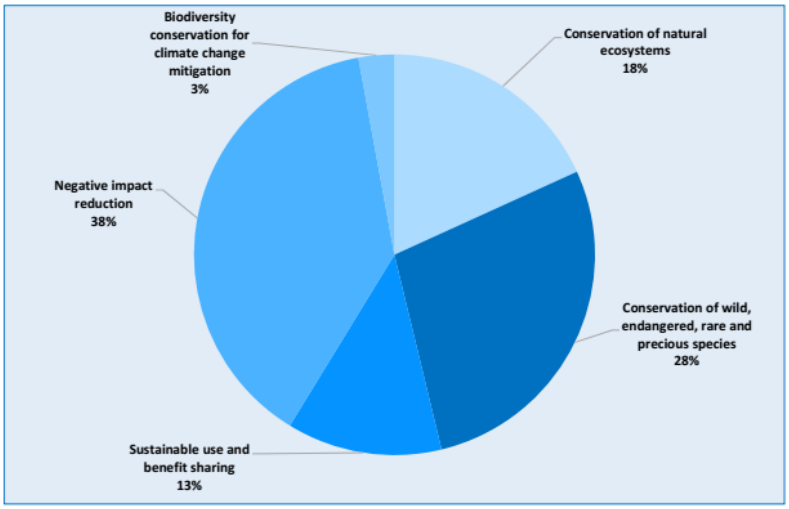


Figure 48: Expenditure for biodiversity from the private sector according to NBSAP objectives

Source: Tran Thi Thu Ha, BER 2018 report, BIOFIN Viet Nam

In 2011-2015, private spending on biodiversity in Viet Nam was relatively high but tended to decrease (in line with the domestic and international economic hardship in this period). Total private expenditure for biodiversity was estimated at 977.562 million VND (approximately 43.4 million USD), focused on increasing the sustainable use of natural ecosystems, ecosystem-based approaches responding to climate change, and preserving threatened wildlife species.

Socialization of conservation areas is one of means of raising funds for conservation from the community

In Viet Nam, all protected areas are currently managed by the state or at the central or provincial level. In practice, the management of protected areas depends mainly on the limited and unevenly-allocated state budget. The situation necessitates policy measures to mobilize more resources (financial and human resources), including community involvement in the management of protected areas. In that context, the Government encourages all economic sectors to participate in the protection and development of special-use forests. Furthermore, transforming well-managed community forests into community-managed protected areas is considered to be a viable option. This aligns with the law as follows:

- Article 5 of the Land Law 2013 stipulates that domestic households, individuals and communities are land users, and are assigned to use and hire land, are granted land use rights and receive land use right transfers from the Government.
- Households and individuals in the country, as well as communities, are recognized as forest owners (Article 8 of the Forest Law 2017).
- Article 16 of the Forest Law 2017 states that the State allocates special use forests (without charging forest use fees) to community members who traditionally own and manage their religious forest.
- Article 10 of the Fisheries Law 2017 on co-management in the protection of fisheries resources states that community organizations are recognized and granted management rights in the protection of aquatic resources when they meet all the conditions.

Based on your country's contribution to achieving the Aichi Biodiversity Target, please describe the level and extent of this contribution that supports the implementation of the Sustainable Development and Sustainable Development Objectives by 2030:

Viet Nam is a of Party to the United Nations Sustainable Development Program. The Prime Minister signed Decision No. 622/QD-TTg dated May 10, 2017, on the 'National Action Plan to implement the 2030 Agenda for Sustainable Development'. Accordingly, in Viet Nam, targets related to the objectives of the 'National Strategy for Biodiversity to 2020, vision to 2030' are: Objective 14, on the conservation and sustainable use of marine resources for sustainable development; and Objective 15, on the protection and sustainable development of forests, biodiversity conservation, ecosystem services, combatting desertification, and preventing degradation of land resources. The objectives show that the Government has committed itself to the implementation of the Aichi Biodiversity Objectives through the implementation of NBSAP, as well as through the goals of the 2030 Agenda on the sustainable development of Viet Nam. The following is a summary of some main results achieved ***in implementing*** SDG 14 and 15:

SDG 14

Viet Nam has been implementing control of marine pollution, as well as the management, protection, and development of marine and coastal ecosystems and fisheries according to objectives defined in strategic policy documents.

The quality of coastal and deep sea water is still quite good (see ABT 8), but there is a risk of contamination as living and production activities release waste water in estuarine and coastal areas.

Investigation of biodiversity in Vietnamese sea areas and islands has occurred, demonstrating that there are research programs on marine systems (according to 5-year plans), following the overall plan on surveys and management of marine resources (Project 47).

Ten out of planned 16 marine protected areas have been established.

SDG 15

Viet Nam has a biodiversity conservation master plan. As of 2018, there were 172 protected areas in Viet Nam with a total area of 2,493,844 ha, including 33 national parks, 65 natural reserves, 18 species and habitat conservation areas, and 56 landscape protection areas. Viet Nam has nominated eight Ramsar sites, nine biosphere reserves, and six ASEAN Heritage Gardens (AHP Zone).

Afforestation has been implemented, with an average of 225,000 ha of forests planted annually, of which over 90% is production forests. The area certified for sustainable forest management is about 225,000 ha, of which natural forest is 86,000 ha, and plantation is 139,000 ha. Natural forest exploitation is managed more closely, closing natural forests nationwide in 2017. Thus, the forest cover has increased rapidly, reaching 41% in 2017 (MARD, 2018).

Viet Nam has successfully implemented a policy of PFES, which has contributed to creating a source of income for households to participate in forest protection, increased the value of forestry production, and improved the efficiency of forest protection. On average, the country earns over VND 1,200 billion annually from payments for over 5 million hectares of forests. In 2017, Viet Nam gained over VND 1,675,581 billion, achieving 101.5% of the plan for 2017, and 130% of it in 2016 (MARD, 2018).

According to Viet Nam's 'Voluntary National Review on the Implementation of the Sustainable Development Goals' (2018), the country has established a National Coordination Committee to implement the UN Anti-desertification Convention and has integrated anti-desertification initiatives and responses to climate change and disaster mitigation. This includes piloting a financial strategy integrated with the global mechanism for the "hottest" areas for desertification in Viet Nam; namely Ninh Thuan and Binh Thuan provinces.

Viet Nam has implemented activities to conserve threatened species despite limited results. Wildlife habitats remain narrowed due to changing land use practices and many species are declining at an alarming rate, facing high risk of extinction. Viet Nam already has and will continue to develop a database of genetic resources and traditional knowledge about genetic resources; it is also developing guidelines for access to genetic resources and benefit sharing Viet Nam.

After the Biodiversity Law 2008 was approved, a system of about 140 legal documents was developed to guide the implementation of the Law. In addition, there are two other Laws directly

related to biodiversity conservation that took effect from January 2019; namely, the Forest Law and Fisheries Law.

Section V. Describe the contribution of the country to achieve the objectives of the Global Strategy for Plant Conservation (complete this section as an option).

V. Describe the contribution of countries to achieve the goals of the Global Strategy for Plant Conservation

Does your country have national goals related to GSPC Goals?

☒ Yes.

Specific objectives of Viet Nam's NBSAP

- Improve the quality and increase the area of protected natural ecosystems, ensuring that the area of terrestrial nature reserves reaches 9% of the territorial area and marine conservation areas reach 0.24% of the seas area; forest cover reaches 45% and primary forest is kept at 0.57 million ha with effective protection; the area of mangroves, seagrass beds and coral reefs is maintained at current levels; 15% of the critical degraded natural ecosystem area is recovered; the number of internationally-recognized protected areas in Viet Nam comes up to ten Ramsar sites, ten Biosphere Reserves, and ten ASEAN Heritage Parks.
- Improve the quality and quantity of threatened species; significantly enhance the status of some threatened species.
- Inventory and conserve indigenous, endangered, precious, and rare genetic resources (domestic animals, plants, micro-organisms) to make sure they are not degraded.

or:

☐ No, there is no national goal involved

Please provide information on any active networks available in your country for plant conservation.

