

# FINANCING AND VALUATING ECOSYSTEM-BASED ADAPTATION IN THE PHILIPPINES

## A Handbook for Banks and Financial Institutions

This handbook is a publication of the Asian Institute of Management Gov. Jose B. Fernandez, Jr. Center for Sustainable Finance based on the unpublished report “The Financial and Economic Case for Ecosystem-based Adaptation in the Philippines,” commissioned by Earth Security, with funding from the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

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The Trinity Project Facebook Page

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# Preface

This handbook is a shorter version of the unpublished report “The Financial and Economic Case for Ecosystem-based Adaptation in the Philippines.” The first part of this handbook, “Financing Ecosystem-based Adaptation in the Philippines,” provides an overview of private financing options for ecosystem-based adaptation (EbA) projects, investigates current practices of financing EbA projects, and identifies potential factors that enable or hinder Philippine banks and financial institutions from offering financing for EbA projects. The second part of the handbook, “Economic Valuation of Ecosystem-based Adaptation in the Philippines,” examines the economic valuation of EbA projects and recommends policy options for the government and other stakeholders to help mitigate the impacts of climate change through EbA. This handbook provides a thorough analysis of financing and valuating EbA projects to help the Philippine banking and finance industry appreciate the value of ecosystems and their role in mitigating the risks and negative impacts of climate change through EbA and other nature-based solutions, which may result in more resilient businesses and communities. Earth Security commissioned this handbook as part of its overall strategy to safeguard and value the earth’s ecosystems. The project is funded by the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

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## Disclaimer

*The analysis and recommendations expressed in this handbook are those of the research team and do not reflect the views and opinions of the Asian Institute of Management Gov. Jose B. Fernandez, Jr. Center for Sustainable Finance (AIM JBF Center) or Earth Security or the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Neither the research team nor the AIM JBF Center nor Earth Security nor the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety accepts any responsibility or liability for relying on the content of this handbook by any person, organization, or community.*

## Foreword

The monetary authority of the Philippines, Bangko Sentral ng Pilipinas (BSP), has issued a requirement for banks to offer more sustainable finance products. This provides banks with a clear regulatory signal about the importance to harness the growing flow of capital towards green finance as a tool for sustainable growth and green recovery.

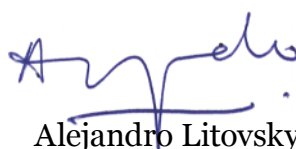
The intensity of each new typhoon season in the Philippines attests to the country's significant exposure to climate change. Banks will have to increasingly consider how they build the resilience of their portfolios by financing climate adaptation, in addition to the main staples of green finance, such as sustainable energy, transport, and infrastructure.

In order to do this, banks must better understand readily available opportunities to finance 'ecosystem-based adaptation' (EbA) projects. This involves using nature and ecosystems to increase the resilience of communities and infrastructure to climate change. EbA makes business sense for banks and their clients.

Think about the coastal protection provided by dense mangroves; how coral reefs reduce the intensity of tidal waves; or the resilience against floods provided by forested hills. Now consider the opportunity to reflect these values in a company's balance sheet, recognizing the cost-effective way of protecting assets, preserving the value of coastal real estate, to name a few benefits.

This handbook will help bankers in the Philippines to understand and begin to consider EbA as part of their portfolios and their compliance with BSP directives. Natural assets are still abundant in the Philippines, but the window of opportunity to act will not be there long as environmental degradation continues to reduce the value of natural capital.

Earth Security is delighted to be working closely with the Asian Institute of Management Gov. Jose B. Fernandez, Jr. Center for Sustainable Finance to advance its mission of linking global finance with nature's capital. This handbook is one of many ways in which we are supporting the transition of the financial sector to embrace the opportunities of working in partnership with nature. We look forward to your continued involvement.



Alejandro Litovsky  
Founder & CEO, Earth Security



## Executive Summary

Ecosystem-based adaptation (EbA) is a nature-based solution for addressing the impacts of climate change on people and their environment. Making the economic and financial case for EbA to private sector stakeholders requires evidence that investments in these projects will lead to benefits for companies that are willing to get involved in such an undertaking. There is also a need to demonstrate to financial institutions that developing financing mechanisms for EbA as part of their product portfolios is a good business decision and reflective of the current business environment.

The first part of the handbook, “Financing Ecosystem-based Adaptation in the Philippines,” examines existing EbA projects from a financing perspective to raise the awareness of the Philippine banking industry on the benefits of financing EbA and eventually engage the private sector in investing for sustainable and resilient environment and communities. The analysis primarily draws from a review of published sources and further validated and contextualized to the Philippine setting through interviews with several key informants from the Philippine banking and finance industry.

A number of actors including the Philippine government, multilateral organizations, and civil society organizations have been implementing EbA projects. However, while multinational enterprises and large conglomerates have been active in climate change mitigation, only a few are implementing adaptation projects. There is also a dearth in engaging small and medium enterprises (SMEs), which make up the majority of the private sector in the Philippines. Most companies consider ecosystem activities as part of their corporate social responsibility efforts rather than an integral component of business operations and revenue generation. This is compounded by the limited availability of sustainable financing products that provide solutions across the SMEs’ life cycle.

The Bangko Sentral ng Pilipinas (BSP), the monetary authority in the Philippines, issued BSP Circular No. 1085 in 2020, which requires banks to offer sustainable finance products to support economic growth and provide lasting benefits for both clients and society while reducing pressures on the environment. The legislation acts as an opportunity to advocate for banks to include EbA projects as eligible projects for sustainable financing.

So far, only three Philippine banks have published their respective sustainable finance frameworks, which describe the inclusion criteria for eligible projects and the processes for managing the portfolio. EbA projects, however, are not explicitly stated in current sustainable finance frameworks of these banks. Green bonds and green loans that adhere to different international standards are the typical sustainable finance products offered in the Philippines. Interviews with top executives of Philippine

commercial and government banks elucidate the different capacities, enabling factors and barriers for banks to finance EbA projects. Key findings include limited knowledge on EbA and its value to businesses. Banks are willing to finance an EbA project if it can be integrated into the company's cash flow.

Aside from the environmental and social benefits received from nurturing healthy ecosystems, EbA also has a direct effect on business operations as illustrated by a number of EbA projects implemented by private sector corporations in the country, so it makes business sense for banks to support and finance private sector EbA projects as part of their sustainable finance portfolio. Business benefits include asset protection and damage cost avoidance, carbon sequestration, alignment to corporate strategy, revenue generation, and regulatory compliance, generating positive cash flow for companies and improving their respective bottom lines, which in turn improves the repayment capacity of any debt held by banks.

There are a number of sustainable finance models being implemented around the world. Among the options, sustainability-linked loans present the most potential for transferability in the Philippines as a good entry-point as it is easier to implement compared to other sustainable financing models. Loan proceeds can be used for both green and conventional projects as long as environmental, social, and governance (ESG) factors are included as key performance indicators. Linking sustainability to loan pricing allows companies to assess their own operations and find ways to improve on their ESG performance. Government banks can also offer sustainability-linked loans when lending to local government units for their projects.

The Trinity Project, a three-fold EbA approach to rebuilding Hijo Resources Corporation's coastal ecosystem, aims to plant 20 hectares of mangrove forest, grow 80 hectares of seagrass meadows, and create a fringing artificial coral reef environment. The case presents how the Trinity Project's revenue model can be integrated into the company's cash flow, which can then be used to apply for a sustainability-linked loan. The company can also explore a blended finance model with the local government to expand the project to cover public coastal areas as well.

