



Study on Nature-based Solutions (NbS) in ASEAN

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Study on Nature-based Solutions (NbS) in ASEAN

The ASEAN Secretariat
Jakarta

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967. The Member States are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.

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Abbreviations

A/R	Afforestation / Reforestation
ACB	Asia Commercial Bank
ADB	Asian Development Bank
AFD	Agence Française de Développement [French Development Agency]
AFOLU	Agriculture, Forestry and Other Land Use
AMS	ASEAN Member States
ASEAN	Association of Southeast Asian Nations
CBD	Convention on Biological Diversity
CDP	Carbon Disclosure Project
CGIAR	Consultative Group on International Agricultural Research
CIFOR	Center for International Forestry Research
COP26	26 th Conference of the Parties to the UNFCCC
CRDT	Cambodian Rural Development Team
EbA	Ecosystem-based Adaptation
ECO-DRR	Ecosystem-based Disaster Risk Reduction
EU	European Union
EVP	Elephant Valley Project
FAF	Food, Agriculture and Forestry
FAO	Food and Agriculture Organization
FCPF	Forest Carbon Partnership Facility
FLR	Forest Landscape Restoration
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gases
ICRAF	International Council for Research in Agroforestry
ICT	Indigenous Communal Land Titling
IFAD	International Fund for Agricultural Development
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau (German financial development cooperation)



KSWs	Keo Seima Wildlife Sanctuary
LULUCF	Land Use, Land-Use Change and Forestry
NbS	Nature-based Solutions
NBSAPs	National Biodiversity Strategies and Action Plans
NDCs	Nationally Determined Contributions
NGO	Non-Governmental Organization
NORAD	Norwegian Agency for Development Cooperation
OFI	Orangutan Foundation International
PLUP	Participatory Land-Use Planning
RECOFTC	Regional Community Forestry Training Center for Asia and the Pacific Pacific
REDD+	Reducing Emissions from Deforestation and Forest Degradation In Developing Countries [...]
SEARCA	Southeast Asian Regional Center for Graduate Study and Research in Agriculture
SFM	Sustainable Forest Management
SFP	Social Forestry Program
SVC	Sam Veasna Centre
TNC	The Nature Conservancy
TORA	Tanah Obyek Reforma Agraria
UKCCU	UK Climate Change Unit
UN SDGs	United Nations Sustainable Development Goals
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VCM	Voluntary Carbon Markets
WCS	Wildlife Conservation Society
WHI	World Hope International
WRI	World Resources Institute
WWF	Worldwide Fund for Nature



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- Forestry Foreign Affairs Office Royal Forest Department of Thailand
- IDH-Sustainable Trade Initiative Indonesia
- IUCN commission on protected and conserved areas
- RECOFTC (Regional Community Forestry Training Centre for Asia and the Pacific)
- SEARCA (Southeast Asian Regional Center for Graduate Study + Research in Agriculture)
- TLFF (Tropical Landscapes Finance Facility) of Indonesia
- Wetlands International
- Wetlands International Indonesia
- World Agroforestry (ICRAF)
- YAGASU (Yayasan Gajah Sumatera)
- APRIL – Restoration Ecosystem Riau



Executive Summary

Nature-based solutions (NbS) and investments in the restoration and effective conservation of natural capital are key for securing future sustainable development opportunities. Globally, much historical economic growth was related to an overexploitation of natural resources. External costs resulting from the unintended impacts – the loss of biodiversity and vital ecosystem services or climate change – put the sustainable development agendas of many countries at risk. Thus, NbS implementation and restoring degraded ecosystems at scale is a very important risk mitigation strategy, with significant potential for synergies among the Sustainable Development Goals (SDGs). The Rio conventions and many related fora therefore widely acknowledge and promote NbS as a key strategy to simultaneously achieve or at least meaningfully contribute to different environment and development goals.

The purpose of this study was to assess and promote the role of NbS in the regional ASEAN context. Methodologically, the study focused on literature and policy reviews. They were additionally informed by qualitative expert interviews with representatives of different institutions. The key methodological steps also included a desk review of selected policies. Here, we analyzed international commitments of ASEAN countries related to NbS, in particular the revised nationally determined contributions (NDC). Further, we reviewed financial instruments and funding sources for NbS implementation. We also collected evidence of successful policies and examples in AMS, conducted interviews and developed an outlook including recommendations.

The results show that different NbS already play a pivotal role in many domestic and international policy targets of ASEAN Member States (AMS). AMS have recognized the importance and potentials for their countries and already strive for implementation at scale, as made explicit in many policies, strategies and action plans for the land use sector. Supported by different bi- and multilateral development cooperation partners, successful policies and pilots provide the entry points for upscaling in line with specific national needs, policy priorities and circumstances.

Despite the wide recognition of the significant benefits and ecosystem services that NbS provide at different levels and scales, the monetizing of these services remains challenging. Many studies have demonstrated the full economic benefits of ecosystems. However, those using the natural capital often have a narrow perspective on financial aspects; external effects are not internalized in cost-benefit analyses and remain academic exercises as most “non-provisioning” ecosystem services are not marketable.

NbS provide a plethora of ecosystem services and benefits for biodiversity; however, they are often framed as “natural climate solutions”, emphasizing the role of ecosystems for greenhouse gas (GHG) sequestration and climate change adaptation. The implementation and upscaling of NbS are key to achieving the targets of the UNFCCC Paris agreement of 2015, and often represent major contributions to Nationally Determined Contributions (NDCs). It is important to understand that ‘NbS’ is an umbrella term. NbS are broader than climate solutions and encompass many different activities that originate from the international climate community. Examples include REDD+, ecosystem-based adaptation (EbA) or ecosystem-based disaster risk reduction (ECO-DRR). At first sight, such framing puts biodiversity and non-climate benefits in the background. However, most traditional and new NbS sources – public and private – require a respective framing. Examples include the Green Climate Fund (GCF) or voluntary carbon markets.

Different international policy for a have created momentum for NbS, but the implementation and upscaling of NbS are still not keeping up with the ambitious national and international targets. Hurdles for progress and success stories beyond pilots are slowed down by unabated technical, financial and political challenges – despite many policies, strategies and action plans at national and international levels that formulate ambitious targets and timelines.



Investors need investment-friendly environments; technical and institutional capacities remain insufficient and need targeted efforts; and policies and action plans should clearly guide which NbS should be implemented, where, how and by whom.

Key study results

NbS play a key role in the international policy commitments of AMS under the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD). Most AMS highlighted the role of NbS in their revised NDCs submitted to UNFCCC, particularly in the mitigation sections. They often emphasize the importance of NbS in the land-use sector, e.g., the restoration of forest and peatlands, conservation agriculture, agroforestry, or the restoration and conservation of indigenous wildlife. All AMS emphasize the importance of NbS for adaptation. Indirectly, NbS are included through a framing such as, for example, integrated management of water and agricultural resources; restoration/rehabilitation/protection/conservation of biodiversity, habitats, forests and peatlands; or as coastal restoration and greening cities.

NbS align well with the Green Economies of AMS and post-COVID recovery, e.g., through improving sustainable livelihoods and creating job opportunities; however, without significant investments, the potential benefits cannot be realized. Public finance and traditional support are not sufficient for triggering the desired transformational change. Many private sector investors have expressed interest to invest in NbS as part of their corporate climate responsibility, but they face significant challenges. This includes high up-front costs, paired with unfavorable enabling environments, high risk and long payback periods. De-risking and creating sound investment climates can help to address these challenges and attract new and significant sources of investment.

AMS have different views on NbS as means for addressing climate change. Some governments see NbS as a key means to enhance the resilience against the impacts of climate change. They emphasize NbS relating to ecosystem-based adaptation or ECO-DRR. Other countries expect NbS to play a key role in their national efforts to mitigate GHG emissions. The framing is decisive for the options for funding NbS implementation.

Some AMS have devised detailed policy frameworks to include specific NbS measures directly and indirectly into their national policies, strategies and action plans. The research and interviews revealed many progressive policies and approaches, but implementation is complex and still not mainstream as it requires cross-sectoral governance and a suitable enabling environment. For example, Indonesia has used its Social Forestry Program to tackle complex cross-sectoral issues within their specific national contexts. Thailand developed the Climate Change Master Plan as a framework for all sectors to formulate an implementation plan for achieving low carbon development pathways and addressing climate change by 2050.

All AMS are already implementing and promoting NbS to protect and restore degraded ecosystems while simultaneously providing livelihoods for community as well as biodiversity co-benefits. We found a plethora of NbS related policies and promising pilots, including restoration and protection of peatlands and mangroves and a general increase of forest cover. The emphasis differs between AMS: while some consider forest-related NbS predominantly as EbA strategies (e.g., Cambodia, Lao PDR and Myanmar), countries such as Indonesia and Viet Nam have a clear focus on mitigation. Other AMS, such as Thailand, are implementing measures like integrated coastal zone management and integrated water resources management to improve their coastal ecosystems and support local community living in surrounding areas.

NbS funding in all AMS is scattered and largely uncoordinated; countries should consider developing comprehensive NbS funding strategies. The many different sources and instruments for domestic and (limited) international funding for NbS are often not well coordinated. For example, official development assistance funds and related technical assistance should be better structured and, where possible, be bundled to allow a targeted and efficient approach to addressing key bottlenecks.



UNFCCC COP26 in Glasgow in December 2021 reiterated the importance of NbS; the conclusion of the Article 6 negotiations and the “rule book of the Paris Agreement” paved the way for upscaling NbS through voluntary carbon markets. The progress made on Article 6 for market-based approaches reconfirms these efforts and provides new opportunities. The massive private sector interest in investing and the renewed political will of countries are important ingredients to make progress on the ground – towards achieving the ambitious targets of AMS.

Recommendations

The successful implementation of NbS-related policies of AMS requires streamlining, more effective regional and in-country coordination (between institutions and sectors) and clear guidance. Even though the circumstances and the approaches to NbS are quite different across AMS, they share similar challenges related to funding and capacities. ASEAN is competing with other regions for the same sources of funding and support. In order to translate international commitments and policy targets into action on the ground, the different stakeholders should focus on the guidance they can give within their mandate, and on addressing the technical, financial and policy hurdles.

ASEAN has an important function as a regional coordination institution, to represent the region internationally and to facilitate learning on best practices among AMS. With regard to NbS, experts see a need to expand the existing programs and activities of the related FAO working group to include relevant issues within ASEAN Working Group on Forests and Climate Change, ASEAN Working Group on Social Forestry, and ASEAN Working Group on Forest Management. ASEAN should establish and continue the existing exchange programs (South-South and North-North cooperation) among AMS on NbS, including social forestry, forest landscape restoration (FLR), agroforestry, REDD+, marine and coastal management, and restoration of degraded ecosystems. Such a program should be implemented and cross-coordinated by the above working groups and have a particular focus on cross-sectoral issues (e.g. (eco)tourism, mining, infrastructure).

If AMS wish the private sector to play a meaningful role in implementing their targets, they should consider developing strategies and guidance for resource mobilization, investment strategies and access-to-finance for implementing organizations. There is currently an unprecedented window of opportunity presented by the private sector’s interest in investing in NbS, especially via voluntary carbon markets. However, many private investors are looking for viable NbS business models, favorable environments and “near-ready” investment opportunities as well as bankable projects. Without clarity on where and in what initiatives they are welcome to invest in, they will eventually turn to other regions or sectors (e.g., renewable energy).

While AMS have developed and revised many policies related to NbS, there is a need to harmonize the policy frameworks and create cross-sectoral linkages. For example, agriculture or mining are sectors with competing interests, and it will remain difficult to make progress on the targets without comprehensive strategies, inter-sectoral coordination and land-use planning within the various sectors interconnected to NbS. The regulations and laws related to nature-based investment should be improved to facilitate coordination, sustainable investment and implementation, and market mechanisms for NbS projects and products.

To mainstream and link the NbS related activities to other sectors, AMS need to integrate these activities into sectoral development (i.e., agriculture, forestry, finance, fisheries, mining, energy, tourism, transport, etc.) and align them with the higher level or broader policies and strategies, such as cross-sectoral themes (sustainable development, poverty reduction, disaster risk reduction and management, and climate change adaptation/mitigation).



Technical and financial development cooperation play important roles in overcoming the hurdles for upscaling successful NbS pilots. Many development cooperation organizations have supported AMS for decades in their natural resource sectors, but they often lack exit strategies to ensure the sustainability of their achievements. Development cooperation organizations should place large emphasis on these aspects in current or new projects. They should focus on building institutional capacities and support implementing agencies with access-to-finance and technical support; furthermore, they should consider their limited funding as catalytic finance, i.e., as a means to tap other appropriate sources of funding such as voluntary carbon projects, private sector investments in sustainable supply chains or GCF funding.

Private sector investors should focus on reducing risks and making use of respective financial instruments and partnerships, e.g., aligning with development cooperation and other stakeholders. Investing in NbS requires long-term commitment and risks. While many NbS business models exist, there are few investment-ready, bankable projects. Investors should pursue de-risking strategies; investing in thorough due diligence; and certification in recognized standards, as well as entering public-private partnerships to address lacking technical and institutional capacities of implementing organizations.



1. Introduction and Study Objectives

Nature-based Solutions (NbS) use protection, rehabilitation and restoration of ecosystems to address societal challenges and development goals (Cohen et al., 2016). They provide sustainable, cost-effective, multi-purpose and flexible alternatives for various objectives by utilizing natural features and processes for cities, landscapes, and coastal ecosystems.

NbS are indispensable for achieving the global goals of mitigating climate change and adapting to its impacts. Even though there is no agreed definition, NbS are implicitly an integral part of the Paris Agreement of 2015. They play prominent roles in most Nationally Determined Contributions (NDCs) submitted to the UNFCCC since 2015 and can be linked to domestic policies, strategies and action plans. In a world full of acronyms and new terms, and the absence of a common understanding, NbS are often framed differently: for example, as mitigation actions in the agriculture, forestry and other land uses (AFOLU) sector in the context of land use, land use change and forestry (LULUCF) or ecosystem-based adaptation (EbA). Since the first round of NDCs, many countries have increased the level of ambition for NbS in their revised NDCs.

Due to the different funding opportunities, the role of NbS in national and international climate policies related to the implementation of the Paris Agreement is a focus of policy makers, investors and other stakeholders. Also, from an implementation perspective, NbS have significant potentials for positive impacts besides climate change adaptation and greenhouse gas (GHG) mitigation: they are key for the conservation of biodiversity and curbing the ongoing loss of habitats, species and genetic varieties. NbS link food security through sustainable value chains and green economies, and they can contribute to post-COVID recovery. Therefore, NbS do not only provide environmental, but also economic, social and cultural benefits.

NbS are receiving significant attention in Southeast Asia as part of an overall strategy to address climate change in the region. Countries of the region are extremely vulnerable, and simultaneously they play important roles in mitigating climate change. AMS have committed to focusing on food security and climate change in the agriculture and forestry sectors in the region. Against this background, this study seeks to provide a solid overview of the status of NbS (related to forest, bare land and coastal ecosystems) in AMS and to

1. take stock of and synthesize existing knowledge to identify best practices for NbS and their socio-economic benefits across forest, bare land and coastal ecosystems,
2. provide environmental and socio-economic evidence-based results in the Southeast Asian region by synthesizing existing knowledge and practices,
3. identify available financial instruments and mechanisms to support the implementation and upscaling of appropriate NbS,
4. provide recommendations on how to integrate and enhance the uptake of NbS in regional policies and at the local level.