There are a number of Vietnamese sites related to plant conservation, namely http://www.botanyvn.com; http://vncreatures.net

Please describe the main measures your country uses for implementing the Global Strategy for Plant Conservation

1. Conservation of natural ecosystems

a) Consolidate and strengthen the system of nature reserves:

- Identify critical ecosystems and prepare plans for expanding the system of protected areas; continue to implement the plan to establish marine and wetland protected areas; Establish biodiversity corridors connecting natural habitats of threatened species; establish three transboundary tiger conservation sites with Laos and Cambodia (Pu Mat National Park in Nghe An province; Sop Cop Protected Area in Son La province; and Yok Don National

Park in Dak Lak province); and establish, in cooperation with Laos and Cambodia, a transboundary conservation area for Virachay, Dong Am Phan and Chu Mon Ray*;*

- Conduct a review of biodiversity related provisions in the current legal documents, and make proposals for amendments, to ensure consistency;
- Conduct research on institutional structures to propose a model for one management authority for protected areas, highlighting the involvement of, and benefits to, the communities living in the buffer zones;
- Improve the management system for protected areas, ensuring they are all established with a Management Board; review and improve the functions and organizational activities, and enhance capacity of Management Boards; implement policies that create incentives for staff working at protected areas; upgrade infrastructure to support management; provide equipment for all protected areas, including biodiversity monitoring and reporting systems;

- Develop and improve regulations on the decentralization and classification of protected areas, and the procedure for establishing new protected areas; prepare and implement management and financial plans, monitoring, and regulations for the management of natural protected areas, with the target to have these in place for all protected areas by 2015; ensure that, by 2020, the area of terrestrial protected areas accounts for 9% of the total territorial area; marine protected areas account for 0.24% of the sea area, and forest coverage reaches 42%;
- Assess the values and ecosystem services of natural protected areas; and
- Develop long-term plans for investment in the buffer zones of protected areas and implement a sustainable economic development model for households in these zones.

b) Conservation of ecosystems of national and international importance

- Investigate and map ecological regions, identifying areas of high biodiversity value, degraded areas, and sensitive areas;
- Conduct research to assess the situation, and develop a data bank and maps of natural wetlands, seagrass beds, coral reefs and other typical natural ecosystems;
- Strengthen protection of primary forests, ensuring the area of primary forest remains at 0.57 million ha, coupled with effective protection, taking measures to prevent deforestation and illegal logging in natural forests, special-use forests, and protection forests;
- Continue to implement forest regeneration and afforestation programs, taking measures to enrich forests with native plants, and promote the prevention of forest fires and increase fire response capacity for all forests;
- Continue to implement the targets for mangrove forest restoration program under Decision 405/TTg-KTN dated March 16, 2009;
- Prepare and implement the national plan for conservation and sustainable use of wetlands with priority given to critical river basins;
- Protect and restore coral reefs and sea grass ecosystems; implement management at central and provincial levels to protect and recover at least 15% of key ecosystems that are being degraded;

and

- Prepare and implement a plan to nominate protected areas for international awards, including wetlands of international importance (Ramsar site), biosphere reserves, and ASEAN heritage parks. Develop and issue guidelines for the management of internationally recognized protected areas; and implement policies to support capacity building for effective management of these areas; making best effort to have 10 Ramsar sites, 10 biosphere reserves, and 10 ASEAN heritage parks by 2020.

2. Conservation of wildlife and threatened species

a) Preventing the decline of threatened species:

- Continue to implement the targets of the program to protect threatened aquatic species as per Decision 485/QD-TTg dated May 2, 2008 of the Prime Minister;
- Investigate, monitor and periodically update the list of threatened species prioritized for protection;
- Implement conservation programs for threatened species prioritized for protection; ensuring that the number of species that are threatened with extinction do not increase; significantly improve the status of at least 10 threatened species; and
- Investigate and assess the status of flora; periodically update, compile, and publish the Viet Nam Red Book.

b) Conservation of native plant varieties, agricultural products, and wild relatives of species

- Conserve agricultural crop varieties and their wild relatives; increase the number of samples of crop varieties that are stored in gene banks; ensure that precious and rare endemic genetic resources will not be reduced and degraded;
- Review, and improve the effectiveness of on-farm conservation of rare and precious crop varieties and implement economic incentives to encourage the involvement of farmers; and
- Implement the national *ex-situ* and *in-situ* gene bank conservation program for rare and precious plant varieties, and micro-organisms.

c) Develop and enhance the effectiveness of biodiversity conservation units

- Assess the current status of *ex-situ* conservation facilities (botanic gardens, medicinal plant gardens, and gene banks) and improve the effectiveness of *ex-situ* conservation;
- Upgrade the Center of Plant Genetic Resources to become a National Plant Gene Bank that meets south-east Asian regional standards.

3. Sustainable use, fair and equitable access, and sharing of benefits derived from ecosystems and biodiversity

a) Sustainable use of ecosystems:

- Conduct research, develop guidelines, and pilot the economic valuation of biodiversity and ecosystem services. The economic valuation of biodiversity and ecosystem services should be put into the national accounting system;
- Improve the policies and institutions to implement payments for the environmental

services of forests at a national scale; and pilot a policy for payment for environmental services applicable to marine ecosystems and wetlands; ensuring that by 2020, there will be at least 15 protected areas applying benefit sharing mechanism;

- Replicate a model for the management of protected areas involving community participation, and implement mechanisms to share benefits in an equitable way amongst involved parties; Apply and implement effectively co-management mechanism in most protected areas, ensuring the community involvement in the management of and sharing benefits from protected areas through policies to encourage community involvement in protected area patrolling and monitoring; implement and control strictly the mechanism of allocating land of protected areas; jointly implement mechanism of payment for ecosystem service and forest environment service leasing;
- Develop and enforce the regulations on ecological tourism in Viet Nam; Effectively implement and manage ecological tourism to provide income for biodiversity conservation and for local people; and
- Develop and implement policies to support production of agricultural, forestry, and fisheries products that meet international standards for conservation and sustainable use of biological resources; Research and evaluate granting certification to sustainable products or environmental-friendly products from agriculture, forestry, and fisheries; Supporting enterprises of agriculture, forestry, fisheries and aquaculture to register their product to be internationally recognized as sustainable or environmental-friendly products.

b) Sustainable use of organisms and genetic resources:

- Investigate, record and take measures to protect and develop valuable non-timber forest products (NTFP), especially medicinal and ornamental plants; and effectively control the unconstrained exploitation and cross-border trafficking of wild species; and
- Promulgate policies and guidelines on breeding, farming and trading of common wild species; Conduct researches on breeding valued species and processing technology to enhance their utilization value to contribute to local economic development and reduce pressure on natural resources; Develop and issue technical guidelines on aquaculture and trade of common wild species; Promulgate a list of common wildlife allowed to be bred and traded as well as guidelines for registering and monitoring the breeding of wildlife.

c) Establish a mechanism for managing access to genetic resources, sharing benefits, protection, and traditional knowledge of genetic resources

- Conduct research and develop regulations guiding a mechanism for access to and benefit sharing of genetic resources; pilot models for access and benefit sharing focusing on the interests of communities;
- Collect, document, and develop a geographic directory and take measures to conserve traditional knowledge of genetic resources; and
- Develop and implement the action plan for capacity building to implement the Nagoya Protocol project.