The first part of the handbook provides a number of recommendations to foster investments and financing on EbA projects. Developing a simpler taxonomy and shared language for sustainable finance can contextualize EbA to the Philippine scenario and enable various stakeholders to understand its benefits. Sustainability-linked loans as well as blended finance models have the biggest potential for adoption in the Philippines because this is already practiced in a number of global banks. Growing and nurturing the ecosystem for sustainable finance to support EbA projects requires educating the private sector on the business benefits, capacitating banks and financial institutions to operationalize sustainable finance, and fostering a conducive regulatory environment. Finally, forming a multi-stakeholder working group can open dialogues, address concerns, and advocate for recognition that EbA is a critical issue that requires investments through sustainable finance.



The second part of this handbook, “Economic Valuation of Ecosystem-based Adaptation in the Philippines,” examines the methodologies on economic valuation of ecosystem services, which have been applied in selected coastal and marine ecosystems in the Philippines. Commonly used valuation methods include avoided damage cost and replacement cost techniques for measuring the regulation services value of ecosystems in relation to climate risks mitigation and adaptation. The results of the economic valuation studies are inputs to policy development and decision making and may provide a basis for the economic case for investing and financing EbAs.

The lack of appropriate incentives provided by the Philippine government for using EbAs as priority adaptation measures in response to climate change is a major hindrance in financing EbA projects. Moreover, banks may not be guaranteed reliable and credible valuation results, in contrast, for instance, with the conventional appraisal of property, given that the practice of economic valuation of ecosystem services is not licensed in the Philippines. There is also no organized network of economic valuation professionals in the country.

The second part’s recommendations include the establishment of a specific policy for conducting economic valuation of ecosystem services that are anchored on existing laws, exploring the possibility of regulating and licensing the practice of economic valuation of ecosystem services, providing training on the economic valuation of ecosystem services for EbAs and other nature-based solutions to climate change, creating a registry and database that can be consulted by stakeholders, especially the private sector, on EbA financing and investing, and developing a means to mainstream EbAs in business operations and other sustainability initiatives.

## PART 1

# Financing Ecosystem-based Adaptation in the Philippines<sup>1</sup>

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<sup>1</sup> The first part of the handbook is a shorter version of the unpublished paper, “A Technical Analysis of Financing Ecosystem-based Adaptation in the Philippines.”

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## 1. Introduction

Ecosystems, communities of organisms that interact with each other and with the physical environment, provide a number of services that improve human wellbeing and contribute to the socioeconomic development of a country.<sup>[1]</sup> A number of investments have been made in the last two decades to maintain the equilibrium of these ecosystems and allow communities to better adapt to climate change.<sup>[2][3]</sup> The first part of this handbook is the technical analysis of existing ecosystem-based adaptation (EbA) projects from a financing perspective. Specifically, the paper aims to:

1. Conduct a global scan of private financing options for EbA projects that could be potentially adopted by Philippine banks and financial institutions,
2. Investigate current practices of financing EbA projects in the Philippines, and
3. Identify potential factors that would enable or hinder Philippine banks and financial institutions from offering financing for EbA projects.

The analysis primarily draws from a review of published sources and further validated and contextualized to the Philippine setting through interviews with several key informants from the Philippine banking and finance industry.

## 2. Climate Change and Ecosystem-based Adaptation

Coastal ecosystems are among the world's most productive and diverse environments, but these zones are also some of the most vulnerable areas to climate risk.<sup>[4][5]</sup> Communities and businesses located along coastlines experience risks such as sea level rise, increased flooding, accelerated erosion and sedimentation, habitat destruction, loss of both terrestrial and aquatic biodiversity, and water pollution, further compounded by the prevalence of tropical cyclones and extreme weather events.<sup>[6]</sup> <sup>[7][8]</sup> Such impacts are more seriously experienced by coastal communities in developing countries in the Asia-Pacific region, like the Philippines, since they have limited access to the resources necessary for resilience.<sup>[9]</sup>

The United Nations Environment Programme<sup>[10]</sup> defines EbA as “*an initiative that used biodiversity and ecosystem services as part of an overall adaptation strategy to help people and communities adapt to the negative effects of climate change at local, national, regional and global levels.*”

Healthy ecosystems play a vital role in increasing climate change adaptation and building resilience through the delivery of indirect and direct benefits for human wellbeing<sup>[10]</sup> and creating opportunities for sustainable economic prosperity.<sup>[11]</sup> Coastal ecosystems such as coral reefs, coastal wetlands, mangroves, salt marshes, and seagrass meadows offer opportunities for EbA. Examples of EbA interventions include restoring fragmented or degraded natural areas, protecting watersheds, and restoring floodplains, connecting habitats, and protecting natural infrastructure from ridge to

reef.<sup>[12]</sup> Effective EbA approaches require a holistic understanding of the different ecological and socioeconomic processes that determined wellbeing and security.<sup>[13]</sup>

EbA is one of the most cost-effective interventions to implement, compared to infrastructure investments, as it aims to replicate or restore what nature has already designed<sup>[14]</sup>, making it particularly accessible and relevant to the context of developing nations that protect most of the world's biodiversity corridors.<sup>[15]</sup> Estimates indicate that annual global investments of USD 45 billion in EbA could reap up to USD 5 trillion each year in economic benefits.<sup>[16]</sup>

### 3. Financing and Implementing EbA Projects in the Philippines

#### 3.1 IMPLEMENTING ACTORS

The Climate Change Commission is the Philippine government's lead agency tasked with mainstreaming climate change mitigation and adaptation through the National Framework Strategy on Climate Change. Climate change adaptation is decentralized to local government units (LGUs) through the development of a local climate change action plan mandated by Department of Interior and Local Government Memorandum Circular 2014-135. Civil society organizations (CSOs) also actively participate in the dialogue on climate change adaptation based on their specific area of expertise and interest.<sup>[17]</sup> For instance, CSOs have been instrumental in developing an EbA community of practice in the Philippines, which provides an online platform to build networks and share knowledge and insights regarding EbA implementation.<sup>[18]</sup>

From the business sector, the Management Association of the Philippines, through its Committee on Climate Change and Sustainable Development, lead Philippine businesses in addressing climate change issues and in promoting sustainable development.<sup>[19]</sup> Representatives of the private sector pledged support by signing the 2015 Manila Declaration, which expresses climate commitments from the private sector in response to the country's Intended Nationally Determined Contributions. As of 2020, 39 organizations in the Philippines are signatories to the United Nations Global Compact, which aims to mainstream sustainable and socially responsible policies in the private sector and catalyze businesses to support the Sustainable Development Goals.