Across these objectives, the study will review regional examples to provide a strong economic perspective and justification for NbS such as job creation, investment perspectives, incorporation into carbon markets etc. The financial bankability/economic importance of NbS is an important aspect to address in this study. The economic importance of NbS is crucial, as (a) NbS should not only address climate change impacts, but also enhance economic development and (b) NbS should be attractive for investors (all different sources of funding) across different scales.

The expected final outputs of the assignment are an extended report and an input or presentation that addresses the above-mentioned objectives. Further milestones include an inception report and inputs to training programs on NbS.



2. Methodology

2.1 Desk Study - Policy and literature reviews

Policy analysis

NbS can be used in terrestrial ecosystems, freshwater systems, ocean systems, and sustainable food systems for addressing climate change in ways that are highly relevant to the goals stipulated in the Paris Agreement. Developing countries, such as ASEAN Member States (AMS), are seeking innovative and sustainable solutions to tackle the threat of climate change and human-induced disasters.

The desk review of policies focused mainly on summarizing national NbS related policies such as the NDCs and National Biodiversity Strategies and Action Plans (NBSAPs). All ASEAN NDCs were recently updated, having been submitted to the UNFCCC either in 2020 or 2021. For each Member State, we analyzed the adaptation and mitigation chapters of the NDC, noting direct and indirect mentions of NbS. The NBSAPs, on the other hand, were published between 2015 and 2019, and referred to targets with timeframes ranging between 2020 and 2030. Within NBSAPs, we analyzed the chapters describing strategies and targets.

A “direct mention” was counted if the words “nature-based solution” or “ecosystem-based adaptation” were used. Indirect mentions included restoration, conservation, natural/green infrastructure, integrated management, sustainable management, rehabilitation, and protection. In some cases, implicit mentions of NbS were counted based on context, even though the abovementioned words were not specifically used.

Identification of financial instruments and funding sources

NbS implementation requires significant new and additional finance. Financing can come from different sources and can take different forms, including grants, credits, financial cooperation, Corporate Social Responsibility funding, payment for ecosystem services, green saving books, blended funding etc. The funding sources vary and can include state fundings, donors, private sector/investors, and public-private partnerships among others. For example, the mangrove/peatland restoration activities in some AMS have attracted donors. During the desk review, we focus on the role of the following funding sources:

- domestic funding and state/sectoral budgets,
- bi- and multilateral development cooperation, and multilateral funds,
- private sector investments.

Evidence collection in ASEAN

The universal categorical approaches of IUCN were used to search evidence on NbS in ASEAN countries (Shacham et al., 2016). These categories are:

1. Ecosystem restoration approaches, including ecological restoration, ecological engineering, and forest landscape restoration;
2. Issue-specific ecosystem-related approaches, including EbA, ecosystem-based mitigation, climate adaptation services, and ECO-DRR;
3. Infrastructure-related approaches, including natural infrastructure and green infrastructure (combining natural and engineered systems);
4. Ecosystem-based management approaches, including integrated coastal zone management and integrated water resources management; and
5. Ecosystem protection approaches, including area-based in-situ conservation such as protected area management.



Data were analyzed and categorized into objectives, approaches, project proponents/implementers, funding resources, results and impacts on both ecosystems and communities. Some data from NbS related initiatives include a broad set of measures ranging from landscape restoration to climate adaptation activities.

Some projects were developed to address environmental issues while providing support to communities through various livelihood improvements. Other projects are private-driven initiatives that contribute to national policy agendas on climate change, with the project proponents expecting benefits on their investments from carbon transactions. Some initiatives are still at early stages while others are already advanced and being scaled up in other areas. Data were further selected to focus on those projects that provide information on economic costs, benefits and impacts of NbS, challenges and opportunities, success/failure factors, and inclusion potential in the regional policy framework of the ASEAN Cooperation on Forestry.

2.2 Expert interviews

Based on the results of the data gathering exercise and initial analysis, key stakeholders representing a range of NbS knowledge and implementations were selected to participate in in-depth interviews. To obtain comprehensive perspectives, interviews were carried out with project proponents/ implementors, government representatives, and experts from research institutions and other stakeholders in ASEAN countries. In addition to these groups, country characteristics were also considered in selecting persons/officials for the interviews so that broad inputs were captured representing the variation among AMS in both social economic development and the implementation of NbS-related approaches.

Different questionnaires were developed and delivered to the target groups. For project proponents or implementors, questions focused on the experiences in establishing activities from planning through to implementation phases. To better understand the current status and future potential of the NbS investment market, questions related to ease of doing business were discussed during interviews with private sectors. For government officials, in addition to general questions related the status of natural resource management in the country, policy frameworks related to NbS were introduced. This approach captured a large range of knowledge and opinions on NbS options for natural resources and community development and on their financing in the Southeast Asian region.

To gain information on specific NbS approaches and their implementation, interviews were conducted with experts from regional research institutions. For this group, questions were asked not only regarding the development of NbS in the region, but also about knowledge gaps and applicability of particular approaches to specific countries. Overall, the interviews conducted were aimed at building on existing available data, collecting inputs across a range of NbS themes, applications, investments, and further refining the results of analysis. Additionally, the results of interviews were used to inform key recommendations for AMS policymakers and implementers.

3. Background and Context of NbS

3.1 Definition, categories and potential of NbS

NbS are not agreed in any of the relevant international fora, as the UNFCCC or the CBD. Is a broad umbrella term with a focus on the ecosystem services provided by different ecosystems, and consumed at different scales – locally, regionally and globally. NbS are also described as ecosystem-based approaches, which combine the concepts of effective protection and sustainable use to address different societal challenges. Against this background, NbS are defined by IUCN (2020a) as

“actions to protect, sustainably manage, and restore the natural or modified ecosystem, which addresses societal challenges effectively and adaptively, simultaneously providing human wellbeing biodiversity benefits.”

The European Commission (2015) defined NbS as

“Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services.”

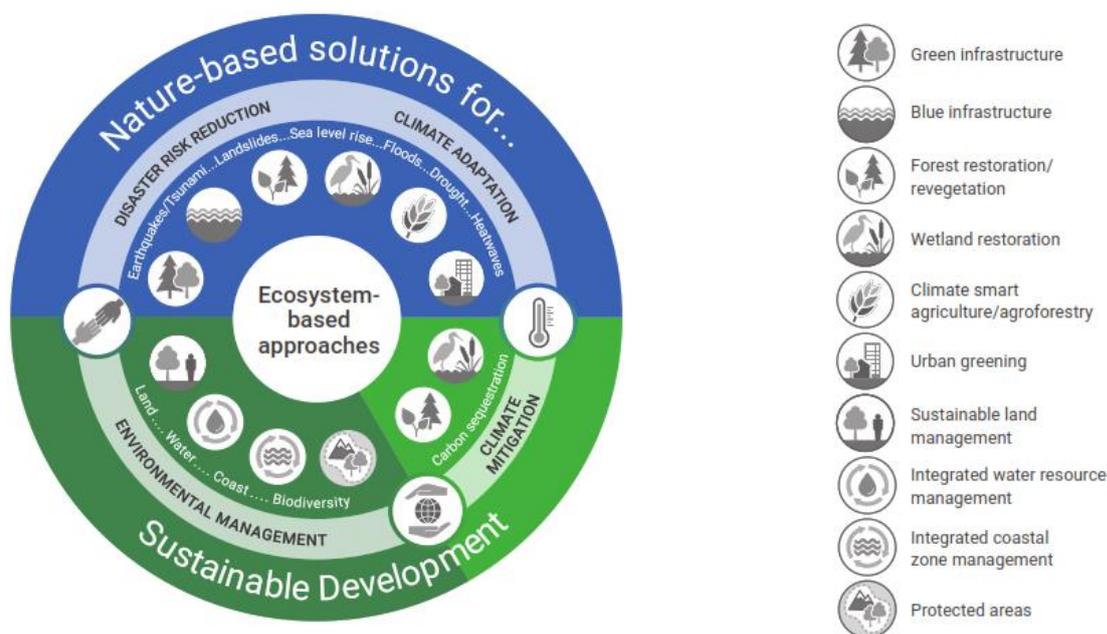


Figure 1: Breadth and benefits of NbS (from Partnership for Environment and Disaster Risk Reduction & Friends of EbA (2020))

Figure 1 illustrates the strong emphasis on NbS in the global discourse on addressing climate change in terms of both mitigation and adaptation, including disaster risk reduction. Despite increasing attention given to adaptation needs, mitigation of climate change is still publicly perceived as the most urgent environmental problem, which requires immediate action. However, there is a broad consensus that NbS equally benefit humans (at and across scales) and biodiversity – by addressing the main societal challenges. This includes progress towards green economies, green recovery after the COVID-19

pandemic, biodiversity conservation and other priorities. Thus, EbA is part of NbS, which as an umbrella term incorporates different purposes and contexts. Accordingly, AMS and other countries all have individual understandings and views of where NbS align and complement with national policies and action plans. Due to the breadth of the concept a concise and negotiated definition in the near future is highly unlikely. However, the definitions above generate a common understanding – for example reflected in the opening statement of the recent 15th World Forestry Congress and its Seoul Forest Declaration¹:

“We, the participants from 160 countries gathered in person and online at the 15th World Forestry Congress in Seoul, Republic of Korea, on 2–6 May 2022, assert that forests, forestry and forest stakeholders offer major nature-based solutions to climate change, biodiversity loss, land degradation, hunger and poverty, but we need to act now – there is no time to lose.”

It is widely agreed that NbS alone cannot solve the challenges related to climate change. Particularly concerning mitigation, they need to be accompanied by low emission development pathways in other sectors (industry, electricity, housing, traffic). In the landscape context, it is crucial to find a sound balance of measures to mitigate trade-offs while optimizing carbon sequestration and GHG emission mitigation potentials, and thereby contribute to the transformational change sought at the global level (figure 2). Given the time that governments and international processes such as the UNFCCC need to agree on, initiate and implement transition processes in these sectors, the implementation of NbS at scale can help to buy time while providing other important benefits.

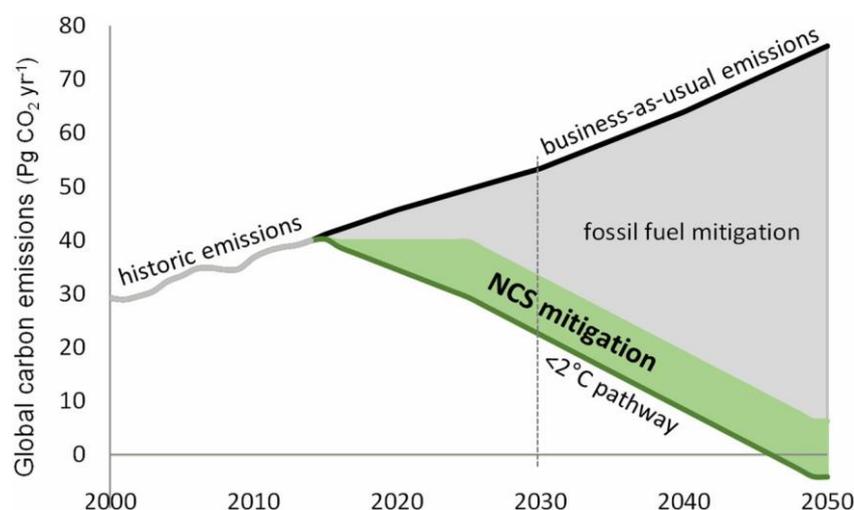


Figure 2: Potential global contribution of natural climate solutions to stabilizing global GHG emissions and the “below 2 °C” target (from Griscom et al., 2017).

With such a focus, Griscom et al. (2017) have structured 20 different NbS into three main categories – forests; agriculture and grasslands; and wetlands and peatlands – to assess the theoretical potential contribution of each NbS (Table 1). They focus on different landscape elements and promote effective conservation, rehabilitation / restoration, or sustainable management and use of ecosystems.

¹ <https://programme.wfc2021korea.org/en/>



Table 1: Nature-based (climate) solutions (adapted from Griscom et al., 2017)

Forests	Agriculture / grasslands	Wetlands / peatlands
<ul style="list-style-type: none"> • avoided deforestation and degradation (REDD+) • afforestation / reforestation (A/R) • (assisted) natural regeneration • improved forest management /SFM • improved plantation management • efficient firewood use • fire management 	<ul style="list-style-type: none"> • biochar • agroforestry systems • improved nutrient management • improved livestock and pasture management • conservation agriculture • improved rice management • avoided grassland conversion 	<ul style="list-style-type: none"> • rehabilitation of coastal areas (including mangroves) • peatland restoration • coastal protection • peatland protection

NbS have significant potential to mitigate emissions (Griscom et al., 2017) but also to reduce impacts of disasters (ECO-DRR), increase resilience and adaptive capacities, and enhance food and water security. However, despite broad consensus and wide recognition, these potentials are not yet being tapped and realized. For example, although mangroves are a natural defense that protects people from flooding, their protective ecosystem services are seldom accounted for (Beck et al., 2018).

Reasons include lack of policy integration (Cohen-Shacham, 2019), lack of access-to-finance and insufficient technical capacities. For example, concerning trees that are key for many NbS (restoration), there is an emphasis on site-adapted native tree species. However, there are often no viable business models for local landowners, or there are no functioning value chains for sustainable products within reasonable vicinity to the implementation areas (making transport costs prohibitively high), or countries have no cost-norms for suitable lesser-known native tree species (meaning that nurseries cannot supply the seedlings in the necessary amount and quality). Therefore, to tap the below-illustrated potentials as estimated by Griscom et al. (2017) the various technical, financial and political hurdles prevailing in the respective country context need to be addressed.