4. Control activities that have negative impacts on biodiversity

a) Strictly control activities considered to be unsustainable or causing environmental pollution such as conversion of land and water surface area use and agricultural practices

- Control the conversion of natural forest land use and water surface area of conservation value, to minimize negative impacts on biodiversity;
- Control over-exploitation, harvesting, and breeding practices of agricultural, forestry, and fisheries which have negative impacts on biodiversity; strictly appraise environmental impact assessment and conduct ex-post evaluation of all development projects related to high biodiversity areas, particularly protected areas;
- Take measures to control environmental pollution with adverse impacts on biodiversity; limit impacts of environmental pollution to the ecosystems, species, and genetic resources, particularly in watersheds and inland wetlands and coastal waters; and support communities in monitoring and reporting water pollution to strengthen law enforcement.

b) Control illegal hunting, trade and consumption of wild fauna and flora

- Encourage the broad participation of communities and mass media in the detection and prevention of illegal acts of exploitation, trafficking and consumption of wildlife; organize campaigns to against wildlife crimes and publish results on media;
- Improve and implement inter-sectoral coordination mechanisms between the environmental police, market management, customs, rangers, and fisheries authorities in the detection and enforcement of illegal exploitation, trafficking, and consumption of wildlife by guiding and training the management and implementation of regulations on biodiversity conservation, the identification of endangered species, the settlement of confiscated species and the investigation of crimes;
- Advocate and conduct awareness program to prevent the use and consumption of wildlife products nationwide; and
- Strengthen cooperation with regional and international law enforcement networks (ASEAN WEN, Interpol) in trafficking and illegal transportation of wild plants and animals.

c) Control, halt and prevent the damage caused by invasive alien species; and enhance biosafety management of genetically modified organisms

- Investigate the status of invasive and potentially invasive alien species on a national scale, with particular emphasis on protected areas, agricultural areas, and forest ecosystems;
- Implement the project to prevent and control invasive alien species to 2020, under Decision 1896/QD-TTg dated December 17, 2012 of the Prime Minister; ensuring that the number of discovered invasive alien species will not increase compared to 2010;
- Enhance cooperation, exchange, and learning from experience on the biosafety management of genetically modified organisms, to improve technical and professional expertise of biosafety management agencies and units at all levels; and

- Increase investment in infrastructure and resources for implementation of measures to monitor and control the risks of genetically modified organisms to the environment and biodiversity; Develop and promulgate legal documents on redress and liability in biosafety management activities of GMOs; and assess the status of the release of GMOs and products containing GMOs to the environment, and their appearance in the market.

5. Biodiversity conservation in the context of climate change

a) Identify climate change impacts on biodiversity and promote biodiversity conservation as a means to respond to climate change

- Conduct research to assess and predict the impacts of climate change on biodiversity of Viet Nam;
- Conduct research on the role of biodiversity in the mitigation of, and adaptation to, climate change in vulnerable areas such as river basins, coastal areas of Red River Delta and Mekong River Delta; and take measures to increase the resilience ability of biodiversity in these regions.

b) Development of biological corridors to increase connectivity among forest ecosystems and critical biodiversity areas to adapt to climate change

- Develop policies for the management of biodiversity corridors, defining management objectives, the use of land in biodiversity corridors, and their connection to the development of land use planning at the local level;
- Establish biodiversity corridors connecting protected areas, making efforts to establish four biodiversity corridors by 2020 and prioritize the implementation of pilot projects in the northern mountainous areas, central and western highland regions; and apply mechanisms to assist financial resources for forest corridors.

c) Implementation of forest regeneration program using methods and approaches such as biodiversity conservation, enhancing carbon stock, and adaptation and mitigation of climate change

- Integrate biodiversity conservation targets into the implementation of the national action program on "Reducing greenhouse gas emissions through efforts to limit deforestation and forest degradation, sustainable management of forest resources, and conserving and enhancing forest carbon stocks" period 2011-2020 (REDD+) approved by the Prime Minister under Decision 799/QD-TTg, dated June 27, 2012;
- Map areas of high biodiversity value in the REDD+ program; promote the use of native species for forest enrichment and restoration in the framework of REDD+; provide information of the implementation of national action plans on REDD+ and contribute to reach two targets of biodiversity conservation and adaptation to climate change;
- Minimize risks to biodiversity from implementation of the REDD+ program through the application of stringent social and environmental security mechanisms.

Progress towards the targets of the Global Strategy for Plant Conservation at the national level:

Target GSPC 1, 2, 3 ...

☒ Go in the right direction to achieve the goal at the national level

Check this box if the measures have been taken and the current state of problems resolved by the goal will be met before the target deadlines.

☐ Progress aims toward national target levels but is insufficient

☐ There is no significant change at the national levels

The tasks and solutions proposed to achieve the specific objectives of Viet Nam NBSAP:

After a period of implementation of the NBSAP's tasks, the positive aspects of biodiversity conservation achieved in Viet Nam can be seen as follows:

- Legal documentation system related to biodiversity conservation is gradually being finalized to serve as basis for conservation activities at both central and local levels.
- Awareness of biodiversity conservation has been step by step improved at all levels of society, especially at local levels and communities in areas with high biodiversity values;
- Enhancing and development biodiversity conservation are carried out at ecosystem, species, and genetic levels, in terrestrial, and marine environments.
- The benefits of biodiversity conservation and ecosystem services have been initially exploited and used for socio-economic development and are reasonably shared to improve people's livelihoods (for examples ecotourism, conservation, exploitation and use of species, genetic resources for livestock development, cultivation, health, scientific research, payment for forest environment services etc.);
- A number of quantitative objectives, such as mangrove area and grass cover, tend to increase, while other indicators on area and percentage of the NR, forest cover have not been obtained yet, but the trend is positive.

Objective GSPC 1: An online flora of all known plants

There are a number of Vietnamese sites related to plant conservation such as: http://www.botanyvn.com and http://vncreatures.net.

There has not yet online flora of all known plants, but in the NBDS, there are list of plant species occurring in protected areas, which has been being upadated.

Viet Nam is known to have approximately 20,000 terrestrial and aquatic plant species, of which 16,428 species are land plants, 13,747 are vascular plant species, 2,681 are species of Marchantiophyta and monophyletic, and of which 30% are considered endemic to Viet Nam.

Table 15. 24 newly described genera of plants in Viet Nam since 1993

1.	*Hiepia* (Asclepiadaceae) – 2012
2.	*Lockia* (Orchidaceae) - 2012
3.	*Theana (*Orchidaceae) – 2012
4.	*Lanonia (*Arecaceae) – 2011
5.	*Miguelia* (Orchidaceae) – 2011
6.	*Newmania* (Zingiberaceae) - 2011
7.	*Hayata* (Orchidaceae) – 2009
8.	*Hamularia* (Orchidaceae) – 2006
9.	*Xyloselinum* (Apiaceae) - 2006
10.	*Kontumia* (Dryopteridaceae) - 2005
11.	*Vietorchis* (Orchidaceae) – 2003
12.	*Zeuxinella* (Orchidaceae) – 2003
13.	*Xanthocyparis* (Cupressaceae) – 2002
14.	*Caobangia* (Dryopteridaceae) – 2002
15.	*Metapanax* (Araliaceae) - 2001
16.	*Ascocentropsis* (Orchidaceae) - 2000
17.	*Rubovietnamia* (Rubiaceae) – 1998
18.	*Vidalasia* (Rubiaceae) - 1998
19.	*Fosbergia* (Rubiaceae) – 1997
20.	*Distichochlamys* (Zingiberaceae) - 1995
21.	*Viet Namochloa* (Poaceae) – 1995
22.	*Grushvitzkya* (Araliaceae) – 1994
23.	*Viet Namia* (Asclepiadaceae) - 1994
24.	*Christensonia* (Orchidaceae) - 1993

Source: Missouri Botanical Garden, 2012

There have been many more plant species newly described in the period 2010-2017.

During the Prosea Project conducted in 1996-2005, botanists from the Institute of Ecology and Biological Resources published 42 volumes of the book of PROSEA.

In the Flora Program of Viet Nam, conducted from 1995 to the present, 21 books on the flora of Viet Nam have been published.

Objective GSPC 2: An assessment of the conservation status of known plant speciesfor conservation actions

As of 2014, the IUCN Red List contained 219 plant species that occur in Viet Nam.

In Vietnam, IEBR had conducted review and assessment of status endangered species, including plants, and developed Vietnam's Red Data Book in 2007, in which 464 plant species have been classified at different conservation levels (noting that these levels differ to the IUCN Red List categories). Other assessments have been carried out to develop the lists of endangered species in Vietnam to be taken conservation measures. In Decree 160/2013/ND-CP, there are 17 species of plants and 15 plant cultivated varieties listed as 'endangered, precious, and rare species' prioritized for protection in Vietnam.