#### 3.2 NATIONAL GOVERNMENT FUNDING

National government agencies and local government units are required to allocate funding for implementing climate change related activities through the national budget. The Philippines is also one of the countries with provisions for a climate-specific fund, the People's Survival Fund (PSF), which aims to finance climate adaptation projects proposed by LGUs and accredited local community organizations across six thematic areas: climate change adaptation, monitoring vector-borne diseases, early warning systems, establishment of regional climate change centers, risk transfer insurance,



and community-based adaptation [see Table 1]. Priority for funding is given to LGUs with a high percentage of people living in poverty or areas with critical biodiversity.<sup>[20]</sup> As of November 2020, the PSF Board has approved PHP 310.34 million for the six projects, with PHP 147.46 million disbursed to the LGUs.<sup>[21]</sup>

*Table 1.* Benefits for companies accessing sustainable finance<sup>[22]</sup>

Proponent	Project	Implementing Partners	Funding (PHP)
Municipality of Lanuza, Surigao del Sur (Eastern Mindanao)	Ecosystem-based adaptation of watersheds, mangroves, and riverine ecosystem; alternative livelihood	None	40.0 million

### 3.3 MULTILATERAL ORGANIZATIONS

Developed nations have pledged significant public financing for climate change adaptation and mitigation projects.<sup>[23]</sup> Some financing is available as official development assistance but much of sustainability financing come from international development organizations via identified climate funds.<sup>[24]</sup> The Philippines currently accesses four funds managed by multilateral organizations, which are the Adaptation Fund, Climate Investment Funds, Global Environment Facility, and Green Climate Fund.

### 3.4 MUNICIPAL BONDS

Municipal bonds are debt securities that may be issued by local government units to finance various public infrastructure.<sup>[25]</sup> These are conventionally considered a tax-efficient option for low-risk investment.<sup>[26]</sup> The Local Government Unit Guarantee Corporation was established to grant LGUs access to private financing sources based on an LGU credit rating classification scheme.<sup>[27]</sup> Table 2 lists some of the municipal bonds issued in the Philippines.

*Table 2.* Selected examples of municipal bonds issued in the Philippines

Local Government Unit	Name of Municipal Bond	Year Issued	Amount (PHP Millions)	Term (Years)	Purpose of the Bond
Boracay-Aklan Province	Boracay-Aklan Provincial Bonds	1999	40	7	Jetty port and terminal building

Local Government Unit	Name of Municipal Bond	Year Issued	Amount (PHP Millions)	Term (Years)	Purpose of the Bond
Puerto Princesa City, Palawan	Puerto Princesa Green Bonds	2000	320	7	Low-cost housing
Pasay City, Metro Manila	Pasay Kaunlaran Bonds	2004	500	7	Public market and commercial center
Municipality of Baliwag, Bulacan	Baliwag Star Bonds	2006	50	7	Integrated solid waste management - materials recovery facility
Municipality of Alfonso, Ifugao	Alfonso Lista Water Bonds	2010	72.5	10	Construction of water supply and distribution system
Aklan Province	Caticlan Super Marina Bonds	2010	260	10	Renovation of Caticlan passenger terminal, recovery of old coastline

Source: Authors' compilation from LGU Guarantee Corporation data.

The Philippine municipal bond market has since stagnated with a few bond issuances over the last decade due to the absence of a secondary bond market and the preference of LGUs to take out loans from government financial institutions such as Landbank and Development Bank of the Philippines, with the LGU's internal revenue allotment as the collateral for the loan.<sup>[28]</sup> Bond proceeds are used to finance infrastructure development in municipalities, without considering ESG risks or benefits based on the analysis of available data from the LGU Guarantee Corporation website.

## 4. Private Sector Gaps in Financing EbA Projects

Developing states, such as the Philippines, have looked at international financing to ease the burden of the government in meeting adaptation costs.<sup>[29]</sup> However, current international funding is not enough to meet the costs of adaptation.<sup>[30]</sup> It is estimated that the Philippines needs USD 12 to USD 15 billion to meet its commitments to the Paris Agreement and reduce up to 70% of greenhouse gas emissions by 2030.<sup>[31]</sup> The role of the private sector has since emerged as the key to addressing the challenges of climate change since dealing with the consequences of climate risks usually rest with private businesses and households.<sup>[32]</sup> Small and medium-sized enterprises, in particular, are most vulnerable to the impacts of climate change because of limited awareness of climate risks.<sup>[33]</sup>

Many enterprises have already directed their efforts on exceptional environmental performance as a top-level corporate commitment.<sup>[34]</sup> Shareholders are increasingly selective in their investment choices, increasing pressure on companies to report on their environmental and social impact.<sup>[35][36]</sup> The use of independent standards and trackers are being mainstreamed, including the Global Reporting Initiative (GRI) standards and Institutional Shareholder Services' Environmental and Social Disclosure Quality



Score. These track the quality of companies' environmental, social and governance (ESG)<sup>4</sup> disclosures and potential investors can compare companies across hundreds of factors.

In 2018, Earth Security mapped out the nature-based projects being implemented by the private sector.<sup>[37]</sup> Extractive industries, along with infrastructure and utilities, lead the way, covering 59% of the projects. In general, industry-initiated conservation and mitigation projects outnumber adaptation initiatives across most sectors. Only agribusiness corporations tend to concentrate their efforts on adaptation, perhaps due to their extreme dependence on the ecosystem. The implementation of these activities may be integrated as part of the company's environmental management system, outlined in the environmental compliance certificate (ECC) for regulatory compliance, or part of the development of a new product or service. However, 86.2% of companies only consider ecosystem activities as part of their corporate social responsibility efforts and 8.6% for regulatory compliance. Most corporations channel their efforts through a philanthropic arm.

Given the Earth Security data, there continues to be low awareness among the private sector on the value of EbAs to business operations and a knowledge gap on the sustainable financing needs of SMEs which in turn leads to limited sustainable financing products that provide solutions across the SMEs' life cycle. Financial barriers are a significant reason why SMEs resort to unsustainable adaptation. SMEs also have limited knowledge and resources to monitor environmental performance, which is often required by sustainable finance contracts.<sup>[38][39]</sup>

Banks and financial institutions have also committed to support the greening of the private sector by investing in climate-friendly assets and developing sustainable financing products for their clients.<sup>[40]</sup> The Task Force on Climate-Related Financial Disclosures was established to strengthen the financial system and enable the growth of sustainable finance by developing standards for consistent climate-related financial risk disclosures.<sup>[41]</sup> Most of the previous climate actions in the private sector were focused on mitigation; companies were considered to be one of the largest contributors to greenhouse gas emissions.<sup>[42]</sup> The implementation of ecosystem-based adaptation in the private sector, especially in developing countries, is less understood.<sup>[43]</sup>

## 5. Sustainable Finance as a Means of Financing EbA in the Philippines

The Bangko Sentral ng Pilipinas (BSP), the monetary authority in the Philippines, joined the Network for Greening the Financial System as part of its initiatives to enhance the role of financial institutions in managing climate-related risks and mobilize funding to spur the transition of the Philippines towards a sustainable economy.<sup>[44]</sup> It also issued BSP Circular No. 1085 in 2020, which requires banks

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<sup>4</sup> MSCI (n.d.) defines ESG Investing, a term often used synonymously with sustainable investing, socially responsible investing, mission-related investing, or screening. It considers environmental, social and governance factors alongside financial factors in the investment decision-making process.

to offer sustainable finance, defined as “any form of financial product or service which integrates environmental, social, and governance (ESG) criteria into business decisions that supports economic growth and provides lasting benefit for both clients and society while reducing pressures on the environment.” The concept also includes green finance, which facilitates the flow of investments towards “green economic activities and climate change mitigation and adaptation projects.” This legislation presents as the biggest enabler and opportunity to advocate for banks to include EbA projects as eligible projects for sustainable financing.

The Principles for Responsible Investing, developed by an international group of institutional investors identified key ESG issues that affect investment decisions, summarized in Table 3 below. EbA projects often provide solutions that address several of these ESG issues.