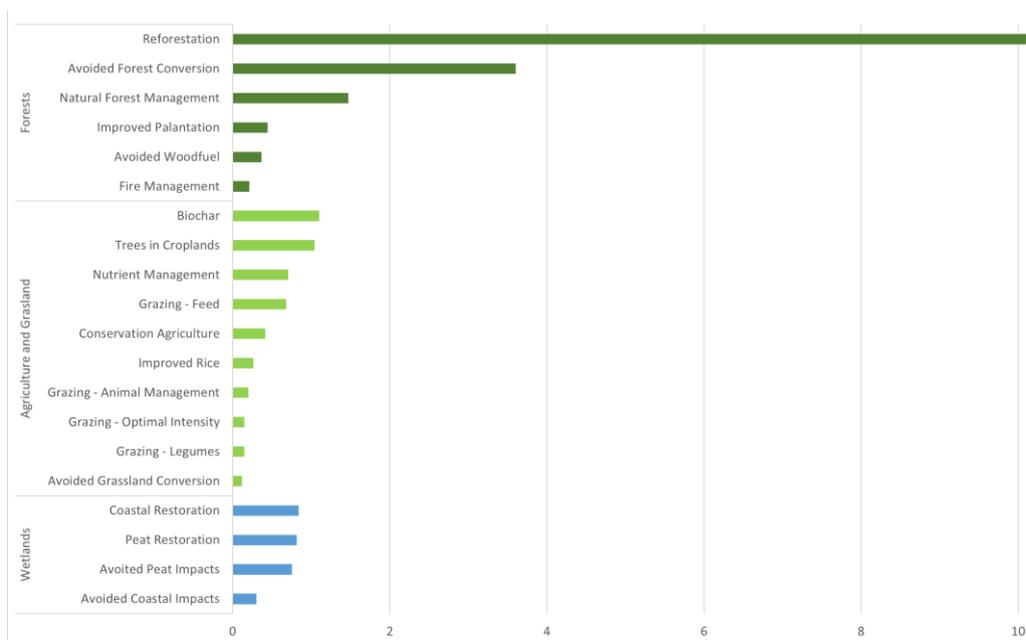


Figure 3: Theoretical global GHG mitigation potential of NbS until 2030 in PgCO₂e per yr. (adapted from Griscom et al. 2017).



IUCN has developed a global standard for NbS in order to avoid misuse of the concept and unintended negative consequences. This will help to ensure that NbS deliver on the full range of different environmental, social and economic benefits. The Global Standard is based on a self-assessment of eight criteria and 28 indicators. Guidance for users on the design of projects, upscaling, lessons learned and new projects is provided on IUCN's homepage².

3.2 Socio-economic costs and benefits, and the investor perspective

The implementation of NbS leads to a wide array of marketable and non-marketable ecosystem services, which accrue over different time spans and scales. Focusing only on direct and marketable ecosystem services leads to severe underestimation of the actual value of successfully implemented NbS.

For example, a large mangrove restoration enhances the protective functions of coastal forests for the local population – it serves as a wind shield and wave breaker, and thus as an effective means to prevent coastal erosion. Through the habitats they create, mangroves serve as breeding grounds for a large variety of fish and shrimp muscles that can enhance food security and diversify income opportunities of the usually poor rural population.

Beck et al. (2018) summarize the many benefits and point at a key challenge: the “protective benefits are often not fully accounted for in policy and management decisions, and mangroves continue to be lost.” Carbon projects or programs focusing on the restoration of mangroves could address this market failure by helping to sequester large amounts of GHG through their rapid growth and thereby providing a globally sought ecosystem service that can generate income.

This example could be complemented by many other NbS. They all have in common a diverse set of benefits – from increased agricultural yields, to avoided loss of soils and erosion, to improved water regulation, to global climate change mitigation. Assessing all relevant costs and benefits of NbS investments will illustrate those environmental gains, and they will also materialize in better economic outcomes and outweigh short-term costs for public entities. Though credibly determining all economic benefits is a challenge, robust estimations are feasible, especially when trade-offs in relation to accuracy are accepted (e.g., due to insufficient data availability) and if system boundaries and time frames can be clearly defined.

Modeling of all relevant economic ecosystem services allows for prioritizing NbS investments and planning at larger levels. Questions to ask include which ecosystem services should be prioritized, who should benefit and how, and when benefits will be realized? Does the farmer choose to improve agricultural productivity, to protect water resources, to avoid erosion, or some combination of these? Policymakers need to understand the costs of FLR as well as the multiple benefits: employment effects; tax and Gross Domestic Product (GDP) contribution; and indirect economic values – for example, the value of carbon sequestration and non-marketable ecosystem services such as avoided erosion and hydrological services.

The economic perspective can and should inform decision makers and institutions who focus on creating suitable enabling environments for NbS implementation. Their task is to remove obstacles, to integrate ecosystem services meaningfully into policies and action plans, and to translate policy targets for NbS into land use planning at all levels. For such decision makers it is key to consider the different stakes, trade-offs and risks of NbS. Economic impact assessments should make efforts to quantify all monetary and non-monetary benefits of NbS and compare these with the costs of inaction. Usually, the message of such assessments is clear and underlines the economic arguments: results will in many cases confirm that the benefits far outweigh the costs.

² <https://www.iucn.org/theme/nature-based-solutions/resources/iucn-global-standard-NbS>



The economic story, however, does not address how the different costs of implementation can be covered. The necessary investment will amount to billions of US\$ and require up-front funding. Additionally, economic returns remain a key element of the investment perspective, especially when public funding is insufficient, and governments seek private sector investments to reach their NbS targets.

Private sector investors interested in investing in NbS tend to have a much narrower (and pragmatic) perspective on costs and benefits than policymakers or NGOs promoting NbS. They also have different information needs in terms of specific impacts, risks related to returns, and cash-flow profiles. Investors need to understand the risks and weigh these against costs (capital and operating expenses) and returns from provisioning services. The aggregation of the costs is also relevant for policymakers, as this provides information about the investment needs.



4. Financial Instruments for NbS Implementation

NbS implementation requires significant financial investments, using different types of assets, capital and economic instruments. Annual investment requirements for global FLR targets and conservation reveal tremendous gaps that can only be closed if different instruments are bundled, efficiency gains are realized and new and additional sources tapped – especially from the private sector, as public funding will remain limited.

Considering NbS as long-term investments implies that there will also be significant and tangible financial returns, which optimally increase over time and extend to other stakeholders – including governments and other sectors, e.g., through GDP contributions, jobs, export commodities and eco-tourism. In line with such a perspective, Deutz et al. (2020) summarize the argument for promoting the use of NbS at scale as follows: “[...] our planet’s biodiversity and natural systems are essentially a capital stock (similar to financial, built, or human capital) that provides a flow of services to people.”

While there is little controversy about the synergies and benefits of NbS, the main question is how countries can attract the funding needed and ensure that different funding instruments are used in a manner that facilitates upscaling without dependence on public funding. After prioritizing NbS needs and priorities, countries should take stock and define strategies for mobilizing and streamlining different funding sources and financial instruments to cover the direct and indirect costs related to

- readiness finance
- up-front and implementation investments, including capital expenditures
- operating expenditures

NbS financing strategies for FLR can include different public and private funding sources and instruments. The most important sources are

- domestic funding, e.g., national budgets, payment for ecosystem services (PES) schemes, and redirecting and reforming harmful subsidies
- bilateral technical and financial cooperation, and multilateral funds
- different private sector sources and investments.

Generally, funding instruments and mixes can include grants, loans, green bonds, debt-for-nature swaps (UNDP, 2019), subsidies, equity, guarantees, buyer-agreements or PES. Key tasks for governments in the context of mobilizing finance for different purposes related to NbS implementation are to develop respective strategies, remove barriers – especially concerning private sector investments in sustainably produced commodities or through voluntary carbon markets – and structure different sources.

4.1 Domestic and regional funding

Based on the Sustainable Finance Initiative, the ASEAN financial sectors have made a strong commitment to ensure that their financial lending supports sustainable business activities in order to reduce impact on natural capital. Their commitment is supported by Switzerland’s State Secretariat for Economic Affairs (SECO) with the World Bank’s International Finance Corporation (IFC), by the UK’s International Climate Fund (ICF), and by international NGOs such as the World Wildlife Fund (WWF), World Resources Institute, and Climate Bonds Initiative among others.

The NbS-related activities in ASEAN are funded by various financial resources. Nine NbS projects are funded via bilateral technical and financial cooperation, multilateral funds, and private sectors (with three projects in each funding category). The national flagship programs in Indonesia and the Philippines are funded via domestic funding. Some programs are supported by blended funding where the initial activity was financed by donors and later, by private sectors.



Table 2: National and regional funding sources for NbS

Meloy Fund – Indonesia and Philippines
ASEAN Catalytic Green Finance Facility (ACGF)
Asia Pacific Climate Finance Fund (AClIFF)
Tropical Landscape Financing Facility
ADM Capital Foundation
People’s Survival Fund in the Philippines
Indonesia Climate Change Trust Fund
Singapore’s a Green Finance Action Plan, Sustainable Bond Grant Scheme

4.2 Bi- and multilateral development cooperation

Technical and financial development cooperation play an essential role in creating the enabling conditions for financing NbS as well as upscaling. This consists of supporting partner countries to create enabling institutional and regulatory frameworks that incentivize public and private investments (blended finance) in NbS; supporting capacity building and developing knowledge products; and designing and implementing suitable financial instruments and services.

GIZ for example has supported the mainstreaming of climate change adaptation in development planning through its 40 Ecosystem-based Adaptation (EbA) projects (IUCN, 2021b) (with EbA being considered one of the most important NbS approaches). Similarly, the Austrian Development Agency (ADA) is funding projects which help communities to identify measures that strengthen countries' climate resilience and EbA. The Agence Française de Développement (AFD) supported the IUCN in developing a new Global Standard for NbS (AFD, 2021).

Table 3: Bilateral funding sources for NbS

Source	Description
Austrian Development Agency (ADA)	Private Corporation owned by Federal Government
French Development Agency (AFD)	Public Industrial and Commercial Institution and Financial Institution
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	Private Corporation owned by Federal Government
KfW Development Bank	Development Bank
Luxembourg Agency for Development Cooperation (LuxDev)	Aid and Development Agency of the Government of Luxembourg
Netherlands Development Finance Company (FMO)	Dutch Development Bank (Private-sector International Financial Institution)
PROPARCO	Development Finance Institution

Until COP26 in Glasgow, NbS-related investments by multilateral bodies have been difficult to track as they may have fallen under different categories of investments (Swann et al., 2021). This is expected to change, as at COP26, a coalition of 10 multilateral development banks (MDBs) made a strong commitment to further mainstream nature into their policies, investments, and operations. They have committed to scaling up “nature positive” investments, aiming to halt and reverse nature loss: “As appropriate, we commit to support countries to secure high ambition for implementing NbS, across their relevant plans and strategies, including long-term strategies (LTS), NDCs, National Adaptation Plans



(NAPs), NBSAPs, and Land Degradation Neutrality (LDN) targets.” Particularly in the post-COVID recovery context, the MDBs see NbS related investments as mechanisms for creating low-skill and fast-implementing jobs — on average, between 7 and 40 jobs per \$1 million invested (UNFCCC, 2021a).

Furthermore, at COP26, the Federal Environment Ministry of Germany (BMU) announced the provision of an additional €10 m to the Adaptation Fund (AF) to support NbS implementation for climate change adaptation (IUCN, 2021a). As of 2018, the AF has invested up to US\$55 million in NbS, while the Green Climate Fund (GCF), International Fund for Agricultural Development (IFAD) and Global Environment Facility (GEF) have invested up to US\$460 million, US\$250 million and US\$180 million respectively (Swann et al., 2021). Table 4 presents the different multilateral funding sources for NbS.

Table 4: Different multilateral funding sources for NbS

Source	Character
Asian Development Bank (ADB)	Development Bank
Climate Investment Funds (CIF)	International Fund
European Investment Bank (EIB)	International Financial Institution
Global Environment Facility (GEF)	Multilateral Fund
Adaptation Fund (AF)	Multilateral Fund
Green Climate Fund (GCF)	Multilateral Fund
International Development Association (IDA)	Development Finance Institution
International Finance Corporation (IFC)	International Financial Institution
International Fund for Agricultural Development (IFAD)	International Financial Institution
Nature+ Accelerator Fund	The Nature+ Accelerator Fund combines the unique expertise of leading public and private institutions and platforms to address the conservation gap by attracting private finance to conservation.

4.3 Private sector funding for NbS: Investing in voluntary carbon projects for conservation or sustainable commodity production

The private sector is not a homogenous group. It consists of many organizations and individuals with very divergent motivations and expectations when investing in NbS. However, they have in common the desire to receive returns, which can take the form of social and environmental impacts or monetary returns on investments. Usually, return expectations concern both financial and other impacts. Philanthropic foundations for example tend to focus on social and environmental benefits; impact investors and development banks typically seek a good balance; and asset investors expect high financial returns in proportion to the risks.

NbS usually have a focus on either conservation, or on restoration and sustainable management. The focus has implications for the options available to different investors: if the aim is to establish sustainable production models for locally and internationally demanded commodities and respective value chains, the underlying business models can trigger the desired NbS investments. Prerequisites are a certain scale from the beginning, pre-existing market structures and technical assistance to address barriers. Generally, the outlook is positive as consumer awareness is increasing in many parts of the world, translating into increased demand for sustainable sourcing and a willingness to pay premiums.



In the past, many successful pilots have been established but have remained niche markets. Scaling proves difficult and takes time, especially where sustainable production competes with unsustainable and often subsidized business-as-usual practices. Here, additional finance through carbon payments can help make NbS business models more attractive and make investments “bankable” for investors.

For NbS related to conservation and environmental protection, the recent developments of voluntary carbon markets (VCM) represent even more opportunities to integrate private investors – provided governments pave the way for such investments and reduce investment hurdles.

4.3.1 Voluntary carbon markets – NbS funding source of the future?

Most existing compliance markets do not currently include NbS, even though some countries, including AMS, consider establishing compliance markets (e.g., Viet Nam) that may also include NbS. VCM and compliance markets are not connected but show the same trends, namely strong and lasting price trends, and growth in traded volumes. Many countries, including the AMS, are currently setting up domestic market schemes and could consider including NbS tailored to their priorities for the land use sector. Until such options arise, the focus for NbS remains the VCM.

In contrast to existing and emerging compliance carbon markets, VCM are still small niche markets. However, since 2019, they have become a true success story, and thus receive much interest by host countries and implementing agencies on the one hand, and potential investors on the other hand. VCM projects are predominantly used by unregulated private sector entities who want to invest in mitigation projects to compensate their unavoidable emissions.

Fueled by the net-zero target of many large corporates, demand for voluntary credits and prices is increasing rapidly: VCM had a total volume of US\$320 m in 2019, which grew to US\$ 487 m in 2020 and, by end of August 2021, was already US\$748 m (Donfrio et al., 2021). Prices per unit have been rising accordingly. Until 2019, most transactions were priced at between US\$3 and \$5 per tCO₂e, which is not sufficient to finance NbS projects. REDD projects currently receive an average of ca. US\$5, and A/R projects between US\$8 and \$10 per tCO₂e – with large variance. For the future, experts currently consider a fair minimum price to be between US\$15 and \$25 per CO₂e, with the High-Level Commission on Carbon Prices even citing prices between US\$50 and \$100 per tCO₂e by 2030 (High-Level Commission on Carbon Prices 2017). This would be in line with prices currently paid, for example, in the EU compliance emission trading scheme. In VCM, NbS are the most important project category – even ahead of renewable energy projects. A key reason for buyers to pay higher prices for NbS is their demand for climate change mitigation projects with significant and evident social and ecological benefits, which NbS can deliver more effectively than any other project type. Often, compliance markets are supported by regulatory measures such as price floors. In contrast, VCM are not regulated.

Transactions are based on voluntary demand and buyers who agree on different mitigation approaches. In the absence of regulation, different certification schemes and standards have emerged to ensure transparency about performance and results, minimize social and environmental risks and thereby give confidence to investors. In the unregulated VCM, standards are therefore indispensable for buyers and investors to ensure the quality of their projects and the resulting certificates. Methodologies for certifying most NbS are available (table 5).