As part of a project conducted from 2014 to 2017 by the Institute of Ecology and Biological Resources under the Viet Nam Academy of Science and Technology, an assessment of species was undertaken with the objective of updating Viet Nam's Red Data Book. The following results on plants are relevant:

- A total of 1,217 species were assessed as being threatened, consisting of 1,114 species of Magnolia, 45 species of Pinophyta, 17 species of Polypodiophyta, one species of Equisetopsida, two species of Lycopodiophyta, one species of Psilotopsida, 14 species of Rhodophyta, six species of Ochrophyta, three species of Chlorophyta, and 14 species of Monophyletic.
- The work proposed that up to 600 species of plants and fungi be included in the Red Book, consisting of 515 species of Magnolia, 41 species of Pinophyta, seven species of Polypodiophyta, two species of Lycopodiophyta, one species of Psilotopsida, 11 species of Rhodophyta, six species of Ochrophyta, three species of Chlorophyta, and 14 species of Monophyletic.

Objective GSPC 3: Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared

In the first half of the twentieth century, French botanists, under chief author H. Lecomte published the General Indochina Flora Book Sets (*Flore Générale de l'Indo-Chine)* and the complement (*Suppléments à la Flore Générale de l'Indo-Chine)* with seven volumes (1907-1952). Based on the Bentham & Hooker system, the authors classified and described more than 7,000 species of plants belonging to over 200 families of vascular plants in Indochina, including Viet Nam.

Since the 1960s, botanists from around the world and Viet Nam have been compiling *Flora of Cambodia, Laos and Viet Nam* (more than 35 volumes have been published). Le Kha *et at*. (1969-1976) published the *Common Viet Nam Plants* in six volumes. Pham Hoang Ho (1970-1972) has published *The most common plants in the South,* which describes 5,326 species of plants. Pham Hoang Ho also researched flora and published *An Illustrated Flora of Viet Nam* in three volumes. This had sufficient number of species to facilitate the study of plant diversity in Viet Nam until now.

In two thematic editions of the *Journal of Biology* (1994-1995), several authors

published on plant taxonomy for hundreds of species. It is noteworthy that the three volumes of the list of Vietnamese plant species (2001, 2003, 2005) identified a list of more than 20,000 plants and fungal species nationwide. This is the most comprehensive and reliable document on Viet Nam's flora. The book serves as the basis for research and taxonomy. To date, 21 books on the flora of Viet Nam have been published.

The scope of research has covered both the continental and coastal territory of Viet Nam. However, surveys are usually restricted to the existing nature reserves.

Most of the collections of plants in Viet Nam, specifically the collections of plant samples at the Institute of Ecology and Biological Resources at the Viet Nam Academy of Social Sciences, have basic records for each specimen.

Objective GSPC 4: At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration

By 2018, there were 172 protected areas in Viet Nam with a total area of 2,493,844 ha, comprising 33 national parks, 65 nature reserves, 18 species and habitat conservation areas, and 56 landscape protected areas, in all ecological/geographical regions of Viet Nam. The total area of nature reserves is 2,269,426 ha, which is equal to 6.8% of the territory.

Objective GSPC 5: At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity

Viet Nam's topography and climate have created a variety of natural ecosystems, including tropical wet evergreen forest, tropical semi-deciduous forest, broadleaf evergreen forest on limestone mountains, natural coniferous forest, sparse forest (dipterocarp forest), Melaleuca freshwater marsh forest, bamboo forest, and mangrove forest. In addition to these eight types of forest ecosystems, forest scientists divide according to 14 types of forest vegetation (Thai Van Trung, 1999). Based on the factors of climate, topography, geology, and soil on the continental part of Viet Nam, it is divided into eight forest ecoregions, with 47 sub-regions, each with specific characteristics, varying by vegetation type and landscape. The important areas for plant diversity have been protected and managed under the system of protected areas.

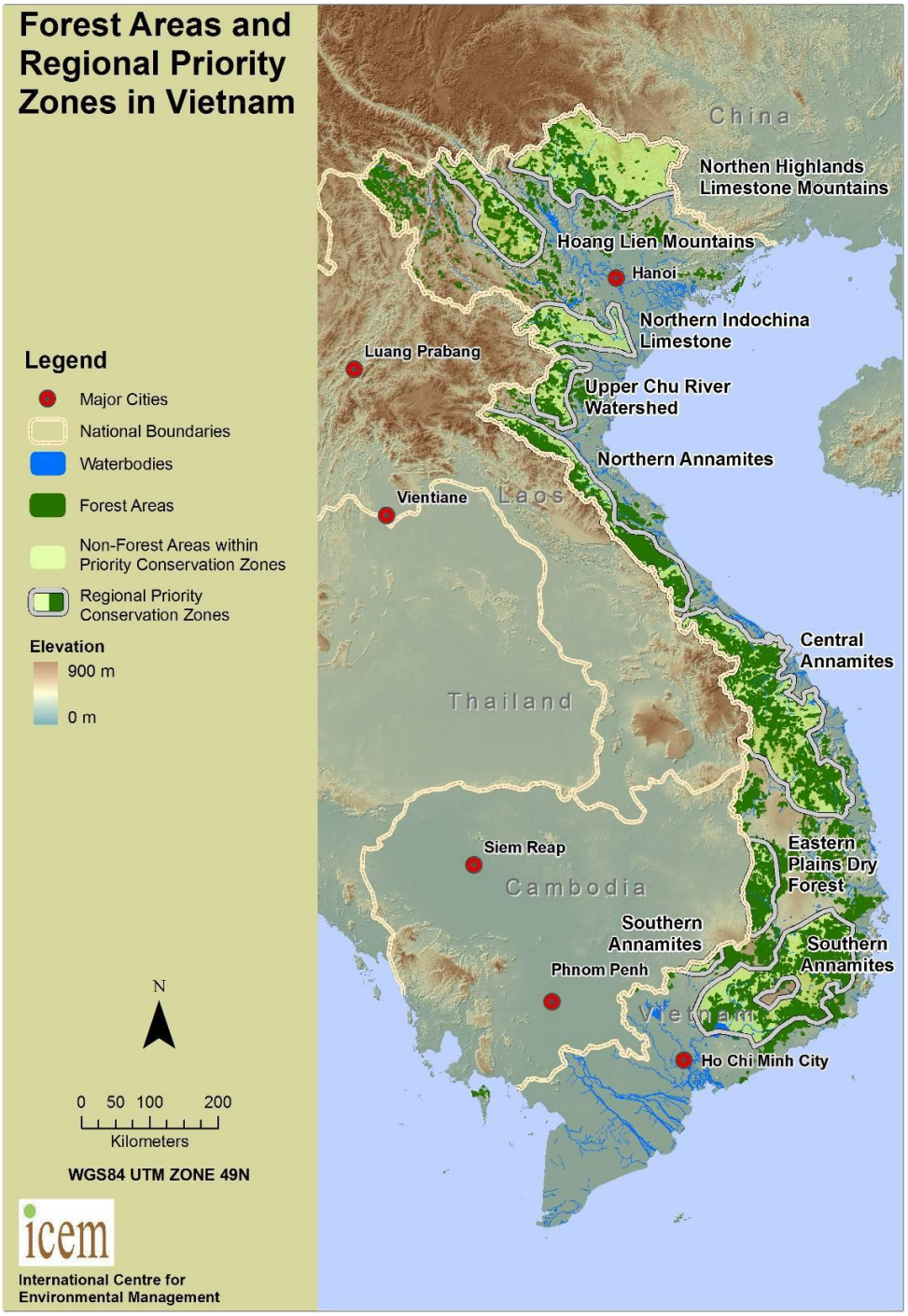


Figure 49. Forest Areas and Regional Priorty Zones in Viet Nam

(source: ICEM, 2010**)**

Objective GSPC 6: At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity

According to the General Statistics Office in 2015, there are 7,834,090 ha of agricultural land in the country. At present, there is a trend towards developing organic agriculture in Viet Nam, beginning with fruits and vegetables.