*Table 3.* Key ESG issues affecting investment decisions<sup>[45]</sup>

Environmental Issues	Social Issues	Governance Issues
<ul style="list-style-type: none"> <li>• Sustainable land use</li> <li>• Plastics</li> <li>• Water</li> <li>• Fracking</li> <li>• Methane</li> <li>• Biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Human rights and labor standards</li> <li>• Employee relations</li> <li>• Conflict zones</li> </ul>	<ul style="list-style-type: none"> <li>• Tax avoidance</li> <li>• Executive pay</li> <li>• Corruption</li> <li>• Director nominations</li> <li>• Cyber security</li> </ul>

## 5.1 SUSTAINABLE FINANCE FRAMEWORK FOR BANKS

So far, only three Philippine banks along with three other corporations have published their respective sustainable finance frameworks. These frameworks have been developed prior to the BSP circular because all of these companies have green loan programs or issued green bonds over the last two years. These frameworks describe the inclusion criteria for which types of projects to finance and/or refinance, as well as detail the guidelines for the selection process for the projects, management of proceeds, and reporting of allocations and impacts. EbA projects, however, are not explicitly stated in current sustainable finance frameworks of the different banks.

## 5.2 GREEN BONDS

Green bond is a blanket term used to refer to this financial instrument but can actually take different forms, depending on the purpose as identified in the issuer’s disclosures. The ASEAN Capital Markets Forum and its corresponding Roadmap for ASEAN sustainable capital markets regulate the development and labelling of the green bond market in the region.<sup>[46]</sup> Green bonds are used to finance projects with environmental benefits, while social bonds raise funds for projects that improve social outcomes, and sustainability bonds are used to finance projects that have both environmental and



social benefits.<sup>[47]</sup> Issuers often exhibit sustainable business philosophies and high corporate social responsibility practices; green bonds provide financing for these practices in lieu of passing it on to the consumer through premium pricing.<sup>[48][49]</sup> Green bonds are also attractive to industries where the natural environment is critical to business operations.<sup>[50]</sup>

There have been seventeen green bond issuances in the Philippines since 2016 as listed in Appendix 1, with issuances increasing in frequency and in the amount per issue with each succeeding year. The initial issuances of green bond were through assistance and support from IFC and focused on renewable energy and energy efficiency. Mostly bonds financed mitigation projects compared to adaptation initiatives, with nature-based projects not explicitly stated in the list of eligible projects. Bonds issued by financial institutions fund a broader range of eligible sustainability projects while corporate issuers focus on projects that are within their line of business. Philippine green bonds are commonly issued in PHP if they are to be listed as local bonds, and USD if they are listed in an international exchange. The growth of green bonds in the Philippines is further legitimized by the BSP as the central bank invested, as part of its foreign reserves, USD 150 million in green bonds launched by the Bank for International Settlements.<sup>[51]</sup>

### 5.2.1 Sovereign Green Bonds

Sovereign green bonds are issued by national governments in either the domestic or foreign currency to raise money for financing the government's sustainability initiatives such as energy efficiency, green transport, the protection of the national environment, and conservation of biodiversity.<sup>[52]</sup> European countries lead the way with the first sovereign green bonds issued by the Netherlands, France, Sweden, and Germany. As of March 2021, twenty-four national governments have issued sovereign green bonds totaling USD 111 billion.<sup>[53]</sup>

## 5.3 GREEN LOANS

Green loans are the newest sustainable financial instrument, filling in a gap as not all borrowers are appropriate for bonds because participation in the bond market requires sufficient earnings.<sup>[54]</sup> Green loans are well positioned to serve SMEs due to their smaller size and earnings. SME borrowing will be critical in the development of the green loan market<sup>[40]</sup>. Green loans, on average, have a 15-year term and its 5.7% risk of default is lower than the 8.5% for conventional loans<sup>[55]</sup>. Some loans also directly link margins with the corporation's progress on ESG objectives.<sup>[56]</sup> The pricing benefit is an attractive feature for firms that hit their sustainability targets.<sup>[57]</sup> In many cases, however, the breach of green covenants on the use of the loan proceeds is not an event of default.<sup>[58]</sup>

The Loan Market Association, the Asia-Pacific Loan Market Association and the Loan Syndications and Trading Association<sup>[56]</sup> crafted the Green Loan Principles to establish the criteria for labelling loans as green through the evaluation and selection of projects, management and use of proceeds, and reporting. The ASEAN has yet to develop its own standards for the green loan market.

In the Philippines, The BSP estimates that about 10.6% of total loan portfolio of banks in 2019 are allocated to green projects.<sup>[51]</sup> More green bonds issued compared to green loan portfolios. Most banks approve loans for sustainable projects but only a number of institutions have specific loan portfolios, which are listed in Table 4. To spur green lending to smaller entities and not just large corporations, the BSP is assessing whether to include lending for green projects as compliance with Agri-Agra Reform Credit Act of 2009 which requires banks to earmark 25% of their loanable funds to farmers and fisherfolk.<sup>[59]</sup> EbA projects are not explicitly stated in eligible projects for green loans with borrowers needing to rationalize EbA against acceptable projects for instance, showing how mangroves can build climate resilience.

*Table 4.* Green loans in the Philippines

Funding Organization	Financing Scheme	Types of Projects Financed	Portfolio Size
<b>State-Owned Banks</b>			
Development Bank of the Philippines	Green Financing Program	Cleaner production, waste minimization, resource conservation, energy efficiency, pollution prevention and control, incorporating climate change adaptation and mitigation and disaster risk- reduction measures,	PHP 21.87 billion
Development Bank of the Philippines	Sustainable Agribusiness Financing Project	Projects necessary for agribusiness MSME survival; not exclusively for green projects	PHP 3.2 billion as of Nov. 2018
<b>Private Banks</b>			
Banco de Oro Unibank	Sustainable Energy Finance Project	Renewable energy financing; energy efficiency financing; replacing or upgrading old equipment or changing process technologies with newer ones	15% of total loan portfolio as of Feb. 2020
Banco de Oro Unibank	Relending JICA's green facility	Renewable energy	USD 50 million
Bank of the Philippine Islands	Sustainable Energy Finance Project	Energy efficiency and renewable energy loans to develop alternative energy solutions throughout the islands.	PHP 130 billion
Bank of the Philippine Islands	Sustainable Development Finance Program	Renewable energy, energy efficiency, climate resilience, agriculture, and other projects in line with the SDGs	10% of total loan portfolio as of Aug. 2019, 20% target in 2020
Rizal Commercial Banking Corporation	Loans from the proceeds of Green and Sustainable Bonds	Renewable energy, energy efficiency, clean transportation, and sustainable water management.	PHP 29.8 billion, 10% of total loan portfolio as of Feb. 2020

Source: Authors' compilation from desk review of financial news articles and bank disclosure documents.

## 6. The Philippine Banking Industry on Financing EbAs

Five sets of interviews were conducted with current and former C-level and senior executives of the largest commercial banks in the Philippines. The sixth interview was with a public government development bank. The researcher also used a video presentation on sustainable finance from another commercial bank. The succeeding summaries are based on the content analysis of these interviews.