Table 5: Overview on certifiability of NbS voluntary carbon projects through Verra's VCS or GoldStandard (adapted from Schwarz et al., 2020)

		VCS	GoldStandard
forests	afforestation / reforestation (A/R)		
	avoided deforestation and degradation (REDD+)		
	improved forest management /SFM		
	improved plantation management		
	efficient firewood use		
	fire management	Africa	
agriculture / grasslands	Biochar		
	agroforestry		
	Improved nutrient management		
	improved livestock and pasture management		
	conservation agriculture		
	improved rice management		
	avoided grassland conversion		
Wetlands / peatlands	rehabilitation of coastal areas (incl. mangroves)		
	peatland restoration		
	coastal protection		
	peatland protection		

Legend:

	<i>no existing methods</i>
	<i>methods available but restricted to regions or activities</i>
	<i>methods available, applicable worldwide</i>

Given positive outcomes of UNFCCC COP26 in relation to Article 6, the conclusion of the rule book on the implementation of the Paris Agreement, and the large demand for and limited supply of NbS, experts expect the following trends:

- Due to consumer awareness and corporate responsibility, many companies in Europe and the USA are increasingly introducing internal CO₂ pricing schemes in their value chains. Rapid changes to operations are not possible, and to meet internal voluntary targets they need to identify compensation opportunities.
- More buyers will enter the market to meet their voluntary commitments. Some sectors may also be covered compliance markets.
- Prices for NbS certificates are likely to further increase, at least as long as demand keeps growing while the supply remains limited.
- Higher certificate prices accelerate the development of more NbS projects, and co-benefits may receive more attention – especially if monitored through respective impact monitoring systems.



- Large companies with high emissions will invest in their own carbon projects to maintain control over reputational risks and costs, if they find suitable investment opportunities.

The growth trend is expected to also develop positively in the future, especially after the UNFCCC COP26 which agreed on key questions related to ensuring the integrity of carbon markets and avoiding double counting of emission reductions.

4.3.2 Voluntary carbon market examples in AMS

In AMS, the implementation of NbS approaches varies according to objectives, strategy, funding availability, and other factors, such as political situation. Some NbS related projects are initiated as part of national strategy and commitment to reduce emissions from deforestation and forest degradation as mentioned in the NDCs of AMS. On the other hand, few initiatives are private investments seeking revenue through the VCM.

AMS have been able to take advantage of the increasing demand for natural capital markets and the current international climate change regime under the UNFCCC to attract and generate moneys from different funding mechanisms, including GCF and carbon trading. Both government and private sectors are motivated to initiate various NbS projects in the region ranging from ecosystem restoration to ecosystem protection, such as REDD.

To successfully implement the initiatives, project proponents collaborate with various stakeholders, including development agencies, international research institutions, NGOs and local communities. Rigorous procedures are followed to ensure that the activities can be certified by global standards, such as Verified Carbon Standards (VCS) and Climate, Community and Biodiversity Standards (CCBA) (Verra, 2021e). Among NbS projects that have generated carbon credits in AMS are the Keo Siema REDD+ project in Cambodia

The Keo Siema REDD+ project demonstrates best practices of NbS activities in ASEAN countries evidenced in strong stakeholder collaboration in generating financial benefits through VCM while protecting natural ecosystems and providing livelihoods for local communities. It is an excellent example of NbS implementation in the region where Keo Siema REDD+ is a government-driven initiative that could be shared for lesson learn for other ASEAN Member States.

Example : Keo Seima REDD+, protecting tropical forests and generating carbon credits in Cambodia

The Keo Seima Wildlife Sanctuary (KSWs), located in eastern Cambodia, covers 292,690 hectares of forest. The forest is a key source of income and central spiritual beliefs for local communities and a crucial habitat for the survival of many species typical of lowland deciduous forests (WCS, 2021). KSWs has been under threat from various drivers of deforestation, including forest clearance for agriculture and unsustainable resource extraction, such as hunting, logging and fishing.

In 2009, the Ministry of Environment (formerly by the Forestry Administration) of the Royal Government of Cambodia with support from Wildlife Conservation Society (WCS) developed a REDD+ project with the objectives to both conserve and restore the biodiversity values and to protect the livelihoods of local people (Verra, 2021f).

Supported by USAID and implemented by the Ministry of Environment together with WCS, the project has established partnerships with different stakeholders. The Keo Siema REDD+ project in Cambodia is one among a number of NbS projects using a blended financial mechanism, which is initially funded by USAID and later via the sale of carbon credits for conserving forests and improving livelihoods of communities living in surrounding project areas. The project has had a positive impact on ecosystems and communities and has provided lessons for further application (Table 6).



The Keo Seima REDD+ project is among the successful NbS approaches to implementation in Southeast Asia. In addition to protecting the forest and benefiting communities, the project has generated significant funding from the sale of carbon credits (Khmer Times, 2021). It is considered to provide additional benefits with the expansion of project areas and strong support from governments in conserving forests and improving livelihoods of local communities.

Table 6: REDD+ voluntary carbon market projects in Cambodia

Keo Seima REDD+, Protecting tropical forests and generating carbon credits in Cambodia	
Aim	To conserve and restore the biodiversity values and to protect the livelihoods of local people.
Impacts	<p>Basic needs and traditional cultural identity were protected for over 2,500 households (approximately 12,500 people) within the 20 participating villages (Natural Capital Partners, 2021).</p> <p>Tenure rights were strengthened through legal and planning support for indigenous communal land titling (ICT), participatory land-use planning (PLUP), and land-use agreements.</p> <p>The project has supported alternative income generation and skill development opportunities. Trainings were provided to improve local farmer capacity on agricultural extension services, communication technology investments and finance.</p> <p>Infrastructure, including bridges, water systems consisting of piped water supply and pump wells, and storage irrigation, was built.</p> <p>Several livelihood activities were initiated, including the establishment of an ecotourism enterprise, community savings groups, and market garden developments.</p> <p>The project has conserved forest landscape for critically important endangered species, such as Asian elephant, Yellow-cheeked Crested Gibbon, Guar, and Green Peafowl (WCS, 2021).</p> <p>In addition to protecting the forests and community benefits, the project has generated significant funding through carbon credits.</p>
Lessons learned	<p>Effective stakeholder collaboration and implementing all project planning and strategic actions were critical to project success.</p> <p>Although the project-implementation period thus far has been relatively short, the project has improved local community livelihoods and provided protection to the forests.</p>
Financial mechanism	USAID funded program



4.3.3 Jurisdictional and national REDD+ in carbon markets

For a number of good reasons, REDD+ has been designed and negotiated under the UNFCCC as a jurisdictional or national approach, for example to keep leakage risks to a minimum. Results-based payments have only been made available through the Carbon Fund under the Forest Carbon Partnership facility (FCPF), bilateral agreements with Norway, and to a limited extent under the GCF and Germany's REDD Early Mover program. The idea of a mechanism REDD+ was abolished prior to the Paris agreement – after 10 yrs. of negotiations between 2005 and 2015 the implementation of REDD+ builds on the Warsaw Framework for REDD+, and article 5.2 of the Paris agreement which names the five (partly undefined) REDD+ activities.

However, there is still a clear need for jurisdictional approaches with results-based finance for measurable, reportable and verifiable emission reductions from reduced deforestation and forest degradation. Against this background, the Architecture for REDD+ Transactions (ART) has been developed. It seeks to develop jurisdictional or even national programs for REDD+ emission reductions and removals, thereby to leverage significant new finance for REDD+ implementation (ART, 2021). For this purpose, ART has developed and introduced the REDD+ Environmental Excellence Standard (TREES), which covers all elements as agreed under the Warsaw Framework for REDD+ and rules for the verification of emission reductions, registration, and issuance of TREES credits.

TREES credits have the ambition to be “real, measured, permanent, additional, net of leakage, verified by an accredited independent third party”, and to rule out double-counting (Winrock 2021). Governments and jurisdictions can apply through submitting concept notes. If the current demand of corporates for credits to achieve their net-zero targets continues to increase, ART TREES may become a key opportunity for governments implementing REDD+.



5. The Role of NbS in ASEAN countries

5.1 The ASEAN policy framework for NbS

In response to the development of NbS, ASEAN has taken steps to provide an overview and initiate a framework that can synergize with the issues and needs in the region. Thus, ASEAN Green Initiative (AGI) was launched by the ASEAN Centre for Biodiversity (ACB) together with the ASEAN Secretariat (ASEC) during the 54th anniversary of ASEAN on 8 August 2021. The AGI objective is to set standards for restoring mangroves and different forests, contributing to community livelihood improvement, and strengthening regional resilience to climate change impacts. It can facilitate various activities to promote conservation ecosystems, preventing desertification, halting biodiversity loss, and reducing land degradation caused by various human interventions and climate change.

On agriculture and forestry cooperation, the ASEAN Economic Community (AEC) Blueprint provides a regional policy framework for increasing resilience to climate change and natural disaster and promoting sustainable forest management. ASEAN has a Vision and Strategic Plan for Food, Agriculture and Forestry /FAF) (2016–2025). The roadmap can be used as a basis to establish the Natural Capital Platform, which will serve as a multi-stakeholder coordination mechanism, facilitating regional activities related to nature conservation and investment carried out by relevant government agencies, the private sector, and civil society. It is expected that the Platform will work under the guidance of the ASEC (Environment Division), ACB, ASEAN Working Group on Nature Conservation and Biodiversity (AWGNCB), and other relevant ASEAN working groups.

On agriculture and forestry cooperation, ASEAN has a Vision and Strategic Plan for Food, Agriculture and Forestry /FAF) (2016–2025). While a specific direction on NbS has not been developed, the vision and strategic plan and other existing frameworks can provide a basis for initiatives and activities related to the implementation of NbS approaches relating to conservation ecosystems, forestry, and climate change. These include the working groups, such as the ASEAN working group on forest and climate change, ASEAN working group on social forestry, and other working groups under the guidance of ASEC (Food, Agriculture and Forestry Division).

Also, the Multi-Sectoral Framework for Climate Change, Agriculture and Forestry towards Food and Nutrition Security and Achievement of SDGs under the Ad Hoc Steering Committee on Climate Change and Food Security (AHSC-CCFS) provides ASEAN Secretariat with a framework for exchanging and harmonizing NbS programs of ASEAN bodies within the ASEAN Socio-Cultural Community and the ASEAN Economic Community.

Within international fora, ASEAN has strong support for the use of NbS approaches to address climate change. The ASEAN joint statement on climate change at COP26 highlighted the importance of promoting sustainable management of forests, including through the implementation of UNFCCC decisions on REDD+ under the guidance of the Warsaw Framework, as well as enhancing biodiversity conservation, protection, and restoration of various terrestrial, coastal and marine ecosystems. At this event, ASEAN took opportunities to urge the international community to improve its adaptation efforts by implementing, among others, NbS and ecosystem-based approaches, focusing on protecting the livelihoods and health of vulnerable groups. Likewise, AMS have highlighted the important role of AFOLU in their NDCs submitted to this event.

The ASEAN Comprehensive Recovery Framework (ACRF) provides opportunities for the region to facilitate activities related to alleviating current severe conditions caused by the COVID-19 pandemic. Under this framework, any action or initiative prioritizes achieving sustainability in ASEAN in all spheres, including agriculture, green infrastructure, and disaster management.

To expand the existing regional frameworks for adopting NbS approaches, the current mechanisms under the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) provide a basis for strengthening ASEAN's capabilities to prevent, mitigate, and manage climate-related disasters. Furthermore, another option, the ASEAN One Response Declaration and the ASEAN



Declaration on Strengthening Adaptation to Drought, and mainstreaming Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) in the implementation of the AADMER Work Program 2021–2025 can be related to NbS measures, particularly DRR.

To support the action, ASEAN can leverage existing platforms, including the ASEAN Green Recovery Platform to bring together various financing and development partners to help AMS in accelerating the development of green infrastructure and promoting a green recovery from the COVID-19 pandemic. Partnerships will support the ASEAN Catalytic Green Finance Facility, a regional facility created by AMS and the Asian Development Bank (ADB) (ADB, 2021). The platform managed by the ADB aims to mobilize additional funding for low-carbon and climate-resilient infrastructure projects in ASEAN.

5.2 Role of NbS in the policies of ASEAN countries

AMS have endorsed and recently revised their national policy frameworks for land use sectors. A detailed analysis of these is beyond the scope of this study. However, some policies can serve as blueprints for other countries with similar strategies and circumstances. The same holds true for best practice examples, and ASEAN can play an important role in facilitating exchanges on experiences made, and lessons learnt.

5.2.1 International NbS commitments: NDCs and NBSAPs of ASEAN countries

The NDCs and NBSAPs will play a key role in NbS implementation in ASEAN. Our review has shown that in the Mitigation section of the NDCs, every country except the Philippines and Thailand highlighted the role of NbS, with Singapore and Malaysia mentioning it directly. For the rest of the countries, the importance of NbS in the land-use sector was emphasized, e.g., through mentions of restoration of forest and peatlands, conservation agriculture, agroforestry, and the restoration and conservation of indigenous wildlife. It can also be noted that while the Philippines and Thailand did not highlight the role of NbS, they may still have national programs in place that utilize NbS in climate change mitigation. However, since the NDCs are concise, they seldom detail the potential role of NbS in climate mitigation efforts.

In the Adaptation section of the NDCs, no country failed to mention NbS, with the majority (Brunei Darussalam, Malaysia, Myanmar, Lao PDR, Singapore, Thailand and Viet Nam) mentioning it directly. Indirect mentions of NbS included integrated management of water and agricultural resources; restoration/rehabilitation/protection/conservation of biodiversity, habitats, forests and peatlands; coastal restoration; and greening urban spaces. Finally, in their NBSAPs, all countries mentioned NbS methods to preserve or improve biodiversity, although Cambodia was the only one to mention the ecosystem approach under the strategic objectives. The indirect mentions of NbS were diverse, from conservation and restoration of ecosystems (forest, mangrove, marine, etc.), to integrated and sustainable management of resources, to species conservation and protection.