By 2015, the nation had 16,033,696 ha of forest land, of which 5,848,557 ha was protected forest land, 2,228,888 ha was special-use forest land and 7,956, 251 ha was production forest land. By 2020, the area of raising soft shell and brackish shrimp will be about 780,200 ha. The area of Pangasius farming in 2016 was 4,552 ha. In some coastal areas and in the Mekong Delta, a rotation culture of having fish in rice fields, mangroves with shrimp and crab farming are expanding. To date, there has no indicator on the percentage of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.

Objective GSPC 7: At least 75 per cent of known threatened plant species conserved in-situ

According to a review conducted by MARD in 2018, the special-use forest system covers an area of 2,269,426 ha, accounting for 7% of the territory. By 2018, there were 172 protected areas in Viet Nam with a total area of 2,493,844 ha area. The number of threatened plant species is likely to increase in the proposed amended Red Book for Viet Nam.

To date, there is no statistic on the percentage of known threatened plant species conserved in situ in Viet Nam.

Objective GSPC 8: At least 75 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programmes

Large botanical gardens in Viet Nam are Bach Thao and Thao Cam Vien. There are also botanical gardens in protected areas (about 15 gardens, covering 8,000 ha), medicinal gardens (about 50 gardens, covering 300 ha) and 600 ha of nursery gardens for forestry.

In terms of gene banks and DNA specimens, at present, there are four organizations in Viet Nam with cold storage for seed preservation: the Viet Nam Academy of Agricultural Sciences, Southern Institute of Agricultural Science and Technology, Can Tho University, and the Institute of Food Crops. During 2011-2015, the Center for Plant Resources under the Viet Nam Academy of Agricultural Sciences stored over 38,334 specimens, collected 7,721 specimens of more than 100 plants species in the country, and imported 231 genetic resources.

The Botanical Garden of Hanoi at the University of Pharmacy (precursor of the University of Indochina), was built in the French colonial period from the early 1910s. Originally, the garden was about 10,000 m^2 with 500 species of medicinal plants taken from all over Indochina. The botanical garden now has about 20,000 samples of Viet Nam's medicinal plants, collected from the period of its establishment up to now.

The Institute of Medicinal Materials of the Ministry of Health is the focal point for preserving the genetic diversity of medicinal plants and, with this aim, has maintained a network in seven ecological zones in Viet Nam. A total of 1,531 genes belonging to 884 species have been preserved in medicinal plant gardens. Of these, five medicinal plant gardens managed by the Institute are preserving 1,168 genetic resources from 760 species.

Objective GSPC 9: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge

Vietnam has progress in conservation of genetic diversity of crops and their wild relatives and other socio-economically valuable plant species.

In 2016, the Institute of Medicinal Materials (Ministry of Health) published a list of medicinal plants in Viet Nam. This contains 5,117 species and subspecies of plants that are used in medicine, belonging to 1,823 genera, 360 families of eight phyla of vascular higher plants, and some taxons belonging to the groups of algae, moss, and mushrooms. In addition, the Institute has conducted surveys of indigenous knowledge, collecting medicinal plants and the indigenous knowledge of ethnic minorities, including H'Mong (Lao Cai) Muong (Thanh Hoa, Hoa Binh, Yen Bai, Nghe An), Dao (Ba Vi, Lao Cai, Hoa Binh, Vinh Phuc), Co Tu (Thua Thien-Hue), Van Kieu (Tay Nguyen highland), Tay (Ha Giang, Cao Bang, Bac Can, Lang Son, Thai Nguyen), Nung (Lang Son), San Diu (Vinh Phuc), and Khmer (An Giang). This project has collected and preserved knowledge of approximately 1,296 medicine remedies held by the ethnic communities.

Over 10 research centers of medicinal plants and more than 50 medicinal herb gardens have been established to conserve and develop these diverse resources. In Viet Nam, there are projects on investigating and researching medicinal plants for each sub-territory or indigenous knowledge on medicinal plants. For example, Dr. Nguyen Van Du, from Institute of Ecology and Biological Resources, has contributed results to the Plan of "Investigation and research on medicinal plants used in ethnic medicine in the Central Highlands and proposal on conservation measures" coded TN3/T10 (2011-2014) as following:

1. The list of medicinal plants in the Central Highlands includes 1,633 species belonging to 6 vascular plant species, among which 51 species are complement to the list mentioned above. In the 88 species that have been recorded in the Viet Nam Red Data Book (2007), the four most critically endangered species (CR) are the Glyptostrobus pensilis (Staunt.) K. Koch, the Indian Rauvolfia serpentina (L.) Benth. ex Kurz, the Cinnamomum parthenoxylon (Jack) Meisn, and the Kim cang petelot - Smilax petelotii T. Koyama. Moreover, there are 37 species endangered (EN) and 47 species vulnerable (VU).
2. Collect 2,400 samples of specimens of medicinal plants through ethnophytic investigation of medicinal remedies of 14 different ethnic groups in the Central Highlands.
3. Develop a digital map of precious and rare medicinal plants in the Central

Highlands for exploitation and use.

4. Build database of 531 samples of medicinal plants collected in the wild through investigation of ethnic medicine in the Central Highlands.
5. Collect 362 ethnic medical remedies of ethnic minority peoples of Ba Na, Cil, Cho Ro, Chu Ru, Dc medical remedies of ethnic minority

Objective GSPC 10: Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded

Vietnam is facing with some new plants invading in protected areas, such as *Merremia boisiana*. This species was trongly invade plant within tropical secondary forests at Vietnam such as Bach Ma National Park, Hai Van mountains, Son Tra natural reserve... Local governments have carried out control plans but not yet success.

Objective GSPC 11: No species of wild flora endangered by international trade

The forests of Viet Nam provide a large number of commercially valuable timber species, including Iron Wood (*Erythrophleum fordii),* Fragant Rosewood *(Dalbergia* spp.*),* various species of timberwood species, such as Apitong (*Dipterocarpus* spp.*),* Yellow Balau *(Shorea* spp.*),* Talauma wood (*Hopea* spp.*)* and other coniferous species such as the Hinoki (*Fokienia hodginsii)*. The abundance of most species that are used as timber have declined considerably in recent decades but knowledge about the impact of this decline on the viability of their populations remains incomplete. Other economically threatened species that are over-exploited include Agarwood *(Aquilaria crassna)*, a plant for aloe wood, and Ngoc Linh Gingseng *(Panax Vietnamensis)*.

In many mountainous provinces of northern Viet Nam, the depletion and local extinction of precious medicinal plants for smuggling across borders is quite common. In Cao Bang, Chinese traders have set up many stations to buy and process local medicinal herbs such as white and yellow Stephania flower, Gynostemma, arrowroot, *Millettia reticulata*, velvet grass etc. Many medicinal plants that are illegally exported to China currently have unclear economic value and poorly-understood therapeutic use. Plant species that are identified in CITES that are threatened by commercial harvesting from natural forests, including orchids and cactus, also continue to be traded.

Viet Nam became a full member of CITES in 1994. From that time, the Vietnamese Government has made efforts to implement the Convention. The country has enacted a series of policies, principles, and regulations to legislate CITES, and has established a system of enforcement agencies, CITES regulatory authorities and scientific bodies.

In 2016, Viet Nam held an international conference on illegal wildlife trade in Hanoi, where a joint statement was issued on combating illegal trade of wild fauna and flora. Subsequently, in 2017, the CITES Management Authority of Viet Nam hosted a meeting to develop a CITES Action Plan that aims to combat the illegal trade of species between Viet Nam, Laos, and China, and to strengthen cooperation in enforcement, control and prevention of illegal transportation and trade of timber and timber products.

Objective GSPC 12: All wild harvested plant-based products sourced sustainably

In Viet Nam, products derived from plants include wood, medicinal plants, food, animal food, fiber, firewood, and other derivatives. In Viet Nam, thousands of species are

exploited for the above-mentioned uses and many are heavily exploited for commercial purposes. For example, Bac Kan province has over 1,000 species that are used as resources. There are many species of high economic value, including *Smilax glabra, Millettia reticulata, Campanulaceae, Stephania, Smilax, Stemona tuberosa, Drynaria fortunei, Keteleeria davidiana,* and *Anoectochilus setaceus*. Although the potential for medicinal herbs is high, there has been little attention paid to sustainable use of such resources. The current situation of exploiting and trading medicinal herbs is quite common and is not under the supervision of any management agency. Most medicinal herbs are exploited by local people to meet market demands. The plant processing facilities ship medicinal herbs to China every month, with the volumes involved being that of up to hundreds of tones. To deal with the situation, Bac Kan People's Committee issued Decision 435/2010 on management of exploitation and trading of medicinal plant resources in the province.