### 6.1 KEY PERSPECTIVES FROM A GOVERNMENT DEVELOPMENT BANK

- Government banks are required to finance projects that contribute to nation-building but also need to show returns since 50% of its income is reverted back to the government.
- Account officers are trained on using ESG criteria when assessing loan applications based on risk categories developed by the DENR, with high-impact projects referred to the program development team for further evaluation.
- Portfolio is concentrated on assisting SMEs, which are typically not proactive, respond to severe climate events through provision of working capital. Loan proceeds are typically used as working.
- The use of proceeds determines eligibility for sustainable finance. Coal projects and manufacturers of cigarettes and liquor are on the exclusion list.
- The bank currently does not integrate ESG factors into pricing the loan or the bond.
- Financing EbAs are considered as part of the bank's CSR program rather than part of the portfolio because a return is not expected.
- There is a willingness to partner with LGUs for financing EbAs because share of revenues from the national government can be assigned to the bank as the means for repayment.

### 6.2 KEY PERSPECTIVES FROM COMMERCIAL BANKS WITHOUT SUSTAINABLE FINANCE FRAMEWORKS

- Sustainability often refers to these banks' own performance in terms of achieving their respective ESG targets and CSR programs.
- Varied definitions of sustainable finance stems from a lack of awareness and knowledge on the topic, which was only brought to their attention through BSP Circular 1085. Sustainable finance is viewed as a regulatory requirement and will not directly benefits banks' financial performance.
- These banks continue to employ conventional processes and criteria for credit assessments. Alternative credit scoring, collateral assessments for high-risk disaster areas, and assistance for SMEs in developing their business continuity plans are also being utilized.
- There is limited appetite for projects that incorporate ESG factors, with only multinational enterprises and conglomerates implement these kinds of projects.
- Banks doubt the viability of EbA projects due to the inability to quantify their benefits, link them to the borrower's cash flow, and assess the ability to pay from a long-term perspective. High interest rates are considered fair due to EbAs being unproven and risky, with banks the risk of default through their loan-loss provisioning.



- Positive reactions to sustainable finance include opportunities to realign their bank's vision, mission, and goals to show commitment to environment and society and learning how ESG factors can be integrated into actual products and services.

### 6.3 KEY PERSPECTIVES FROM COMMERCIAL BANKS WITH SUSTAINABLE FINANCE FRAMEWORKS

- The BSP circular and Securities and Exchange Commission (SEC) sustainability reporting guidelines for publicly listed companies are necessary to scale up ESG investment in the country, ensuring that banks remain profitable, but with a purpose.
- Climate risk is equated to financial risk and incorporating ESG factors in financial products requires a real business proposition, ensures that projects will be technically acceptable and will run as planned, providing a return on investment for the client, and thereby banks are able to secure repayment [see Table 5]. By investing in these kinds of companies, banks are also able to future proof their own business model.
- The market growth for ESG bond investment is attributed to international institutional investors making it advantageous to partner with underwriters, arrangers and syndicate leads who know these ESG investors. The choice of currency for the bond issuance is based on the financing needs of the bank's clients.
- Developing the Philippine market for sustainable finance is challenging. Banks need to show bigger companies how sustainability can be integrated as a holistic strategy and SMEs how financing can help transform their operations to be more climate resilient.
- These banks neither incorporate ESG factors or sustainability targets in the pricing of the loans or determination of the bond yield nor do they link ESG factors as criteria for an event of default.
- Publicly reported allocation reports track the use of proceeds and measure the percentage of the sustainable finance portfolio against the total portfolio of the bank, and the allotment to each project funding category.
- Financing EbAs can be considered if there is a concrete effect on a borrower's bottom line, either through cash flow generation, additional jobs for the company, or a new revenue stream.



**Table 5.** Benefits for companies accessing sustainable finance

Environmental Benefits	Social Benefits	Governance Benefits	Profitability Benefits
<ul style="list-style-type: none"> <li>• Lower greenhouse gas emission</li> <li>• Better waste management,</li> <li>• Improved disaster, preparation</li> <li>• Generation of clean energy</li> <li>• More efficient energy use</li> <li>• Climate resilience</li> </ul>	<ul style="list-style-type: none"> <li>• Positive impact on the community</li> <li>• Higher local economic growth and increased employment</li> <li>• Helping MSMEs become the key drivers of inclusive growth</li> </ul>	<ul style="list-style-type: none"> <li>• Improved project management</li> <li>• Increased equipment reliability and availability,</li> <li>• Improved productivity and product quality</li> <li>• Compliance with ECC and other regulatory requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Futureproofing the business</li> <li>• Lower insurance premium</li> <li>• Reduced operating costs and cost of capital</li> <li>• Damage avoidance</li> <li>• Higher efficiency</li> <li>• Lower stranded asset risk</li> <li>• Product innovation and new revenue streams</li> <li>• Improves cash flow</li> <li>• Higher margins</li> <li>• Better ability to repay loans</li> </ul>

*Source: Authors' summary of key informant interviews.*

## 6.4 NEEDS ANALYSIS

There is no one-size-fits all solution to mainstreaming sustainable finance in the Philippine banking system. Banks require different support mechanisms depending on their resources and capabilities, and current progress in implementing sustainable finance frameworks. Based on the insights provided by the interviews, Philippine banks can be classified across three tiers, as illustrated in Table 6.



**Table 6.** Needs analysis based on bank tiers

**Tier One Banks — Universal banks that have existing sustainable finance frameworks.**

- Increasing allocation of sustainable finance portfolios against the total portfolio through new products and filling the gaps in their markets, especially among medium-sized enterprises.
- Help in educating potential clients and their stakeholders on the benefits of including ESG factors into their own business models.
- Determining how EbA projects manifest in the cash flow of the borrower and development of specialized financing instruments for financing EbA projects.
- Support on further integrating ESG criteria into the sustainable finance products, especially on pricing schemes and incentives linked to project key performance indicators (KPIs) or borrower's corporate ESG performance.
- Third-party verification of sustainable finance frameworks and crafting more sophisticated risk-rating and monitoring systems to further quantify the corresponding effect of ESG risks to their own rating methodologies, a requirement for stress testing.

**Tier Two Banks — Universal banks that do not have sustainable finance frameworks**

- Development or reassessment of sustainable finance frameworks.
- Capacity-building to make these banks competent in the actual implementation of the framework and improving operational knowledge in financing projects that incorporate ESG factors.
- An in-depth analysis of the model for sustainable finance and financing EbAs to concretize the numbers, such as calculations of risks and exposure, loss provisioning revenue generation, cost savings, and profits that can be directly attributed to sustainable finance.

**Tier Three Banks — Smaller banks such as thrift banks and rural banks**

- Educating bank employees on foundational knowledge on the benefits of mainstreaming sustainable finance, including financing nature.
- Auditing the current bank portfolio to see which components can be re-allocated to sustainable finance.
- Access to grants and technical expertise for development of sustainable finance frameworks and transforming their banking operations to comply with BSP Circular 1085.

*Source: Authors' analysis of key informant interviews.*

The following questions were brought up by the interviewees during the key information interviews. These questions indicate knowledge or operational gaps in banks as they develop or refine their respective sustainable finance frameworks:



- Who should be part of the sustainable finance committees of banks?
- How do banks go about changing the risk management charter board-level committees?
- What kinds of projects should banks prioritize in their sustainable finance frameworks?
- How can banks assess their portfolios and identify which existing components can already be categorized as sustainable finance?
- How can banks modify our existing financial products to comply with BSP Circular 1085?
- What ESG criteria should be incorporated into the credit risk-rating process, how do banks obtain that information and analysis, and how can it be layered into existing calculations or modelling?
- How can sustainable finance be included into the scorecards of the bank's board and management committees? What metrics do should be tracked?
- What kind of incentives should banks offer to relationship managers for them to promote sustainable finance products over conventional loans and investments?