Table 7: Direct (green) and indirect (yellow) mentions of NbS in the NDCs and NBSAPs of ASEAN Member States (no mention: red)

	NDC (international climate commitments)		NBSAP (international biodiversity commitments)
	Mitigation	Adaptation	
Brunei Darussalam	No direct mentions of NbS One indirect mention of NbS: afforestation and reforestation to increase forest cover.	One direct mention of NbS as a way to increase resilience. One indirect mention of NbS, in the context of coastal restoration projects for flood mitigation.	No direct mentions. Indirect mentions, e.g.: reservation of forest and marine areas, protection, conservation, sustainable harvesting, rehabilitation of degraded ecosystems, adaptive management, ecological strategies, and reforestation.
Cambodia	No direct mentions of NbS Several indirect mentions, e.g.: conservation agriculture, improved monitoring of resources and land use, sustainable forest management, reduced deforestation.	No direct mentions of NbS Several indirect mentions, e.g.: Effective management and protection of ecological systems, standardized green spaces for urban planning, biodiversity conservation, integrated water management planning.	Direct mentions of the ecosystem approach. Indirect mentions, e.g.: adaptive management, protection and conservation areas, restoration/rehabilitation of degraded ecosystems, conservation, sustainable management, restoration of agroecosystems + mangrove ecosystems, community-based nat. res. management.
Indonesia	No direct mention of NbS. Few indirect mentions, e.g.: restoration of peatlands, rehabilitation of degraded forest land.	A few indirect mentions, e.g.: conservation areas, restoration of degraded lands and wetlands.	No direct mentions. Indirect mentions, e.g.: appropriate management, preservation, sustainable utilization, conservation (areas), restoration, recovery.
Lao PDR	No direct mention of NbS Several indirect mentions, e.g.: reduced deforestation and forest degradation, conservation, sustainable management.	Several direct mentions of NbS and ecosystem-based adaptation. Several indirect mentions, e.g.: climate resilient farming systems, protected areas, integrated land-use planning, and green infrastructure.	No direct mentions. Some indirect mentions, e.g.: conservation, environmentally sound production and consumption, sustainable management, rehabilitation, protection, integrated management.
Malaysia	No distinction is made between mitigation and adaptation. Several direct mentions of NbS in the context of wetland rehabilitation and coastal resilience. Indirect mentions of NbS, e.g.: rehabilitation and protection programs, green-gray infrastructures, conservation, integrated management (agricultural and water resources), and coastal protection.		No direct mentions. Some indirect mentions, e.g.: biodiversity conservation embedded into land-use plans, safeguarding of key ecosystems.



Myanmar	<p>No direct mention of NbS</p> <p>Several indirect mentions, e.g.: agroforestry for climate resilience, adaptive crop development, reserved and protected forests, protected area systems.</p>	<p>Several direct mentions of NbS and EbA.</p> <p>Several indirect mentions, eg.: conservation agriculture, integrated soil and water conservation, integrated management, resilience-enhancing natural resource management, conservation and restoration.</p>	<p>No direct mentions.</p> <p>Few indirect mentions, e.g.: sustainable management, conservation, safeguarding ecosystems.</p>
Philippines	<p>No mention of NbS.</p>	<p>A few indirect mentions, e.g.: forest protection, restoration, reforestation and conservation.</p>	<p>No direct mentions.</p> <p>Indirect mentions, e.g.: restoration, conservation (management), green infrastructure, sustainable agriculture.</p>
Singapore	<p>No distinction is made between mitigation and adaptation. One direct mention of NbS in the context of coastal protection measures.</p> <p>A few indirect mentions, e.g.: conservation of more native plants and animals by carrying out recovery plans, enhancing forest, marine and coastal habitats, Integrated Urban Coastal Management (IUCM), adaptive tree management, conservation of native species, forests and habitats.</p>		<p>No direct mentions.</p> <p>Several indirect mentions, e.g.: species conservation, recovery programs, rehabilitation, green corridors, ex-situ conservation, integrated management.</p>
Thailand	<p>No mention of NbS.</p>	<p>One direct mention of EbA</p> <p>Indirect mentions, e.g.: integrated water resource management, conservation, rehabilitation.</p>	<p>No direct mentions.</p> <p>Several indirect mentions, e.g.: conservation, restoration, sustainable utilization, in-situ and ex-situ conservation, integrated management.</p>
Viet Nam	<p>No direct mentions of NbS.</p> <p>Several indirect mentions, e.g.: protection and conservation of forests, restoring protected forests, regeneration, land conservation.</p>	<p>Direct mention of NbS and EbA.</p> <p>Few indirect mentions, e.g.: integrated natural resources management plan, restoration of mangroves and coastal protection.</p>	<p>No direct mentions.</p> <p>Several indirect mentions, e.g.: protection, restoration, conservation, biodiversity corridors, regeneration.</p>



5.2.2 Best practice examples of national policy frameworks related to NbS

In recent years, AMS have issued and endorsed many policies, regulations and strategies to address current ecosystem degradation and the diversity of climate change impacts (Annex 1). These policies and strategies are mainstreamed into planning and decision-making at all levels of government and in all sectors, including forestry, agriculture and environment.

For example, Myanmar has implemented the new National Environmental Policy, which provides long-term, strategic guidance for achieving sustainable development (UNDP, 2021a). This policy confirms that environmental protection continues to be a main objective in Myanmar's sustainable development pathway. The National Environment Strategy and Action Plan, 2016–2023 (NESAP) of Cambodia outlines that environmental protection and sustainable natural resource management are the pillars of the country's socio-economic development (ADB, 2018). The NESAP provides guidance and a roadmap for synergizing and improving the governance and programs/initiatives to manage the environment and natural resources in the country.

Viet Nam has revised its Forestry Law, its Biodiversity Law, the Forestry Sector Development Strategy 2021–2030 with a vision until 2050 – to name but a few important policies. They are specified and complemented by a notable number of bylaws and decisions, all streamlining the policy framework for the land use sector and making use of existing mechanisms such as the successful Payment for Forest Ecosystem Services scheme and new opportunities to translate the policy objectives into action on the ground.

Some AMS have devised policy frameworks to include NbS measures directly and indirectly into their national strategies. Brunei Darussalam considers NbS among options to increase resilience against climate change into the medium- to long-term adaptation vision, strategies and/or plans of NDCs, which is outlined in the National Climate Change Policy (ASEAN, 2021). Recently, Viet Nam has issued the Viet Nam Forestry Department Strategy for the 2021–2030 period, with a vision to 2050 (MoARD, 2021). The strategy maintains the important role of forests in socio-economic development, mitigating natural disasters, responding to climate change, and preserving natural resources and biological diversity. Similarly, Malaysia has launched the new Malaysian Forestry Policy to address issues around forestry and conservation and protection of biodiversity (FRIM, 2021). The policy covers sustainable forest management, conservation and protection of biodiversity, and climate change mitigation and adaptation.

To accelerate efforts in addressing natural resources degradation and climate change issues, some AMS provide policies that also harmonize various related regulations and synergize different sectoral governances and initiatives. Indonesia has used the Social Forestry Program (SFP) to tackle complex cross-sectoral issues within its specific national context. Thailand developed the Climate Change Master Plan as a framework for all sectors to formulate an implementation plan for achieving sustainable low-carbon growth and addressing various issues related to climate change by 2050.

Policy framework for implementing climate change strategy in Thailand

The Climate Change Master Plan (CCMP) 2015–2050 is among important national policies to address climate change issues in Thailand. The CCMP aims at mainstreaming climate resilience into development planning at all levels, reducing GHG emissions and establishing policy instruments to encourage sustainable and low-carbon development (ONEP, 2019).

It consists of three key strategies:

- 1) climate change adaptation,
- 2) mitigation and low-carbon development, and
- 3) enabling environment for climate change management.



It was the country's first comprehensive, long-term strategic framework to address climate change. The CCMP provides a vision for a low-carbon, climate-resilient development pathway in line with the country's economic and socio-cultural contexts, as well as a 'sufficiency economy' philosophy and sustainable development agenda (UNDP, 2020).

The advantage of the CCMP is that it was designed to provide frameworks for all sectors in order to create an implementation plan for achieving sustainable low-carbon growth by 2050. The CCMP provides guidance for other initiatives and strategic plans related to tackling climate change, including the use of NbS-related measures. It focuses on the development of supporting mechanisms for tackling climate change, including adaptation, mitigation, low-carbon development, capacity building and coordination among government agencies (ONEP, 2019). The CCMP specified measures and categorized the objectives into three groups, (1) short-term targets (to 2016), (2) medium-term targets (to 2020) and (3) long-term targets (to be achieved over the period 2020–2050).

The CCMP provides guidance for national climate change responses and is used by relevant agencies to formulate specific sectoral plans to address climate change. It can facilitate an inter-ministerial, cross-sectoral group mechanisms to coordinate all governmental actors that already work on climate change related issues, including the forestry and agriculture sectors. All strategic plans for sectors related to climate should be aligned to the CCMP. For example, the Agriculture Strategic Plan on Climate Change (ASPC) (2017–2021) – which guides adaptation and provides a synthesis of knowledge on the impacts of climate change on agricultural sectors – was developed and updated in accordance with the CCMP (FAO, 2021).

On forestry related-issues, the CCMP has enabled the government to provide guidance on the adoption on NbS related measures. For example, although few activities related to REDD+ have been carried out in Thailand, the CCMP expects that the REDD+ mechanism would be a potential means whereby the country could promote forest conservation and enhancement of carbon stocks in the forest sector, which is one of the major strategies in climate change mitigation (ONEP, 2015). The CCMP clearly specifies that the strategy for climate adaptation in the sector of natural resource management utilizes actions and measures such as REDD+ for ecosystem protection. Furthermore, it provides a basis for a multi-sectoral approach to implementing REDD+ considering that the drivers of deforestation and forest degradation often lie outside the forestry sector (UNFCCC, 2021b).

As the key policy framework to address the cross-cutting climate change issue, the CCMP accommodates the existing policies of all sectors. Thus, the provisions of sectoral policies are still implemented within each sector, and only the cross-cutting issue of climate change needs to be aligned with the CCMP. It is important to note that the CCMP was used as framework to develop sectoral inputs for the country's INDC and NDC submitted both to COP21 in Paris and to the recent COP26 in Glasgow (ONEP, 2019; FAO, 2021).



Figure 4: Coastal area and forests of Koh Chang, Thailand



5.3 NbS examples and lessons learned in AMS

ASEAN is one of the most biodiversity rich regions on the planet and is home to many threatened and endangered species, as well as different ecosystems. It comprises 5% of the world's forests and one-third of the world's coastal and marine habitats (FAO, 2021). However, its natural resources, both terrestrial and coastal ecosystems, are under pressure due to the growing population, increased demand for goods and services, and the extension of agricultural lands into forests and other ecologically sensitive areas. In some ASEAN Member States (AMS), increasing deforestations have driven the loss of habitats, overexploitation, and degradation.

To address ecosystem degradation and climate change, ASEAN has implemented NbS related approaches to protect and restore ecosystems while simultaneously providing livelihoods for communities and biodiversity co-benefits. Various NbS approaches, including ecosystem restoration and FLR, are used to protect peatland areas and increase forest cover in some ASEAN countries. Forest-based NbS approaches are vital as a climate adaptation strategy in Cambodia, Lao PDR and Myanmar, while Indonesia and Viet Nam have a clear focus on the NbS approach as a climate change mitigation solution. In addition to using the FLR approach, some other AMS, including Thailand, have implemented integrated coastal zone management and integrated water resources management to improve coastal ecosystems and the livelihoods of local communities living in surrounding areas. Additionally, ecosystem protection approaches are implemented in Greater Mekong countries as part of their national strategies to reduce deforestation.

Some AMS, such as the Philippines and Viet Nam have used NbS related approaches to restore degraded lands. Different NbS approaches have been implemented in Indonesia, including infrastructure-related approaches, such as combining natural and engineered systems for mangrove restoration. The construction of permeable dams and sea walls has proven successful in reducing coastal erosion while providing alternative livelihoods for local people.

5.3.1 Enhancing climate change resilience of rural communities living in Cambodia's protected areas

The Community Protected Areas (CPAs) of Beungper Wildlife Sanctuary, Phnom Prech Wildlife Sanctuary, and Phnom Kulen National Park in Cambodia are important for communities living in and dependent on these forests. Currently, these areas are under threat from different drivers of deforestation, including unrestricted grazing by livestock, unmanaged fishing, illegal logging, and degradation and disturbance resulting from human activities (WWF, 2021).

In 2013, the Ministry of Environment (MoE) of the Royal Government of Cambodia with support from the United Nations Environment Programme (UNEP), proposed a project "Enhancing Climate Change Resilience of Rural Communities living in Protected Areas in Cambodia". The project objectives are to restore the degraded CPA forests and improve local community livelihoods by growing a variety of plants around the rice paddies to increase vegetation yields and to install irrigation systems (Adaptation Fund, 2021). It has provided benefits directly to local communities, ranging from the infrastructure construction to capacity development (UNEP, 2019).

Additional information on the impacts is presented in Table 8. Among lessons learned from the project is that continuous stakeholder consultations ensure continued support for the project. Further information on lessons learned and financial mechanisms is presented in Annex 2.



Table 8: The objective and impacts of enhancing climate change resilience of rural communities living in protected areas of Cambodia

Title	Enhancing Climate Change Resilience of Rural Communities Living in Protected Areas of Cambodia
Aim	To restore the degraded CPA forests and improve local community livelihoods by growing a variety of plants around the rice paddies to increase vegetation yields, and by installing irrigation systems.
Impacts	<p>Infrastructure development and capacity building for local communities.</p> <p>>500 households trained in alternative income generation, including chicken and cricket breeding, ecotourism, and home garden vegetable production.</p> <p>Improved rice harvests.</p> <p>Pumping wells and tankers built for collecting rainwater benefiting 1,900 households.</p> <p>The forest restored with multi-use native tree species provides food, erosion control, timber, medicine, and fruit.</p> <p>The planted trees alongside 2,200 hectares of rice paddies have contributed to reducing erosion and enhancing soil productivity.</p>

5.3.2 Alleviating community poverty and improving ecosystem health through agroforestry in Lao PDR

The agricultural lands across Huay Hai, Huay Phet, Nam Sang and Sonephansay villages in central Laos' Pakkading District were degraded from slash and burn activities in the past. Natural forests within these areas have been absent since 1989 (Southpole, 20210). Such deforestation has caused severe soil erosion followed by pollution of nearby water bodies. To restore these lands and improve local community livelihoods, a rubber company, Lao Thai Hua Rubber Co. Ltd, has proposed implementing an agroforestry approach by planting rubber trees (Verra, 2021a). The project has provided benefits for local communities and environment through direct employment and capacity development, such as agricultural trainings (Verra, 2021b).

Additional information on the objective and impacts is presented in Table 9. A key lesson learned from the project is that it is important to have active participation of local communities in the project from the planning phase through to implementation. Further information on lessons learned and financial mechanisms is presented in Annex 2.

Table 9: The objective and impacts of agroforestry in Lao PDR

Title	Alleviating poverty and improving ecosystem health through agroforestry in Lao PDR
Aim	To restore degraded lands by planting rubber trees and to have a direct impact on social and economic development by creating sustainable livelihoods and other development benefits for these communities.
Impacts	<p>Employment and capacity development for local communities.</p> <p>Income for local communities through 1) cash paid upfront for leased land, and 2) agricultural commodities planted amongst the trees as part of the agroforestry system.</p>



Improved infrastructure in the area to provide economic accessibility for the project and farmers' agricultural lands.

The agroforestry system includes protected ecosystems and improved biodiversity. The project has helped to mitigate flood risks, kept soil healthy, and promoted biological diversity. Streams and riverbanks have been protected to regenerate naturally, which will improve habitats and subsequently increase climate resilience.