Another example of managing medical herbs comes from Huu Lien Nature Reserve in Lang Son Province. Actions undertaken there include:

- Invest in awareness-raising species conservation programs so that all local people can understand and participate in conservations.
- Guide people to use plants to maximize health care, while not affecting the growth and regeneration of natural herbs.
- Formulate a unified regulation on management in buffer zones;
- Invest in the construction of forest and home gardens to produce medicinal herbs in a way that it is a reliable source for pharmaceutical materials for the market place;
- Reduce pressure on natural source of herbs.
- Build a conservation garden of threatened species.

The Institute of Medicinal Materials, which is under the Ministry of Health, has carried out activities such as research on the import and domestication of medicinal plants; on various species' biological characteristics; building technological processes for raising medicinal plants and animals, ;on the selection of breeds; formulating seed standards; organizing the assay; evaluation of medicinal plant varieties; and development of regulations for producing safe medicinal herbs following good aquaculture practices (Viet-GAP).

Thus, medicinal plant gardens in small protected areas have been created in Viet Nam. There is also cultivation of medicinal plants at a larger scale, including in medicinal garden in Tam Dao, Sa Pa, Hanoi, and Ho Chi Minh City.

The need to use high-value products exerts pressure on natural resources. Also problematic is the widespread use of agrochemicals and unsuitable agricultural practices in Viet Nam, which can undermine crop quality. Adoption of international standards on sustainable harvesting of medicinal plants and essential oils (ISSC MAP) aims to ensure sustainable management of medicinal plants during the processes of collection, management, production and marketing.

According to the report (draft) of the Government of 2018 on the results of three years of implementation of the Program for Sustainable Forestry Development for the period 2016 - 2020, as of August 2018, the total area of forest certified under the FSC system is 229,281 ha (147,667 ha of planted forest and 81,604 ha of natural forest) in 17 provinces with 36 applications Certificates: four households (Tuyen Quang, Yen Bai, Quang Tri and Quang Nam) and 32 forestry companies. Timber production is certified at 2.0 million m^3, certified wood has a 10-15% higher selling price than unlicensed wood.

Objective GSPC 13: Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care

There have been some activities to survey and support to maintain and expand local knowledge innovations and practices for livelihoods, local food security and healthcare.

The Institute of Ecology and Biology Resources, the Institute of Medicinal Materials, Hanoi University of Pharmacy, and the Institute of Social Sciences have conducted research on ethnic botany for many years. Such research investigates knowledge of indigenous peoples on natural resource use and conservation. It has also built databases on medicinal resources and collected and created a system for conserving genetic resources of plants and animals and the experience of ethnic minority groups use of medicinal plants. As a result, hundreds of medicinal plants and traditional herbs have been collected from the Dao, Nung, Tay and H'Mong ethnic minority groups in the mountains of Viet Nam. Some positive practices, such as the protection of sacred forests and sacred waters (habitats for many species of wild fauna and flora), of ethnic minorities are maintained by the authorities at all levels.

The Institute of Medicinal Materials has conducted surveys of indigenous knowledge, and collected medicinal plants and the experience of ethnic minority groups in using such medicinal plants, including for H'Mong (Lao Cai) Muong (Thanh Hoa, Hoa Binh, Yen Bai, Nghe An), Dao (Ba Vi, Lao Cai, Hoa Binh, Vinh Phuc), Co Tu (Thua Thien-Hue), Van Kieu (Tay Nguyen highland), Tay (Ha Giang, Cao Bang, Bac Can, Lang Son, Thai Nguyen), Nung (Lang Son), San Diu (Vinh Phuc), and Khmer (An Giang), groups. This has included the collection of 1,296 folk medicine remedies. Issues related to indigenous knowledge, especially that of ethnic minorities, on the exploitation of biological resources for health etc. are integrated into strategies and national action plans on biodiversity.

Objective GSPC 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes

Viet Nam has botanical gardens for education and entertainment purposes. These include botanical gardens in Hanoi and Ho Chi Minh City. In addition, there are many botanical gardens built for research and conservation in the protected areas; namely Cuc Phuong Botanical Garden in Ninh Binh; Tam Dao Vegetable Garden in Vinh Phuc, Thai Nguyen; and Bidoup Nui Ba Botanical Garden in Lam Dong Province.

Improving awareness is an effective measure of strengthening biodiversity conservation.

Therefore, since the Biodiversity Law came into effect, there have been activities aimed at raising awareness of biodiversity. Extra-curricular activities on conservation often bring students to the educational and recreational gardens. Internships for students who are majoring in botany are usually undertaken at botanical gardens in protected areas.

Objective GSPC 15: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy

A network of education and training of managerial and technical human resources in the field of biodiversity conservation in Viet Nam has been developed. About 20 universities have specializations in biodiversity, including biology, environmental management, forestry, agriculture and fisheries, geography, and natural resources. Many universities have also postgraduate programs, including Masters and PhD degrees related to biodiversity conservation, including University of Natural Sciences (Hanoi National University), Hanoi University of Education, Hanoi Agricultural University, Forestry University, Vinh University, Nha Trang University, National University at Ho Chi Minh City and the University of Agroforestry at Ho Chi Minh City. Some private universities with training in environmental science, agriculture, forestry, etc. also incorporate natural resources and biodiversity into their curricula. In 2016, the Ministry of Education and Training assigned a number of universities to compile teaching documents related to biodiversity conservation.

Over ten research institutes have specialized majors related to biodiversity. For example, the Institute of Ecology and Biological Resources of Viet Nam's Academy of Science and Technology has four specialized research groups related to plants: i) Lab of Botany (research on plant taxonomy); ii) Lab of Plant Ecology; iii) Lab of Plant Resources; and iv) Lab of Ethnic Botany. In addition, there is Me Linh Biodiversity Station, an area of about 200 ha forest land, which contains a collection of typical tropical plants and animals of Viet Nam. Many generations of botanists of the Institute are the authors of most books on flora that have been published in Viet Nam. Many researchers in botany at institutions and universities across Viet Nam have been trained in botany at the Institute of Ecology and Biological Resources. More information can be found at http://www.iebr.ac.vn

Nha Trang Oceanography Institute of Viet Nam's Academy of Science and Technology has a laboratory for marine botany. More information can be found at http://www.vnio.org.vn

The Institute of Tropical Biology in Ho Chi Minh City, which is under the Viet Nam Academy of Science and Technology, has research groups in plant gene technology and plant cell technology. More information can be found at http://itb.ac.vn/

The Southern Institute of Ecology in Ho Chi Minh City, which is under the Viet Nam Academy of Science and Technology, has a research group in botany. More information can be found at http://sie.vast.vn/

Over the past 20 years, a network for plant genetic conservation, storage, and exploitation has been formed. The Plant Resources Center, overseen by MARD, is the focal point of the network. There are about 500 people in the network; of these, 140

people are in the Plant Resources Center: two Associate Professors, ten staff with doctorates, 34 staff with master's degrees, 64 with Bachelor's degrees, and the rest are technicians and technical staff.

The Viet Nam Academy of Agricultural Sciences is a special institute within MARD. During the period of 2006 - 2012, the Institute graduated 103 staff with PhDs and 188 staff with Masters in the fields of plant resource management. Please refer to http://vaas.org.vn/

The country has nearly 8,000 people with bachelor's degrees who have experience relating to the fields of biology, agriculture, fisheries and forestry. Every year, hundreds of undergraduate students in biology and biotechnology graduate and approximately 50 masters and 10 PhDs complete their degrees in a range of fields relating to biodiversity and natural resource management. In the above figures, people who have been trained in botany and conservation accounts for about ¼ of the total number.