## 7. The Business Case for Sustainable Finance for Nature

It makes business sense for banks to support and finance private sector EbA projects as part of their sustainable finance portfolio. Aside from the environmental and social benefits received from nurturing healthy ecosystems, EbA also has a direct effect on business operations and the corresponding balance sheet and profitability of the business.<sup>[60]</sup> Appendix 2 identifies several examples of EbA projects implemented by corporations in the Philippines and describes the corresponding benefits. The business benefits of EbAs generate positive cash flow for the companies and improve their respective bottom lines, which in turn improves the repayment capacity of any debt held by banks. The involvement of the largest groups of companies in the Philippines in EbA projects provides evidence to the business case for nature-based solutions.

## 8. Global Models on Financing EbA Projects

Several banks, insurance companies, and public financial institutions have already developed financing products for nature, which can be evaluated and adapted by the Philippine banking and finance sector as they develop their own sustainable financing frameworks.

### 8.1 SUSTAINABILITY LINKED LOANS

A sustainability-linked loan links the risk rating and corresponding pricing of the loan product to the borrower's performance on identified ESG key performance indicators [see Table 7]. Globally, the sustainability-linked loan market has exceeded green loan volumes in 2019, making this model the preferred type of sustainable finance arrangement. BNP Paribas provided a biodiversity linked loan for Finnish forest company UPM [see Box 1].

**Box 1. BNP Paribas and UPM's Biodiversity-Linked Loan<sup>[61]</sup>**

In March 2020, BNP Paribas acted as sustainability coordinator for UPM's, a Finnish forest-based corporation, Euro 750 million revolving credit facility with a tenure of five years, twice extendable for one-year. This is the first sustainability linked loan that included biodiversity and climate related KPIs are part of its pricing scheme:

- Net positive impact on biodiversity in the company's forests in Finland
- 65% reduction in CO2 emissions from fuels and purchased electricity between 2015 and 2030

Biodiversity as one of the KPIs highlights its role to business performance and the importance of sustainable finance in protecting ecosystems.

Unlike sustainable or green loans, proceeds of sustainability linked loans can also be used for conventional projects with the interest rate linked to the project's ESG performance or the borrower's enterprise-wide sustainability targets.<sup>[62]</sup> This means that sustainability linked loans can be used to finance EbA projects alongside conventional ones. Meeting sustainability targets will result in a preferential interest rate while underperformance will result in an increase in pricing.<sup>[63]</sup>

**Table 7. Other examples of sustainability linked loans**

Borrower	Industry	Bank	Amount	Tenure	Use of Proceeds	KPIs
Gold Coast Airport (Australia)	Infrastructure	Common-wealth Bank	AUD 75 million	5 years	Capital expenditures	Carbon emissions
Seaspan Corporation (Hong Kong)	Shipping	Societe Generale and BNP Paribas	USD 600 million	6 years	Revolving credit facility	Carbon emissions, alignment to Poseidon Principles
Swire Pacific (Hong Kong)	Conglomerate	DBS Bank	HKD 2 billion	5 years	Revolving credit facility	Energy consumption, water usage, diversity, inclusion
Westfarmers (Australia)	Agribusiness	Common-wealth Bank	AUD 400 million	3 years	No data	Indigenous people employment, carbon emissions

Wilmar International Limited (Singapore)	Agri-business	United Overseas Bank	USD 200 million	2 years	Advance the company's sustainability agenda	Corporate governance, carbon emissions, land use, community relations, supply chain practices
Xylem (United States)	Water Utility	ING and 11 other banks	USD 800 million	5 years	Revolving credit facility	No data

Source: Authors' desk review of corporate press releases

The Asia Pacific Loan Market Association<sup>[64]</sup> identifies several common key performance indicators which can be used to measure sustainability performance across several categories. These are summarized in Table 8.

**Table 8.** Examples of key performance indicators for sustainability linked loans<sup>[62]</sup>

KPI Category	Metrics
Energy Efficiency	Improvements in the energy efficiency rating of buildings or equipment
Greenhouse Gas Emissions	Reductions in equivalent greenhouse gas emissions in the production of goods
Renewable Energy	Proportion of renewable energy to fossil fuels used or generated
Water Consumption	Reduction in water consumption
Affordable Housing	Increases in the number of affordable housing units developed by the borrower.
Sustainable Sourcing	Improvement in the use of verifiable sustainable procurement criteria
Circular Economy	Reduction of waste through recycling or use of recycled materials
Sustainable Farming and Food	Sourcing or producing food products that have ecolabels or certifications
Biodiversity	Improvements in conservation and protection of biodiversity
Global ESG Assessment	Improvements in the borrower's ESG rating and/or obtaining a recognized ESG certification.

Source: Authors' desk review of corporate press releases.

## 8.2 PARAMETRIC INSURANCE

Parametric insurance protects an individual or organizational policyholder against the occurrence of a specific event, with payouts based on the magnitude of the event.<sup>[65][66]</sup> Initially conceived for insuring against disasters such as earthquakes and typhoons, parametric insurance is now being used to finance EbA as well. Afirme Seguros Grupo Financiero SA de CV launched the first parametric insurance product for repairing hurricane damage to coral reefs and beaches of Quintana Roo, Mexico with the policy purchased by the Mexican government and the USD 3.8 million payout wind speeds above 100 knots.<sup>[67]</sup> AXA is also using parametric insurance for mangroves [see Box 2].



### Box 2. AXA CYMO and XL Parametric Insurance

AXA offers the CYMO service that provides real-time alerts and response for clients facing natural disasters while AXA XL is currently developing a parametric insurance which can cover specific areas of mangroves in the Caribbean. Mangrove restoration costs range from USD 23,000 to USD 45,000 per hectare, equivalent to 30% of the cost of hydrological restoration, and as little as 0.12% the cost of constructing a seawall. Net present value calculations for 30 years with 4% discount rate show mangrove restoration in most of the coastlines in the Caribbean results in benefit-cost ratios greater than 15, indicating a good investment opportunity.

Payout is triggered by a natural event that damages mangrove forests, as measured by wind speed. Policy holders can be individual property owners, private businesses with mangroves protecting commercial and industrial properties, trust funds with multiple property owners along the same stretch of mangrove forests, or by local governments protecting mangroves in public areas.

*Source: Consolidated from the AXA website, press releases and reports.*

## 8.3 GREEN MUNICIPAL BONDS

Cities and municipalities can lose as much as 0.5% to 1% of their GDP to climate-related losses.<sup>[67]</sup> This led to the rise in popularity of the green municipal bond, a fixed-income financial instrument issued by local governments for raising funds through the debt capital market, with green municipal bonds only used to finance public projects with well-defined environmental benefits such as infrastructure or nature-based solutions.<sup>[68]</sup> Green municipal bonds are often issued by cities and municipalities located along the coast since these areas are more vulnerable to floods, sea level rise, storm surges, hurricanes, and other extreme weather events. The United States accounts for 70% of green municipal bond issuances.<sup>[69]</sup> Table 9 describes several green bonds that have been issued by city or state governments over the last several years.

Table 9. Green municipal bonds for financing EbA

State or City Government	Name of Green Bond	Year	Amount	Use of Proceeds
Massachusetts	Green bond	2013	USD 100 million	Land acquisition, open space protection and environmental remediation. 4% of the fund is allocated to habitat preservation and restoration, including the acquisition of 70 acres of coastal wetland for conservation.