5.3.3 The Southern Cardamom Reduced emissions from deforestation and forest degradation (SCRP), Cambodia

The Southern Cardamom National Park and Tatai Wildlife Sanctuary in Cambodia is one of the 200 most important locations for biodiversity conservation on earth. Comprising of 445,339 hectares, the landscape is important habitat for several species of IUCN threatened birds, mammals, and reptiles, and identified by the Royal Government of Cambodia as an opportunity for tiger reintroduction (Wildlife Alliance, 2021). The watershed is important for the fisheries for Thailand, Cambodia, and Viet Nam and supports the regulation of climate for the Southeast Asian peninsula. However, in recent years, the landscape has been under intense pressure from uncontrolled small-scale land conversion of forest to agricultural land by migrants and conversion to agro-industrial plantations by the private sector. Such driver of deforestation has threatened the ecosystem of the Southern Cardamom region and livelihood of local communities depending on the landscape.

To address this issue, in 2017, the Ministry of Environment of the Royal Government of Cambodia in partnership with Wildlife Alliance decided to create the Southern Cardamom reducing emissions from deforestation and forest degradation project (SCRP). Two important project activities are agricultural intensification and community-based ecotourism. During implementation, the project has provided direct benefits to communities. These include providing jobs for local community for patrolling of the project areas as well as by providing additional project activities to the communities that are designed to mitigate the drivers of deforestation. Additionally, the project has support securing long-term tenure rights for forest-dependent communities and improving rural livelihoods (Verra, 2021c). Additional information on the objective and impacts is presented in Table 10. Further information on lessons learned and financial mechanisms is presented in Annex 2.

Table 10: The Southern Cardamom REDD+ (SCRP) in Cambodia

Title	The Southern Cardamom Reducing Emissions from Deforestation and Forest Degradation Project (SCRP), Cambodia
Aim	To reduce deforestation, improve livelihoods and protect biodiversity.
Impacts	<p>Several pump wells and drinking water systems were constructed.</p> <p>Participatory land use planning, including securing community land tenure across a total of 28 villages in 11 communes</p> <p>Local community gained employment in patrolling.</p> <p>The project has developed a community agricultural store and marketplace to link farmers with markets widely across southern Cambodia.</p> <p>Local community received training on ecotourism and act as service providers to manage and implement ecotourism within the project zone.</p> <p>It has provided training on agricultural methods and intensification, especially on modern agricultural techniques and financial literacy.</p>



The project has contributed to the conservation of biodiversity, including protecting critical habitat for significant populations of many IUCN listed species, such as Asian elephant, Asiatic black bear, sun bear, large spotted civet, clouded leopard, and dhole, as well as the critically endangered reptiles, the Siamese crocodile and Southern River terrapin.

5.3.4 The National Greening Program in the Philippines

Deforestation has been one of the major threats to biodiversity and local communities living around forests in the Philippines. For many years, drivers of deforestation, such as logging, conversion of land to other uses, slash-and-burn cultivation, forest fire and natural forest related diseases have caused excessive destruction of habitats and loss of endangered species. The deforestation has also led to floods, soil erosion and landslides, displaced families and damaged property (Luna MPG, 2016).

To address these issues, in 2011, the government of Philippines established the National Greening Program (NGP) through Executive Order (EO) No 26. The program’s contribution to employment has been particularly important for communities who depend on forest-related work for their livelihood and income through establishment of agroforestry plantations, as well as in rehabilitation of degraded forestland and protection of the remaining forests in the country. Additional information on the objective and impacts is presented in Table 12. Further information on lessons learned and financial mechanisms is presented in Annex 2.

Table 11: The objective and impacts of the National Greening Program in the Philippines

Title	The National Greening Program in the Philippines
Aim	To carry out reforestation and rehabilitation of unproductive, denuded and degraded forestlands while simultaneously reducing poverty, creating alternative livelihoods, securing food, conserving biodiversity and enhancing climate change mitigation and adaptation.
Impacts	<p>Since 2011, the GNP has reforested more than 2 million hectares with 1,7 billion seedlings planted on different types of degraded lands, including denuded forestlands and coastal areas (DENR, 2020).</p> <p>The project has generated a total of more than 5.6 million jobs in seedling production, plantation establishment and maintenance and protection.</p> <p>In some areas, the program has provided employment for former rebels as forest guards to protect forests and natural resources, as part of the peace process with the government.</p> <p>In addition to reforestation, the NGP has indirectly contributed to the improvement of water quality in rivers and irrigation used for farmlands, reduced the threat of flooding, and has potentially increased carbon sequestration.</p> <p>The NGP has encouraged strong coordination among national government agencies, civil society, private sectors and local communities.</p>

5.3.5 Improving resilience of vulnerable coastal communities to climate change in Viet Nam

Mangrove ecosystems in coastal regions of Viet Nam are important for local communities who depend on these healthy trees for livelihoods and protection from natural hazards (Hai et al., 2020). In recent years, deforestation has occurred and many poor communities living in mangrove areas have been severely impacted by frequent flooding. Each year, approximately 60,000 houses in coastal provinces are destroyed or damaged by floods and storms (GCF, 2021a).



In response to this challenge, in 2015, the government of Viet Nam proposed a project for improving resilience of vulnerable coastal communities to climate change. The project has provided several benefits to local communities, including the construction of some infrastructures, capacity development and ecosystem restoration. More than 1,900 hectares of mangroves have been replanted as storm-surge buffer zones in all five coastal provinces, providing better protection from storm surges for more than 2,700 people (GCF, 2021b).

Additional information on the objective and impacts is presented in Table 14. Among lessons learned from the project is that greater stakeholder engagement is needed, not only in the implementation stage, but also during the preparatory and project design phases. Further information on lessons learned and financial mechanisms is presented in Annex 2.

Table 12: The objective and impacts of improving resilience of coastal communities to climate change in Viet Nam

Title	Improving resilience of vulnerable coastal communities to climate change in Viet Nam.
Aim	To increase the resilience of vulnerable coastal communities to climate change.
Impacts	<p>>1,900 hectares of mangroves have been replanted as storm-surge buffer zones in all five coastal provinces, providing better protection from storm surges for more than 2,700 people.</p> <p>888 out of 1,109 storm-resilient houses were constructed, benefiting over 4,000 poor and near-poor residents of high-risk coastal areas.</p> <p>In collaboration with Thuy Loi University, the project successfully organized a certified training on community-based disaster risk management (CBDRM) for 7,500 people in 77 communities and awarded 28 certified CBDRM trainers.</p> <p>Improved tools and data for climate risk mapping and participatory disaster risk management planning have been initiated in seven provinces.</p> <p>A total of 15 livelihood models for 828 households (10% female-headed) were established in cooperation with the private sector to ensure that products produced by farmers were acquired by traders at a stable market price.</p> <p>>630 households have increased their income by 10–20% from livelihood interventions due to proper technical instruction and qualified breed sources.</p>

5.3.6 Building with nature, Indonesia

The northern shorelines of Java, Indonesia are important for local communities, especially fishermen whose livelihoods depend on aquaculture ponds behind a wide mangrove greenbelt. These shorelines, however, have been degraded due to the removal of mangrove belts for unsustainable coastal aquaculture and infrastructure (Wetland International, 2016).

In response, Indonesia’s Ministry of Marine Affairs and Fisheries supported by Wetland International and Ecoshape, a consortium of private parties, government organizations and research institutes proposed a project, called Building with Nature, to restore mangrove forests using natural processes combined with grey techniques such as building permeable dams and sea walls (Weadapt, 2021).

This project has introduced innovative mangrove aquaculture systems whereby part of the aquaculture pond is converted to make space for riverine mangroves (Wilms et al., 2020). While the project is still ongoing and the significant results may not be seen immediately, it has supported local communities and biodiversity protection. Through the project facilitation, local communities have established joint



venture activities on milkfish and shrimp aquaculture, tourism, compost production for aquaculture, and fish feed production from crab flour.

Additional information on the objective and impacts is presented in Table 15. It was found that land subsidence occurred and intervened in the early project implementation, which demonstrated that comprehensive planning conducted at an early stage would help to anticipate this issue. For further information on lessons learned and financial mechanisms cf. to Annex 2.

Table 13: The objective and impacts of building with nature in Indonesia

Title	Building with Nature Program in Indonesia
Aim	To restore mangrove forests using natural processes combined with grey techniques such as building permeable dams and sea walls.
Impacts	<p>Villagers in the project areas received trainings on aquaculture to improve their productivity, income, and knowledge and awareness of mangrove conservation. They were also taught about a financial incentive mechanism called Bio-rights, which is a combination of economic productivity and environmental conservation and restoration measures.</p> <p>Permeable dams built in the project have helped to create a healthy sediment balance, which is expected to create seabeds where mangroves will regenerate naturally and develop a natural defense against further erosion.</p> <p>To secure sustainable financing of these activities, the community groups set aside some of the profits into a group savings fund that is used for mangrove rehabilitation and other income-generating activities.</p>

5.3.7 Ecosystems protecting infrastructure and communities project in Thailand

Klang Island is located within the Krabi River Estuary in the southwest of Thailand. It is about one meter above sea level and experiences high sea tides that occur annually between October and December. Mangrove forests were the best defense for local coastal populations against natural hazards such as storms surges, strong winds or sea level rise.

However, communities living on the island have been under threat from storms and winds during monsoon seasons. Mangrove forests have been deforested and converted into shrimp ponds for aquaculture and excessive water extraction has become very detrimental to the lands (Mangrove Action Project, 2021).

To address this issue, in 2015, the government of Thailand proposed a project involving community-based ecological mangrove restoration for storm surges and other coastal hazards under the IUCN’s “Ecosystems Protecting Infrastructure and Communities” (EPIC) program. This small project has provided benefits to local communities in different ways, including capacity building and improved ecosystems (Monty et al., 2017).

Additional information on the objective and impacts is presented in Table 16. Among several lessons learned is that implementing hydrological restoration in the field with local people was an effective way to transfer Community-based Ecological Mangrove Restoration (CBEMR) knowledge. Further information on lessons learned and financial mechanisms is presented in Annex 2.



Table 14: Infrastructure and community project in Thailand

Title	Ecosystems protecting Infrastructure and Communities Project in Thailand
Aim	To restore abandoned aquaculture ponds to become productive mangrove habitats, which helps coastal protection and supports resource-based livelihoods, especially fisheries.
Impacts	<p>Improved local ecosystems.</p> <p>Capacity building for local communities and government officials on ecosystem protection.</p> <p>Establishment of two mangrove demonstration sites using the CBEMR method involving 25 community members.</p> <p>Establishment of a formal collaboration platform for marine and coastal resource management.</p>

5.4 Lessons learned: Challenges for NbS implementation and upscaling in AMS

Challenges/barriers for NBS uptake and implementation are complex as they are all interrelated. Sarabi et al. (2020) have used sophisticated methods to structure these challenges and to demonstrate the interdependencies (Figure 6).

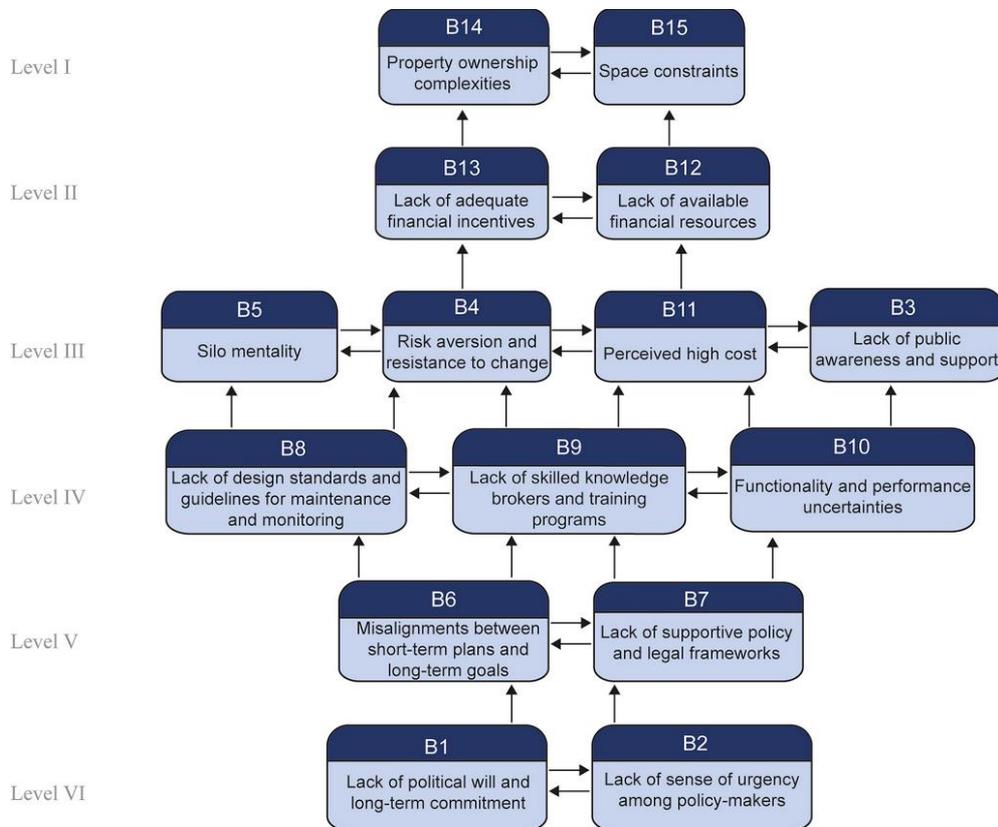


Figure 5: A 6-layered model for interdependent NbS barriers (Sarabi et al., 2020)

In the context of this study, we classified the challenges for NbS implementation and upscaling into political and societal, financial, biophysical and technical categories.



Political and societal challenges

Lack of binding and joint policies in ASEAN: the ASEAN region could strongly benefit from overarching, ASEAN-level policy that could provide a solid framework for NbS implementation and upscaling.

Insufficient political support and coordination: in most cases, the benefits (especially the non-economic ones) are undervalued by politicians as well as the public. Lack of a sense of urgency among policymakers and institutional fragmentation were identified as one of the key barriers in studies (Sarabi et al., 2020; Sarabi et al., 2019). NbS need to become an organic part of strategies and planning processes and, in some cases, part of laws and regulations. Further, the private sector generally depends on consistency in the policy frameworks (Morita and Matsumoto, 2021; Schmalzbauer, 2018).

Promoting social inclusion and acceptance: NbS are expected to be sensitive to their location, the social dynamics and needs. Failing to involve different social groups in the design and implementation of NbS leads to no-impact-for-society action. Numerous participatory tools are available to overcome this issue (Schmalzbauer, 2018).

Limited knowledge base for NbS: Even though knowledge and experience of NbS is increasing, information is often scattered and difficult to access. Some knowledge is not presented in a ready-to-apply manner for decision makers (UNEP, 2021; Sarabi et al, 2020; Schmalzbauer, 2018). Continuous capacity building and raising public awareness are therefore crucial at all levels in ASEAN (ASEAN, 2021).

Insecure land tenure: land tenure insecurity is a common challenge in NbS implementation, which restricts smallholder farmers' long-term investments (Simelton et al., 2021).