Objective GSPC 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy

Viet Nam has a system of botanic gardens, which has been mentioned above. Also, Viet Nam's protected area system has the function of preserving important national and international ecosystems and threatened species. Many forest ecosystems and different vegetation types are being conserved, including tropical evergreen rainforest, semi-evergreen tropical, deciduous forest, broadleaf evergreen forest on limestone mountains, natural coniferous forest, sparse forest (dipterocarp forest), Melaleuca freshwater marsh forest on peat land, bamboo forest, and mangrove forest.

There is a botanic association under the General Biology Association of Viet Nam's Union of Science and Technology Association. The network of botanical gardens, protected areas, and botanists are working towards conservation and sustainable development of plant diversity and plant resources of Viet Nam, as well as the objectives of the Global Strategy for Plant Conservation (GSPC).

Most research institutes and universities involved in botany have cooperative relationships within the country, as well as cooperation with institutes and universities internationally.

Section VI. Additional information on the contributions of indigenous peoples and local communities (completion of this section is optional)

VI. Additional information on the contribution of indigenous peoples and local communities to achieving the Aichi Biodiversity Targets if not provided in the above sections.

Viet Nam has 54 ethnic minority groups, who predominantly live in forest and mountainous areas that have high levels of biodiversity. Most ethnic groups have their own indigenous knowledge relating to the use of natural resources, including resources in both forests and the

sea. Products from biological resources are abundant and used daily as food, medicine, household goods etc.

Section VII. Updated national profile on biodiversity

VII. Updated national biodiversity profile (Please review and update the content currently displayed at https://www.cbd.int/countries).

Biodiversity events

Biodiversity of Viet Nam

1. Current status and trends in biodiversity, and benefits from biodiversity services and ecosystems

Viet Nam's territory is located in the eastern part of the Indochinese Peninsula and extends over 15 latitudes from the north to the south, with a length of about 1,650 km and a total land area of 331,698 km^2. The total area of wetlands in Viet Nam is 11,847,975 ha (not including seasonal streams and springs, hot springs, and mineral water spots), accounting for 37% of Viet Nam's total natural land area Viet Nam. The country also has a coastline of 3,260 km (excluding island coastlines) with more than 3,000 small and large islands along the coast as well as the spratly and paracel archipelagos. Viet Nam's exclusive economic zone is over 1 million km^2.

Viet Nam is recognized globally as having high biodiversity. To date, approximately 51,400 species have been identified in Viet Nam, including 7,500 species or varieties of micro-organisms, 20,000 plant species, 10,900 species of terrestrial animals, 2,000 species of invertebrates and freshwater and saltwater fish, and over 11,000 marine species. Of the known organisms, the level of endemic is quite high (about 30% of terrestrial species, 4.6% of species and subspecies of birds, 27.4% of freshwater mussels and snails, and 58% of freshwater shrimp, crabs etc.). From 2014 to September 2015, 344 species of organisms have been newly described (208 species of animals, and 136 species of plants).

In addition to having high diversity of natural organisms, Viet Nam is one of the world's most diverse sources of cultivated plants and livestock, and has more than 6,000 varieties of rice, about 800 species of crop plants, and is the source of 40 domestic animals. Livestock and crops have been developed for hundreds of years and have valuable genetic traits. These are precious indigenous genomes of Viet Nam that need to be protected, preserved, and developed.

Biodiversity resources have contributed to the livelihoods of Vietnamese people for generations through the provision of food and health care. This is especially the case for people living in remote areas who are directly dependent on resource extraction.

In 1990, national forest cover was only 28%, with an area of 9,175,000 ha. Thanks to the forest plantations, the area of forest and forest cover increases every year. By 2017, the forest area reached 14,415,381 ha, covering 41% of Viet Nam's total national area. However, because planted forest is a monoculture, the diversity of fauna living in such forest is much lower than

that in natural evergreen tropical forest. Primary forest covers only 0.5 million ha and is fragmented, scattered in the Central Highlands, south-east and north-central regions of Viet Nam. It is also exploited, which results in reduction of natural resources and ecological services.

The trend for mangrove forest in Viet Nam from 1943 (408,500 ha) to 2009 has shown a very strong downward trend; the lowest of which in that period, 83,288 ha, was reached in 2003. This means that, in 60 years, 4/5 mangrove forest area has been lost. Statistics on mangrove forest area from 2010 to 2017 show that the area is still changing annually. As of 2015, the area of mangrove again fell quite low, covering approximately 57,211 ha, however, by 2017, it had reached an area of 213,142 ha due to reforestation projects.

Primary mangrove forests are only left in small areas in coastal Quang Ninh and Ca Mau. In fact, 62% of the mangrove forest area is a monoculture, newly planted and poor in biomass and biodiversity. The area of mangrove forest has been reduced mainly due to being cleared for shrimp and other aquaculture, as well as for construction of infrastructure, residential areas, and other economic activities. Mangrove loss leads to serious damage to biodiversity, especially loss of breeding and nursery areas for many marine species and habitats of bird species, as well as loss in accumulation of estuarine sediments and reduction of pollution or erosion.

According to the Red List of the International Union for Conservation of Nature (IUCN), there were only 25 threatened species in Viet Nam in 1996; however, this jumped to 362 species of animals and 219 species by 2014. In the Viet Nam Red Book (2007), the total number of threatened species is 882 (418 species of animals and 464 species of plants), of which nine species are considered extinct in the wild in Viet Nam. Notably, in 2011, the sub-species of *Rhinoceros sondaicus annamiticus* was officially declared extinct in Viet Nam (Gersmann, 2011). For flora, *Paphiopedilum Vietnamense* is extinct in nature. Many of the plants that were previously classified as endangered are now in critically endangered, including *Cupressus torulosa, Callitropsis,* and *Panax bipinnatifidus.*

Monitoring of important bird areas indicates that the number of threatened species, especially of globally-threatened migratory birds, is declining. Some species have not been seen for several years.

A project conducted from 2014 to 2017 that focused on assessing threatened species to amend Viet Nam's Red Book, Viet Nam proposed the inclusion of 1,211 species, including 600 species of plants and fungi, and 611 species of fauna. If this is undertaken, a new version of the Red Book of Viet Nam will have a significantly high number of species.

As of 2018, Viet Nam has 172 protected areas with a total area of 2,493,844 ha in various geographic/ecoregions on the continent and in four marine areas (Gulf of Tonkin, Central Viet Nam, South East and the South West). This consists of 33 national parks, 65 nature reserves, 18 species and habitat conservation areas, and 56 landscape protected areas. The area of terrestrial protected areas is 2,269,426 ha, accounting for 6.8% of Viet Nam's territory. All forests that have threatened species or important habitats can be found in those protected areas. In Viet Nam's 'Master plan for national biodiversity conservation by 2020, vision to 2030', there is a plan to gradually add 46 new protected areas. The total number of existing and planned new reserves nationwide would thus reach 219, spread cross 3,067,000 ha.

2. Main pressures and impacts on biodiversity (direct and indirect):

Threats to biodiversity in Viet Nam include population growth and increased consumption of

natural resources, illegal exploitation of timber and non-timber forest products, over-exploitation and illegal fishing, and hunting and trading of wildlife (plants and animals). Other threats consist of transforming forest land and water surface for infrastructure development, expanding agricultural land and growing industrial crops, introduction of invasive alien species, pollution, climate change, forest fires, and changing land use that decreases the total area of natural forest and/or fragments the forest ecosystem and causes loss of habitat for wildlife.

Agricultural land increased from 6.7 million ha in 1990 to 7.8 million ha by 2015. Illegal logging and timber exploitation are still widespread, even inside conservation zones. The construction of roads for timber transport has facilitated the hunting and exploitation of non-timber forest products, putting more pressure on wildlife populations.

For freshwater ecosystems, there is over-exploitation and illegal extraction of economically valuable aquatic species, and the development of hydropower dams and plants. The later leads to loss of habitat for many aquatic species as well as prevents migratory species from breeding, resulting in changes to the reproductive cycle, growth and feeding behavior of organisms in the river systems; it also causes huge impacts on downstream river systems, as well as coastal estuarine areas due to changes in water circulation and saline intrusion.