State or City Government	Name of Green Bond	Year	Amount	Use of Proceeds
Flagstaff, Arizona	Wildfire bond	2014	USD 10 million	Thin 15,000 acres of forest to prevent fires and increase resiliency to floods and storms.
Miami, Florida	Forever bond	2017	USD 400 million	Roadway improvements (USD 23 million), parks and cultural facilities (USD 78 million), public safety (USD 7 million), sea-level rise mitigation and flood prevention (USD 192 million), affordable housing (USD 100 million). One of the project proposals include planting mangroves as part of a plan to restore the city's seawall.
Rhode Island	Beach, clean water, and green economy bond	2020	USD 74 million	Improvements to state beaches, parks and campgrounds, clean drinking water, local recreation, conservation of forested land and farmland, municipal resilience. Previous issuances in 2016 and 2018 helped conserve 229 acres of land to protect drinking water supplies and wildlife habitat and provide additional revenue streams from recreational activities.

*Source: Authors' compilation of green municipal bond announcements from local government websites.*

## 8.4 PRIVATE FINANCING MECHANISMS FOR CORAL REEFS

Securing the long-term future for coral reefs and other ocean resources requires public-private financing mechanisms.<sup>[70][71]</sup> Through the Global Fund for Coral Reefs, BNP Paribas is involved with a consortium in raising and investing USD 500 million over the next ten years to finance projects and businesses that reduce negative impacts on marine environments. It aims to bridge the financing gap by bringing in a combination of grant money from multilateral organizations, concessional loans and private investment from banks and their clients.<sup>[72]</sup> HSBC, alongside the Queensland Government of Australia, became the first buyers of Reef Credits to help meet the AUD 4 billion investment needed to meet water quality targets in marine ecosystems. The scheme incentivizes actors to implement water quality improvements providing farmers an opportunity to monetize the shift to sustainable agricultural practices. One reef credit is equivalent to one kilogram less pollutant, which can then be considered as one contribution to meeting a buyer's ESG KPIs.<sup>[73]</sup>

## 8.5 BLENDED FINANCE

Blended finance combines funding from different sources—public, private, and philanthropic—to contribute towards financing sustainable development projects.<sup>[74]</sup> Concessional funding from public and philanthropic sources is first used as catalytic capital to mobilize a project that can protect and preserve natural assets. The initial results serve as proof to attract private funding, which is more

difficult to secure since investors are looking for market-rate returns.<sup>[75]</sup> Convergence has formed a global multi-sectoral network that aims to direct private sector funding to improve SDG outcomes in developing countries. Through the network, members can participate in blended finance through different means—initiator, sponsor, advisory, or investor. Convergence’s main funding windows are summarized in Table 10.

*Table 10.* Convergence funding windows<sup>[75]</sup>

<b>Funding Window</b>	<b>Funder</b>	<b>Themes Covered</b>	<b>Examples of Approved Projects</b>
Indo-Pacific Design Funding Window	Australian Government	<ul style="list-style-type: none"> <li>• Sustainable and resilient infrastructure</li> <li>• Gender equality</li> </ul>	<ul style="list-style-type: none"> <li>• Local utility project aggregator to bring together electric cooperatives in the Philippines to invest in and own renewable energy projects.</li> <li>• Remittance-based financing mechanism for micro-infrastructure products</li> </ul>
Asia Natural Capital Design Funding Window	RS Group (private sector)	<ul style="list-style-type: none"> <li>• Protecting biodiversity</li> <li>• Reducing ecosystem degradation (e.g., deforestation)</li> <li>• Mitigating and adapting to climate change</li> <li>• Reducing unsustainable use of land and oceans</li> <li>• Restoring and rehabilitating impaired terrestrial, and coastal and aquatic ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>• Blended blue finance facility for effective management of marine protected areas in Southeast Asia.</li> <li>• Sustainable seafood fund to reduce the unsustainable use of ocean resources</li> </ul>
Global Emerging Markets Design Window	Canadian Government	<ul style="list-style-type: none"> <li>• Renewable energy</li> <li>• Agriculture and food security</li> <li>• Health and education</li> <li>• Climate change mitigation and adaptation</li> </ul>	<ul style="list-style-type: none"> <li>• Climate Finance Facility, the developing world’s first “Green Bank”.</li> <li>• Blue bond for financing debt conversions for Small Island Developing States that face climate change challenges.</li> </ul>

## 8.6 CENTRAL BANK SUPPORT

Central banks have a key role in developing monetary and oversight policies that support financial institutions in operationalizing sustainable finance.<sup>[76]</sup> In 2020, ASEAN central banks established a



regional agenda to support sustainable banking through the ASEAN Sustainable Banking Principles.<sup>5</sup> As an example, the Monetary Authority of Singapore (MAS) has established a grant facility to support sustainability linked loans by providing grants to borrowers to validate sustainability linked loans and help banks defray the cost of developing sustainable finance frameworks. MAS has gone beyond simply issuing guidelines and allocated funding to stimulate both the supply and demand side for sustainable finance [see Box 3].

### *Box 3. The Monetary Authority of Singapore<sup>[77]</sup>*

The Monetary Authority of Singapore (MAS) launched the world's first grant scheme to support green and sustainability-linked loans in November 2020. Grants can be used by borrowers to cover up to SGD 100,000 in expenses related to engaging independent advisors (e.g., Sustainalytics) for validation of sustainably linked loans over a three-year period. MAS defrays up to 90% of costs or a maximum of SGD 180,000 to help banks develop sustainable finance frameworks to economically empower SMEs and individuals.

MAS also incentivizes banks to provide SMEs with access to project financing, capped at 60% of bank expenses or SGD 120,000.

## 8.7 APPLICABILITY TO THE PHILIPPINE CONTEXT

Banks and financial institutions need to be incentivized by lower tariffs to mobilize parametric insurance.<sup>[78]</sup> The current experiences in parametric insurance in the Philippine are either large public policyholders (the national government) or small individual policyholders (farmers). Heterogeneous parametric insurance must be able to address different needs and industry characteristics of the private sector. The lack of sophisticated and up to date risk analyses decreases the attractiveness of parametric insurance, which requires a deep understanding of vulnerabilities and risks to determine trigger points. Green municipal bonds have low potential because of the stagnant municipal bond market in the Philippines caused by a preference of LGUs to take on debt from government banks. Better terms and conditions and easier bond flotation are necessary to attract LGUs to switch to green municipal bonds. Blended financing of ocean assets can work but the biggest hurdle will be inter-agency cooperation as well as efficient collaboration with the private sector and civil society.

<sup>5</sup> The ASEAN Central Banks' Agenda on Sustainable Banking is retrieved from the Annex of the Joint Statement of the 6th ASEAN Finance Ministers and Central Bank Governors' Meeting (AFMGM) on October 02, 2020, available at <https://asean.org/joint-statement-6th-finance-ministers-central-bank-governors-meeting-afmgm/>

Sustainability-linked loans present the most potential for transferability in the Philippines as a good entry-point into sustainable finance. Loan proceeds can be used for both green and conventional projects as long as ESG factors are included in the credit risk rating. It is easier to implement since some companies and industries are already required by regulation to submit impact analyses. Linking sustainability to loan pricing allows companies to assess their own operations and find ways to improve on their environmental, social and governance performance. Government banks can also offer sustainability-linked loans when lending to LGUs for their projects because considering sustainability performance as part of the loan conditions will benefit constituents and make local executives more prudent in the use of public funds.