Financial challenges

Lack of financial support: Whereas obtaining public and/or private finance for NbS implementation has been a common barrier in the past, current reports are showing that approximately US\$133 billion/year currently flows into NbS (using 2020 as the base year), 86% of this coming from public funds and 14% being private finance. It is estimated that NbS-related investments will at least triple in real terms by 2030 and increase four-fold by 2050. This results in cumulative total investment of up to US\$8.1 trillion, and a future annual investment rate of US\$536 billion (UNEP, 2021). Work with businesses to provide more sustainable incentives and support and working with financial industry are one of the key recommendations of the ASEAN report (ASEAN, 2021).

Coordination between private and public finances: NbS implementation is sometimes hindered by a lack of coordination between private and public financiers. Further, operational and bureaucratic challenges are not new. In the past few years however, innovative private and public funding solutions have been implemented worldwide (Toxopeus and Polzin, 2021) and could have potential in the ASEAN region.

NbS represent a great opportunity for private sector investment. As businesses are growing and knowledge on NbS is improving, financial de-risking products such as guarantees and insurance are being developed to create attractive risk-return profits for large investors. In the ASEAN region, there seems to be significant disconnect between the development sector and private investment. Some activities supported by development funds do not reach their commercialization phase and private sectors are reluctant to take them up. Further, as in other regions, in ASEAN there is also a lack of private sector involvement and enabling environment for private sector investment in NbS.

Integration of NBS benefits into valuation and accounting methods: how to weigh long-term public value against (lack of) private short-term cash flows? How to deal with the difficulty of translating NbS benefits into monetary units to avoid underinvestment in and overexploitation of natural resources? Currently, several workable accounting and valuation methods capable of capturing the multiple benefits of NbS



are being developed and implemented, such as [ThinkNature](#), [Evaluating the impact of nature-based solutions: A handbook for practitioners](#), and others (Toxopeus and Polzin, 2021; Schmalzbauer, 2018).

Biophysical and technical challenges

Limited space (land): a comprehensive literature review by Sarabi et al. (2019) identified land limitation as one of the key NbS implementation and uptake barriers. Generally, NbS require larger land areas (and time) to provide the expected benefits in contrast to conventional infrastructure approaches. Especially in urban areas, where land is scarce and resources expensive, NbS implementation can be restricted. Here, technical solutions should be promoted that do not necessarily require large areas of land.

Multiple benefits challenge: NbS aim to provide environmental, social and economic benefits simultaneously. This is however difficult to achieve, as different stakeholder groups involved in decision-making have potentially conflicting interests, and there may be biopsychical as well as financial barriers. An early and active involvement of these groups seems to be an obvious though not always simple way of addressing this. Further, mapping tools, valuation methods and assessments are highly important.

Lack of information: this is one of the limiting factors frequently mentioned in the literature. Lack of comprehensive information regarding the creation, implementation, monitoring and management of NbS may lead to a great deal of uncertainty or even create conflict among actors (Sarabi et al., 2019; Schmalzbauer, 2018). This is a particular challenge related to designing NbS.



6. Recommendations

6.1 Recommendations for ASEAN

ASEAN has started to advance NbS development as a means of addressing environmental degradation in the region. Different regional policies and initiatives related to NbS are presented in this study. The newly launched ASEAN Green Initiative (AGI) provides steps to initiate NbS activities along with the establishment of the Natural Capital Platform as suggested in other studies. Other existing regional policies and frameworks can also be used to strengthen cooperation among AMS on NbS implementation in the region.

In line with ASEAN guidance and frameworks related climate change and to facilitate the development of NbS within agriculture and forestry sectors, we suggest the following actions:

1. Expand the existing programs and activities of related working groups under the Food Agriculture and Forestry Division – including ASEAN Working Group on Forests and Climate Change, ASEAN Working Group on Social Forestry, and ASEAN Working Group on Forest Management – to incorporate NbS-relevant issues.
2. Establish and continue the existing exchange programs (South-South and North-North cooperation) among AMS on NbS related approaches, including social forestry, FLR, agroforestry, REDD+, marine and coastal management, and restoration ecosystems. Such programs should be implemented and cross-coordinated by the working groups.
3. Synergize the existing programs and initiatives within working groups and other ASEAN bodies under the Food Agriculture and Forestry and Environment Divisions on climate change through joint workshops and other regional events. The Multi-Sectoral Framework for Climate Change, Agriculture and Forestry towards Food and Nutrition Security and Achievement of SDGs under the Ad Hoc Steering Committee on Climate Change and Food Security (AHSC-CCFS) is useful as a bridge between the ASEAN Socio-Cultural Community and the ASEAN Economic Community to coordinate such harmonization.
4. Strengthen cooperation among ASEAN working groups under the Food Agriculture and Forestry and Environment Divisions on NbS related discussions through a joint submission to international fora, such as the Convention on Biological Diversity, the United Nations Forum on Forests, the United Nations Convention to Combat Desertification, the Food and Agriculture Organization of the United Nations, the International Tropical Timber Organization, the and Aichi Biodiversity Targets of the Convention on Biological Diversity.
5. Promote capacity building on NbS related measures, including environmental management of ecosystems and natural resources, social forestry programs, sustainable forest management, climate change adaptation and mitigation, and other relevant topics.
6. Provide support for the establishment of a natural capital platform and actively participate in the development of the ASEAN natural capital road map.

6.2 Recommendations for ASEAN Member States

AMS have established various policies and strategies to adopt NbS in their national agenda. Different activities related to NbS measures are being implemented in the region, including REDD+, FLR, and ecosystem and coastal restoration. There is a growing demand for NbS investments, and opportunities to scale these up and obtain support from the existing financial mechanisms developed by international organizations, such as GCF and private sector initiatives, such as carbon trading. Some AMS have demonstrated the ability to capitalize NbS through carbon markets while tackling cross-sectoral climate change issues and alleviating poverty within their national contexts.



Our additional analyses and synthesis of studies of NbS related activities in several AMS and based on stakeholder consultations point to a number of key recommendations that can help scale up NbS application:

1. AMS need to further strengthen and harmonize policy frameworks on various sectors interconnected with NbS. The regulations and laws related to nature-based investment should be improved to facilitate coordination, sustainable investment and implementation, and market mechanisms for NbS projects and products.
2. AMS should encourage project developers and stakeholders (e.g., governments, private sector, donor agencies, international financial organizations, academic institutions, and civil society) to prioritize developing innovative business models to attract sustainable NbS investment. This could include creating and disseminating cost-benefit analyses and financial models that illustrate business models for NbS investment over suitable time and geographic scales.
3. AMS should improve knowledge for all stakeholders on NbS through various initiatives and capacity developments. This can be done by establishing collaboration among stakeholders, including with international organizations, NGOs, educational institutions and research institutions, private sectors, and communities. Capacity development should cover various topics and themes of NbS and these could include project development, which is one of the most critical aspects for attracting financing from public and private sources.
4. AMS should provide incentives as necessary for NbS initiatives and ensure such incentives are properly used for achieving the NbS objectives by establishing and implementing a stringent monitoring and evaluation system. Considering NbS investment is capital-intensive, requiring significant amounts of public funding or private investment, or a blend of grants and venture, these incentives could be a source of project capital or in-kind supports that could help bridge the funding gap between the current implementation of NbS and commercialization or generating profits. This will also help the projects that are supported by development funds but continue being dependent on public funding – i.e., there are no private-sector based exit and upscaling strategies.
5. AMS, with support from relevant stakeholders, should strengthen governance, reform economic structures and mainstream green growth within national development plans and government processes in all sectors related to NbS.
6. AMS should promote cross-sectoral governance for NbS upscaling.

6.3 Recommendations for development cooperation

Technical and financial development cooperation play important roles in the efforts of governments wishing to implement and upscale NbS as appropriate in the respective national contexts. Much work has already been carried out, but governments and other stakeholders need further assistance to overcome the challenges related to upscaling NbS.

Countries need continued support in regional and national coordination, knowledge management and exchange of best practices; in addition, there are specific needs that may be different from country to country but are generally related to addressing policy and technical hurdles, as well as mobilizing funding. For suitable enabling environments, technical cooperation institutions should focus on streamlining all relevant activities and on removing specific policy barriers, e.g., concerning land tenure, land use planning or private investments.

Key recommendations for development cooperation include:

1. There is a large demand for targeted technical and institutional capacity building at all levels, for extension providers and implementing organizations. Both, technical and financial cooperation should thus “think in viable business models” and respective value chains when setting up new programs or modifying existing ones – this, in combination with enabling institutions, should be the exit strategy of NbS development cooperation projects.



2. Generally, development cooperation projects should have a catalytic role and help governments to attract private sector investments, e.g., through de-risking approaches, private public partnerships, and bankable investments.
3. Development corporations can also support governments as accredited entities to tap respective funding from international funds, and to bundle different sources through tailored instruments at national or subnational levels – especially for conservation-focused NbS where meaningful private sector investments are unrealistic.
4. Under the NbS umbrella, projects should try to create synergies between adaptation, mitigation, biodiversity conservation and development agendas.
5. Countries should be supported in monitoring and measuring NbS impacts, thus contributing to the national reporting systems, and also additional fundraising efforts.

6.4 Recommendations for private sector investors

For private sector investors, NbS provide significant investment opportunities in AMS. Depending on the individual interests in and motivation for investing in NbS, different investment strategies can be pursued. Most NbS investments require a long-term commitment, strong local implementing institutions and a clear strategy that also considers the various risks and contains risk mitigation strategies. Interested investors should:

1. derive long-term investment strategies for their respective NbS portfolio or investments.
2. scrutinize the target countries and regions for potential engagement and assess the bureaucratic requirements and government regulations for NbS investments including, for example, the question of carbon rights and ways to prevent double counting in the context of Paris Agreement Article 6.
3. practice due diligence, including undertaking assessments of the capacities of the identified implementing institutions and social and environmental risks.
4. develop risk mitigation measures as portfolio diversification and consider exit strategies, and, in this context, make careful choices around the type of investment or investment vehicle.
5. rigorously apply certification of recognized standards to ensure environmental and social integrity and also mitigate their reputational risks,
6. next to MRV systems, consider setting up monitoring systems that provide robust information about positive investment impacts, e.g., on biodiversity, improved livelihoods, hydrological services, jobs created or avoided erosion.
7. seek alignment with initiatives and development cooperation programs to reduce risks and avoid pitfalls.
8. pave a way for setting best practices to promote upscaling at national and regional levels.



7. Outlook, Entry points and Cross-sectoral links

AMS have recognized that the wide range of NbS is essential for achieving their sustainable development goals. Translating the national and international policy targets into implementation and upscaling measures requires that technical, financial, and political challenges be addressed. Countries should analyze their options for tapping existing and potential NbS financing from different public and private sector sources.

Different public funding sources exist but remain limited. Multilateral NbS funding plays an important catalytic role but is insufficient to cover the investment needs. Thus, finding appropriate and effective ways of involving the private sector is key for a successful upscaling of proven and desired pilots. For example, options include voluntary and compliance carbon markets, PES schemes or sustainable value chains and commodity production. Globally, countries with clear and investment-friendly business environments for NbS have a competitive advantage in the competition for funding and thereby attract significant private sector investments.

NbS in the context of SDGs, NDCs, NBSAPs, and green growth require countries to establish consistent cross-sectoral governance settings. Implementation measures and programs should be integrated into the development of relevant related sectors, especially agriculture, forestry, fisheries, tourism, mining, energy, transport, and finance. Pilot projects on agroforestry, of coastal or mangrove restoration could include co-management, co-governance, and business engagement.

Another success factor and prerequisite is broad acceptance from and significant benefits for the local population. Tools for technical capacity building on NbS include safeguards, certification, participatory approaches with multi-stakeholder dialogues, spatially explicit land-use planning, impact monitoring and digital solutions. When these measures align with the broader policy targets, NbS can help AMS to make significant progress on sustainable development, EbA, disaster risk reduction, mitigation, and poverty reduction.



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Annexes

Annex 1: List of relevant AMS policies and regulations on climate change, forestry and environment related to NbS

Country	Policy and Regulation
Brunei Darussalam	Forest Act Chapter 46
	Land Code Chapter 40
	Environment Protection and Management Order (EPMO 2016)
	Wildlife Protection Act
	Wild Flora and Fauna Order 2007
	National Forest Policy 1989
	Brunei Darussalam National Climate Change Policy 2020
	Green Protocol Guideline
	Brunei Selective Felling System BSFS Guideline
	Town and Country Planning Act (National Land Use Masterplan 2006-2025)
	Heart of Borneo Initiative
	Reduced Cut Policy
	No logging policy at Peat Swamp Forest by Forestry Department, 2017
Strategic National Action Plan (SNAP) for Disaster Risk Reduction 2012–2025	
Cambodia	National Environment Strategy and Action Plan, 2016–2023
	Cambodia Climate Change Strategic Plan
	Sub-Decree No. 35 on creation of a National Committee for Managing Climate Change
	Law on Disaster Management
	National Forest Programme (2010–2029)
	National Committee for Disaster Management 2004
	Climate Change Strategic Plan for Disaster Management Sector 2014–2018
	Climate Change Priorities Action Plan for Agriculture, Forestry and Fisheries Sector 2014–2018
	Climate Change Action Plan for the Education 2014–2018
Gender and Climate Change Action Plan (2014–2018)	



	Climate Change Action Plan for Ministry of Land Management, Urban Planning and Construction 2015–2018
	Climate Action Plan of Ministry of Environment 2016–2018
	National Climate Change Action Plan for Public Health (2014–2018)
	Climate Change Action Plan for Rural Development Sector 2014–2018
	Climate Change Financing Framework
	National Policy on Green Growth 2013
	Royal Decree on the organisation and functioning of the national committee for disaster management 2015
	Cambodia National Adaptation Plan Financing Framework and Implementation Plan 2017
	Law on the adoption of the National Strategic Development Plan (NSDP) 2019–2023
	National Environmental Strategy and Action Plan 2016–2023 (2018)
	National REDD+ Strategy 2017–2026
Indonesia	Law 32/2009 Environmental Protection and Management
	Law about Forestry 1999
	Law No.18/2013 about Prevention and Eradication of Forest Destruction
	Strategic Plan for Biodiversity
	Ministry of the Environment and Forestry Regulation Number P.83/MenLHK/Sekjen/Kum.1/10/2016 on Social Forestry
	National Medium-Term Development Plan 2015–2019 (RPJMN 2015–2019)
	Presidential Decree 16/2015 on the Structure of the Environment and Forestry Ministry
	Decree 62/2013 Regarding a Managing Agency for the Reduction of Emission (sic) from Deforestation and Degradation of Forest and Peat lands
	Presidential Instruction 5/2019 on extension of the forest moratorium
	Presidential Decree 61/2011, National Action Plan to reduce GHG emissions (RAN-GRK)
	President Regulation 71/2011 on the Implementation of a National Greenhouse Gases Inventory
	P. 30/Menhut-II/2009 On the implementation of REDD activities
	Minister of Forestry Regulation P.68/Menhut-II/2008 on Implementation of Demonstration Activities Reducing Carbon Emissions from Deforestation and Forest Degradation
	Presidential Regulation no. 46/2008 on the National Council for Climate Change (NCCC or DNPI)