Most of the coastal marine ecosystems are degraded, some seriously due to habitats being heavily affected by development activities and environmental pollution. The increase of consumption, coupled with the unsustainable exploitation of fisheries resources, has depleted coastal fisheries. Overfishing and illegal exploitation of marine products continue. The size of fish species dominating the catch in most Vietnamese waters is quite small and often does not reach the length indicating sexual maturity. Destructive fishing techniques, such as the use of explosives, toxins, and electricity, are used often in both inland and sea waters. This is considered a serious threat to more than 80% of the coral reefs of Viet Nam. Off-shore fishing vessels (capacity group > 90 CV) constitute a much smaller share of the fishing fleet than do near-shore boats (capacity group <90 CV).

Measures to strengthen the implementation of the Convention

3. Implement the NBSAP

The first national biodiversity action plan of Viet Nam (NBAP) was approved by the Prime Minister in 1995. The second NBAP was developed and approved in 2007, covering five more broad objectives and containing specific and measurable goals and indicators. Its main objectives are to strengthen and develop the special-use forest system; restore 50% of degraded watershed forest; effectively protect plants and animals that are at risk of extinction; increase the area of nationally and internationally important wetland protected areas to more than 1.2 million ha; restore 200,000 ha of mangroves; publicize and perfect the conservation system in order to effectively preserve indigenous, precious, and rare agricultural crop plants, livestock, micro-organisms, and animal breeds with high socio-economic value; control and prevent the exploitation, trading, and consumption of threatened wild animals and plants; inspect 100% of species, varieties, and genetic resources of imported animals; undertake awareness-raising and education in the community about the conservation, development, and sustainable use of biodiversity; and strive for more than 50% of the population to regularly access information on biodiversity and biosafety, as well as to contribute their opinions in issuing decisions on biosafety certificates.

The Review of implementation of the Biodiversity Action Plan concludes that:

- The legal framework related to biodiversity conservation is gradually being finalized. The Law on Biodiversity, which was prepared and promulgated in 2008, is considered the most important legal basis for the management of biodiversity. A decree guiding the implementation of the Law has also been promulgated.
- The system of nature reserves is continuing to be improved, including terrestrial, wetland and marine conservation systems.
- The development of community-based models for sustainable use and the equitable sharing of benefits from biodiversity resources have brought benefit both in terms of biodiversity conservation and improved the living standards of people living in nature reserves.
- Awareness-raising and educational programs on biodiversity for all levels of management, people and students has been undertaken. Many communication programs, and educational publications to introduce knowledge on biodiversity conservation and biosafety have been built and are widely spread.

4. Overall actions taken to implement the Strategic Plan for Biodiversity in the period of 2011-2020

There have been remarkable developments in Viet Nam's protected area system in terms of their number, area and extent. In 2010, the total forest area (accounting for both natural and plantation forest) was 13,388,075 ha but, as of 2017, reached 14,415,381 ha and covered 41% of Viet Nam's total area. There are 172 protected areas, with a total area of 2,493,844 ha, located in various geographic/ecoregions and in four seas. Specifically, the area of terrestrial protected areas is 2,269,426 ha, accounting for 6.8% of Viet Nam's area. Furthermore, a system of 16 marine protected areas was approved by the Prime Minister in 2010. In 2014, the Prime Minister approved the 'National Master Plan for Biodiversity Conservation by 2020, vision to 2030'. Accordingly, the existing protected area system was finalized and 46 new protected areas are proposed to be gradually established. This will bring the total number of protected areas to 219 with an area of about 3,067,000 ha.

Protected areas, and those areas with international or regional importance are as follows: six globally-recognized prioritized ecosystems recorded by WWF, eight Ramsar sites, nine World Biosphere Reserves; three World Natural Heritage sites, six ASEAN Heritage Sites, 63 important bird areas, and 104 key biodiversity areas.

In addition to *in-situ* conservation of species, *ex-situ* conservation has been developed. This consists of 11 wildlife rescue centers zoos/botanical gardens (three large ones: Thu Le Zoo, Bach Thao Zoo and Thao Cam Vien), botanical gardens and botanical collections within protected areas (about 15 gardens with a total area of 8,000 ha); five medicinal gardens with an area of 300 ha; breeding centers of precious and rare species of high economic value; and genetic banks of livestock, plants, and micro-organisms at research institutions.

Specifically, in the period 2011-2015, the Plant Resources Center of Viet Nam's Academy of Agricultural Sciences and it's conservation network have safely conserved over 38,3404 accessions of crop species and crop wild relatives samples , collected 7,721 accessions of more than 100 plant species, imported 231 genetic resources, multiplicated and evaluated 18,336

times crop accessions, documented 35,755 records of passport data and 46,914 records of description data for15,534 crop accessions, more than 7,000 times of crop accessions were provided for breeding, research and train, and 70 native species of livestock and poultry were restored . Many mangroves have also been newly planted in coastal areas.

Community-based conservation management, sustainable use of biodiversity resources, and ecotourism have become models that aim to enhance livelihoods and are used at local levels, especially in protected areas and biosphere reserves. These livelihood models generate employment and income for the local community, and work as a mechanism for the preservation of indigenous knowledge. In addition, there have recently been studies on indigenous people's knowledge of botany, especially relating to their protection and use of natural resources. Traditional cultural activities, such as the creation of sacred forests, establishment of erosion-prone forest vegetation, and sacred streams for fish all are supported by local government and play a role in the protection of biodiversity.

5. Mechanisms to support the implementation of national objectives (legislation, funding, capacity building, coordination, integration, etc.):

Measures to protect the environment and the conservation and sustainable development of biodiversity resources have been integrated into government policies, as well as sectoral and inter-sectoral strategies, plans, programs in agriculture, industry, tourism, commerce, finance, and education. National strategies regarding poverty reduction, hunger eradication, sustainable development, attempts to combat desertification and climate change, to implement green growth, as well as regional development plans all include measures to address biodiversity. Biodiversity conservation has also been incorporated into the implementation of various international conventions and decrees.

Some agencies have begun to collect environmental protection fees, and to inspect permits for discharge of waste water. Recently, the concept of payment for ecosystem services has been introduced in provinces as a pilot, to test this as a means of obtaining financing for biodiversity conservation. Various laws, such as the Law on Biodiversity (2008) and Forest Law (2017), provide a legal framework for the application of new policies and regulations regarding access and sharing benefits from ecosystem services. In addition, infrastructure development projects and strategic environmental assessments have integrated biodiversity indicators into their planning by conducting environmental impact assessments.

The budget for conserving biodiversity has increased in recent years, as a result of the Five Million Hectare Reforestation Program, the 'Coastal Forest Protection to Cope with Climate Change in the period of 2015- 2020' project, the Viet Nam Environment Fund, the Viet Nam Conservation Fund, Trust Funds, and the Viet Nam Fisheries Resources Restoration Fund. Of all the funding sources for biodiversity conservation, official development assistance accounts for an important share of total investment. The Government has committed to allocating 1% of the total national budget for environmental protection and biodiversity conservation from 2006 (even though from 2011 to 2015, total biodiversity expenditure accounted for only 0.16% of GDP and 0.58% of total state budget expenditures). Lack of investment in conservation is still a big challenge for achieving the national targets in the NBSAP.

6. Monitoring and Evaluation Mechanism:

The monitoring of biodiversity indicates that some of Viet Nam's threatened wildlife species are critically close to extinction. In some monitoring sites, a number of globally-threatened migratory birds have declined substantially or are no longer seen.

Technologies (e.g. remote sensing, geographic information systems, camera trapping) have been used in biodiversity monitoring and have produced encouraging results. Approaches for ecosystems typical in Viet Nam, such as forests, wetlands and oceans, have been developed and published. Some technical guidelines on the monitoring of wetland, forest, and sea ecosystems and guidelines for reporting on the status of biodiversity have been prepared and promulgated since 2014. However, there is no long-term, systematic and comprehensive plan on monitoring and evaluation of biodiversity across the country yet.