	National Action Plan Addressing Climate Change 2007
	Regulation No.20/2012 about Forest Carbon Management
	Regulations No.11/2013 and No.36/2009 about procedures for Licensing Activities for Absorbing and Restoring Carbon in Forests
	Regulation No.70/2017 Implementing REDD+ & Sust. Management of Forests
	Regulation 206/2005 Establishing National Committee For Clean Development Mechanism
	Strategic Plan Sustainable Tourism and Green Jobs for Indonesia
	Government Regulation 57/2016, amending regulation 71/2014 concerning protection and management of peat ecosystems
Lao PDR	Strategy on Climate Change of the Lao PDR 2010 and Climate Change Action Plan 2013–2020
	Forestry Strategy to the Year 2020
	Decree on Climate Change 321/2019
	National Biodiversity Strategy 2020
	National Policy on Environment and Social Sustainability of the Hydropower
	Water Sector Strategy and Action Plan
	National Green Growth Strategy to 2030
	Natural Resources and Environment Strategy 2016–2025
	Agriculture Development Strategy to 2025 and vision to 2030
	Strategy on Climate Change and Health Adaptation 2018–2025 and action plan 2018–2020
	National Strategy on Education and Awareness on the Environment and Climate Change 2018–2025
	Environmental Protection Law (2013 version)
	Disaster Risk Management Law 15/2019
Malaysia	National Policy on Climate Change
	Malaysia Forestry Policy (2021)
	11th Malaysia plan 2016–2020
	Green Technology Master Plan 2017–2030
	National Green Technology Policy
Myanmar	National Environmental Policy (2021)
	Law No. 21/2013 on Disaster Management
	Law No. 9/2012, The Environmental Conservation Law



	The Forest Law 1992
	Myanmar Action Plan for Disaster Risk Reduction
	National Biodiversity Strategy and Action Plan
	National Sustainable Development Strategy
	Myanmar Climate-Smart Agriculture Strategy
	Myanmar National Climate Change Policy
	Climate Change Strategy and Action Plan (MCCSAP) 2016–2030
	The Myanmar National Framework for Community Disaster Resilience 2016
	Myanmar Agriculture Dev. Strategy & Investment Plan (2018–19/ 2022–23)
	Myanmar Sustainable Development Plan (2018–2030)
	Myanmar National Environmental Policy
	Climate Change Strategy 2018–2030
Philippines	Philippine Disaster Reduction and Management Act (RA 10121)
	The Climate Change Act (RA 9729), and its Implementing Rules and Regulations (IRR, Administrative Order No. 2010-01)
	Philippine Green Jobs Act no 10771/2016
	Republic Act no 11494 providing for COVID-19 response and economic recovery
	Republic Act No. 11285 (Energy Efficiency and Conservation Act)
	Executive Order No. 174, Institutionalizing Philippine Greenhouse Gas Inventory Management and Reporting System
	Executive Orders no. 43 and no. 24 on the Cabinet Cluster on Climate Change Adaptation and Mitigation
	National Climate Change Action Plan
	Framework Strategy on Climate Change
	Philippine National REDD-plus Strategy
	Philippine Strategy on Climate Change Adaptation
	Executive Order 472, institutionalising the Committee on Fuel conservation and Efficiency in Road Transport
	Executive Order No. 881, Authorizing the Climate Change Commission to Coordinate Existing Climate Change Initiatives, Reducing Emissions from Deforestation and Forest Degradation - Plus, and Other Similar Mechanisms
	Administrative order no 220 creating an inter-agency committee on Climate change
	Executive orders 774/2008 and 785/2009 on the Presidential Task Force On Climate Change
	Philippines Master Plan For Climate Resilient Forestry Development 2016–2028



	National Disaster Risk Reduction and Management Plan 2011–2018
	Philippine Green Building Code (P.D. 1096)
	Enhanced National Greening Program (Executive Order 26 of 2011 and Executive Order 193 of 2015)
	Moratorium on endorsements for greenfield coal power plants
	Philippine National Climate Risk Management Framework of 2019
	Adoption the Lawin Forest and Biodiversity Protection System a National Strategy for Forest and Biodiversity Protection in the Philippines (DENR Administrative Order No 2018–21)
	Declaring an Interdepartmental Convergence for a National Greening Program (EO 26, series of 2011) and Expanding the Coverage of the National Greening Program (EO 193, series of 2015)
Singapore	National Environment Agency Act (Chapter 195)
	Building Control Act (Chapter 29)
	Carbon Pricing Act no 23/2018
	The National Biodiversity Strategy and Action Plan, updated 2019
	The Nature Conservation Masterplan (NCMP 2015).
	The Marine Conservation Action Plan (MCAP 2015)
	The Sustainable Singapore Blueprint
	Climate Action Plan
Thailand	Strategic Plan on Climate Change (2008–2012)
	Thailand Power Development Plan 2015–2036
	Climate Change Master Plan (CCMP) 2015–2050
	The 12th National Economic and Social Development Plan 2017–2021
	National Sustainable Development Strategy
	National and Economic Development Plans
	Smart Grid Development Master Plan 2015–2036
	Environmentally Sustainable Transport System Plan 2013–2030
	National Strategy 2018–2037
	Strategy for Climate Change in Agriculture 2017–2021
	Climate Change Adaptation Plan on Public Health 2018–2030
Viet Nam	Viet Nam Forestry Department Strategy for the 2021–2030
	The National Strategy on Environment Protection to 2020
	The Sustainable Development Strategy for 2011–2020
	Law on Environmental Protection No: 55/2014/QH13



Law on Marine and Island Resources and Environment No.82/2015/QH1
Resolution 24/NQ-TW: Active response to climate change, improvement of natural resource management and environmental protection
Viet Nam's Green Growth Strategy and related PM Decisions
Decision No.799/QĐ-TTg approving the national REDD action programme and Decision 419/QĐ -TTg
The National Climate Change Strategy approved by Decision no 2139/QĐ-TTg
Decision No. 543/QĐ-BNN-KHCN: Action Plan on Climate Change Response of Agriculture and Rural Development Sector in the Period 2011-2015 and vision to 2050
Decision No. 158/2008/QĐ-TTg on the Approval of the National Target Programme to Respond to Climate Change
Decision No. 2730/QĐ-BNN-KHCN: Decision on Promulgation of the Climate Change Adaptation Framework Action
Decree 119/2016/ND-CP and PM Decision 120/2015 on Sustainable Management, Protection and Development of Coastal Forests
PM Decision No.1474/2012 issuing the National Action Plan on Climate Change 2012-2020
Urban Development of Viet Nam Responding to Climate Change 2013–2020 scheme and Urban Green Growth Development Plan to 2030
PM Decision 2044/2016 approving the Climate Change Policy Framework
PM Decision 811/2016 introducing the Climate Change Action Plan for Construction 2016-2020
PM Decision 1002/2009 on Community Awareness and Community-based management of natural disaster risks
PM Decision 46/2014 providing for Natural Disaster Forecasting, Warning and Communication
PM Decision 1775/2012 On GHG Emission and Carbon Credit Management
Decision 622/QĐ-TTg approving the National Action Plan for the Implementation of 2030 Agenda for Sustainable Development
2016–2020 Science and Technology Programme for Climate Change Response, Natural Resources and Environmental Management
2016–2020 Science and Technology Programme for Natural Disaster Prevention and Control and Environmental Protection
Decision No. 90/QĐ-TTg approving the master plan for natural resources and environment monitoring networks for 2016–2026 with a vision to 2030



Annex 2: Summary of lessons learned and financial mechanisms for NbS examples in ASEAN Member States

Enhancing climate change resilience of rural communities living in protected areas of Cambodia

Lessons learned Practical community-driven solutions are important to engage communities participating the project.

Continuous stakeholder consultations ensure continued project support.

Improved field monitoring strategies would help keep better track of the success of interventions.

Introducing elements for scaling up early on (at project design phase) and integrating elements across various project components provides a clear pathway for future upscaling efforts.

Financial mechanism Donor funded through Adaptation Fund.

Alleviating community poverty and improving ecosystem health through agroforestry in Lao PDR

Lessons learned It is important to have active participation of local communities in the project from the planning phase through to implementation.

Intensive communication is among key successful approaches to establish cooperation with local communities.

An initiative development to improve local community livelihoods often requires commitment and significant efforts from different sectors, including private sectors.

Financial mechanism Private investment funded by Lao Thai Hua Rubber Co. Ltd

Southern Cardamom REDD+ project, Cambodia

Lessons learned Address deforestation in large areas need comprehensive strategies and financial and human resources involving different stakeholders, including local communities. It also needs strong understanding in conservation, high performance, and zero tolerance for corruption, and commitment from the stakeholders, including officials and local community.

Financial mechanism Financial support was initially provided by Wildlife Alliance with additional funding from various donors, including Department for Environment, Food & Rural Affairs (DEFRA) of UK, United States Fish & Wildlife Service (USFWS), Wildlife Works Carbon, Wallace Research Foundation, British Embassy Phnom Penh, and Golden Triangle Elephant Foundation.



Improving local community and protecting forests through social forestry program, Indonesia

Lessons learned	<p>Addressing significant policy and regulatory gaps would help to accelerate the implementation of the program</p> <p>Further internalizing within the Ministry of Environment and Forestry (MoEF), and mainstreaming with other government agencies would expedite the program implementation on the ground</p>
Financial mechanism	<p>Financing mostly from the Ministry of Environment and Forestry's budget. Other budgetary and non-budgetary resources have been leveraged to finance activities that lead to social forestry outcomes.</p> <p>Communities can access revolving funds under the Public Development Center for Forest Development Financing scheme, which is managed by the ministry. Some development agencies have also provided funding through different mechanisms to support social forestry related activities implemented by NGOs.</p> <p>The Indonesian government has considered leveraging international climate finance, such as the Green Climate Fund (GCF). In August 2020, GCF approved a US\$103.8 million payment for REDD+, the vast majority of which (some US\$93.4 million), will support and expand decentralized sustainable forest governance, including the SFP (UNDP, 2021).</p>

The national greening program in Philippines

Lessons learned	<p>Involving all related stakeholders starting from the planning phases and improving coordination among stakeholders would help to accelerate project implementation.</p> <p>Decisions made in the best interest of the beneficiaries are important for effective and strong engagement of the communities in reforestation and environmental protection programs.</p>
Financial mechanism	<p>A flagship project of the Department of Environment and Natural Resources (DENR) funded through national budgets that aims to plant 1.5 billion trees covering 1.5 million hectares for a period of six years from 2011 to 2016 (PIDS, 2015). The NGP was extended until 2028 to cover all remaining unproductive denuded and degraded forestlands in the country.</p>

Restoring mangrove and protecting coastal greenbelt of Aceh and Northern Sumatera for local community livelihood improvement in Indonesia

Lessons learned	<p>Raising public awareness is not a short-term activity but rather requires long-term actions to improve local community knowledge.</p> <p>Involving community at every phase of implementation from planning through to completion is key to success. It is important to be adaptive in accommodating community needs while focus on the main objectives</p> <p>The success in helping to improve family incomes is the principal factor that helped guarantee sustained community participation in an ecosystem-based disaster risk reduction and economic recovery.</p>
Financial mechanism	<p>Livelihoods Funds (impact investment fund created by private companies)</p>



Improving resilience of vulnerable coastal communities to climate change in Viet Nam

Lessons learned	<p>During the COVID-19 pandemic, the project implementation uses a number of virtual approaches, including online consultations, reviews, and trainings, which do not require direct intervention or field visits.</p> <p>Distanced online training on community-based disaster risk management has resulted in more experienced trainers (3-4) being mobilized to facilitate different sections and group discussions (compared to the traditional methodology, which utilizes only two trainers).</p>
Financial mechanism	<p>Funded by Green Climate Fund (GCF) and implemented jointly by United Nations Development Programme (UNDP) and the Water Resources Directorate (WRD) in the Ministry of Agriculture and Rural Development (MARD)</p>

Building with nature, Indonesia

Lessons learned	<p>Prioritizing community livelihood needs is important to accelerate efforts in raising awareness. Conducting trainings of trainers from local community is important for further capacity development.</p> <p>Involving local community at every phase of implementation from the planning through to completion is important and key for the success of the project.</p> <p>Comprehensive planning conducted at an early stage would help to anticipate an issue of land subsidence occurring and intervening during project implementation.</p>
Financial mechanism	<p>A donor-funded program supported by the Dutch Sustainable Water Fund, a programme from the Netherlands Enterprise Agency on behalf of the Dutch Ministry of Foreign Affairs, The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) as part of the International Climate Initiative (IKI), Waterloo Foundation, Otter Foundation, Topconsortia for Knowledge and Innovation, and Mangroves for the Future</p>

Ecosystems protecting infrastructure and communities in Thailand

Lessons learned	<p>Although CBEMR is relatively new, local community can implement it faster compared to other climate change methods, such as adaptation and mitigation</p> <p>Implementing hydrological restoration in the field with local people was an effective way to transfer CBEMR knowledge</p> <p>Community have learned best practices in CBEMR approaches through hands-on experience, observation and implementation that helps builds their interest.</p>
Financial mechanism	<p>Funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) through the International Climate Initiative (IKI)</p>



Annex 3: List of consulted stakeholders

Name	Position	Organization
Dr. Preecha Ongprasert	Director of General Administration Division	Forestry Foreign Affairs Office Royal Forest Department of Thailand
Ray Thomas Fernandez Kabigting	Chief, Environmental Forestry Section	Forest Resources Management Division, Forest Management Bureau (FMB) Department of Environment and Natural Resources (DENR) of Philippines
Ildelfonso L. Quillooy	Supervising Forest Management Specialist	Forest Resources Management Division, Forest Management Bureau (FMB) Department of Environment and Natural Resources (DENR) of Philippines
Mohammad Sulkhan	Head of Capture Fisheries and Marine Affairs	Dept. Marine Affairs and Fisheries District of Demak, Central Java, Indonesia
Dr. Elizabeth Simelton	Climate Change Scientist	World Agroforestry (ICRAF)
Dr. Thora Amend	Vice Chair of Governance	IUCN commission on protected and conserved areas
Regan Pairodmahakij	Senior program officer	RECOFTC (The Regional Community Forestry Training Centre for Asia and the Pacific)
Fitrian Ardiansyah	Country Director	IDH-Sustainable Trade Initiative Indonesia
Bambang Suprayogi	Founder and Chief Executive Officer (CEO)	YAGASU (Yayasan Gajah Sumatera)
Susanna Tol	Senior Communications and Advocacy Officer	Wetlands International
Apri Susanto Astra	Coordinator of Nature-based Solution Programme	Wetlands International Indonesia
Bradford Sanders	Deputy Head of Conservation	APRIL – Restoration Ecosystem Riau
Bangkit Oetomo	Investment Associate	TLFF (the Tropical Landscapes Finance Facility) of Indonesia
Pedcris M. Orencio	Program Head of Research and Thought Leadership Departmen	SEARCA (Southeast Asian Regional Center for Graduate Study and Research in Agriculture)



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