## 9. The Trinity Project of Hijo Resources Corporation<sup>6,7</sup>

### 9.1 ABOUT THE COMPANY

Hijo Resources Corporation (HRC) is a Davao-based diversified corporation with business interests in leisure and tourism, agribusiness, property development, and port operations. The company is based in a 760-hectare property in Tagum City, Davao del Norte.

### 9.2 CHALLENGE AND OPPORTUNITY

Hijo's property spans 60% of Tagum's coastlines and contains a large lowland river basin. Deforestation in the upland watershed areas have offloaded sediment onto the intertidal and subtidal zones. Siltation has wiped out the rich marine ecosystem, including mangroves, sea grasses and corals. Salt water has begun to intrude into the water table, threatening the coconut plantation and the 60-hectare primary rainforest within Hijo's property. The coastline has retreated by over 100 meters, with Hijo losing one hectare of land area each year or a total loss of roughly 20 hectares so far. This translates to millions of pesos in lost property value plus equivalent losses in productive asset utilization from the 20 hectares each year.

### 9.3 ECOSYSTEM-BASED ADAPTATION SOLUTION

The Trinity Project is a three-fold approach to rebuilding HRC's coastal ecosystem. Carried out in four phases covering four kilometers of Hijo's coastline in Tagum City, Davao del Norte, the Trinity Project aims to plant 20 hectares of mangrove forest, grow 80 hectares of seagrass meadows, and create a fringing artificial coral reef environment (see Figure 1). The total rehabilitated area is estimated to cover around one hundred and twenty hectares of intertidal and sub-tidal zones. The boundaries

<sup>6</sup> The section is written using the format developed by European Investment Bank (n.d.). Investing in Nature: Financing Conservation and Nature-Based Solutions.

<sup>7</sup> This theoretical case is based on the Hijo Resources Corporation management case (unpublished) written by Maria Angela G. Zafra, Wilfred S. Manuela Jr., Manuel J. de Vera, and Angelina G. Golamco of the Asian Institute of Management, Philippines.

of the project reach from the southern side of the Madaum River down to the northern side of the Libuganon River.



Figure 1. Trinity Project Site Map

Source: Harry D. Morris, Hijo Resources Corporation

## 9.4 INVESTMENTS

The implementation of the Trinity Project was carried out over four phases with each phase covering roughly one kilometer of coastline. Each stage of the project was estimated to cost between PHP 2.5 million and PHP 3.5 million, including materials, wages, and professional fees. These are summarized in Table 11.

Table 11. Cost of the Trinity Project

Materials or Inputs	Cost of Materials	Cost of Labor	Other Costs
Concrete bommies (for the artificial coral reefs)	PHP 13,000 to PHP 15,000 per bommie	PHP 5,000 labor per bommie	
Mangrove seedlings (for the mangrove nursery)	PHP 108,000 for 100,000 seedlings per year (PHP 1.08 per seedling)	PHP 408,000 per year to maintain the mangrove nursery; no cost for volunteer planting in the coastal sites	

Materials or Inputs	Cost of Materials	Cost of Labor	Other Costs
Bamboo slats (for the bamboo barriers)	PHP 652,000 for the bamboo barrier for Phase 1 (out of 4 phases) <sup>8</sup>	PHP 1,451,000 for Phase 1 (out of 4) <sup>8</sup>	PHP 210,300 contingency fund for replacement of damaged bamboo slats that make up the bamboo barrier
Sea grass (for the sea grass meadows)	No cost since sea grasses are taken from existing donor sites	Not accounted for	

*Source: Hijo Resources Corporation management case (unpublished) written by Maria Angela G. Zafra, Wilfred S. Manuela Jr., Manuel J. de Vera, and Angelina G. Golamco of the Asian Institute of Management, Philippines.*

Financing came solely from HRC, which had invested PHP 5.9 million in the project so far, including a budget of PHP 3.4 million for 2018. The annual budget for EbA was entirely from Hijo's office of the president. No loans have been taken and the project has yet to receive any external grant funding.

## 9.5 INITIAL RESULTS

Implementation of the first phase of the Trinity Project has resulted in the return of different fish species, growth of corals and spread of sea grass meadows. Transplanted corals doubled in size in two years. Biodiversity count increased from eight to over 35 species of reef fish within 1,800 square meters. Over 6,000 square meters of seagrass have been cultivated and 2,100 mangroves have been planted to cover 4,000 square meters. In the long run, HRC and the Trinity Project hope that their continuous efforts in the Davao Gulf will create a thriving marine ecosystem with visible increase in biodiversity, as well as establish an ecotourism hotspot, and provide a sustainable aquaculture environment.

## 9.6 PROPOSED FINANCING MODEL

### *Bank Finance*

With Phase 1 as a proof of concept and viability of the Trinity Project, Hijo Resources Corporation can apply for a loan to finance the remaining three phases of the EbA from a bank. A sustainability-linked loan covers the capital and operating expenditure for the project and at the same time link the financing terms to biodiversity and ESG-related KPIs. This allows Hijo to expand its operations in a more sustainable way.

<sup>8</sup> The length and coverage of each phase slightly differs.



### Guide for EbA Financing

Banks focus on a borrower's debt repayment capacity as demonstrated by a projected cash flow statement. Borrowers such as HRC can approach banks by preparing a monthly projected cash flow statement that will highlight the new revenue streams generated by the EbA project including the potential savings in future expenses. Table 12 shows an example of a modified projected cash flow statement which highlights the new revenue streams due to the rehabilitation of HRC's coastal and marine ecosystems and cost savings from reduced flood damage and reduced clean-up.

*Table 12.* Sample cash flow with inclusion of EbA benefits

Cash Flow	Amount
<i>Sources of Cash</i>	
Regular revenues	xx,xxx
New revenue streams	
Ecotourism	xx,xxx
Enhanced fish catch	xx,xxx
<i>Total Sources of Cash</i>	xxx,xxx
<i>Uses of Cash</i>	
Regular expenses	xx,xxx
Repayment of debt	
Flood damage before savings	xx,xxx
Cost savings from reduced flood damage	(xx,xxx)
Clean-up expenses before savings	xx,xxx
Cost savings from reduced clean-up	(xx,xxx)
<i>Total Uses of Cash</i>	xxx,xxx
<b>Net Cash Flow</b>	<b>xxx,xxx</b>

The approach shows what would be the projected net flood damage and clean-up expenses after deducting the future cost savings as a result of the EbA initiatives. The projected cash flow statement will influence the amount of the loan to be granted and the timing of the loan disbursements. It is important to provide a detailed description of the assumptions supporting each item in the projected cash flow statements. A former banker in the Philippines with 20 years commercial lending experience confirmed that the modified cash flow model will enhance understanding of the benefits and costs of EbA projects.

For sustainability-linked loans, the loan application should be supported by KPIs. A more environmentally responsible borrower results in better debt repayment capacity and a future-proof loan portfolio for the bank. Table 13 shows examples of KPIs that are specific to Hijo's EbA project:

**Table 13.** Possible sustainability linked loan KPIs for the Trinity Project

SLL KPI Categories	KPI Descriptions
Biodiversity KPIs	<ul style="list-style-type: none"> <li>Biodiversity count in the bommies (fish and corals)</li> <li>Hectares of seagrass meadows</li> <li>Number of mangroves planted and survival rate</li> </ul>
Asset Protection and Damage Avoidance KPIs	<ul style="list-style-type: none"> <li>Land loss due to erosion (baseline of one hectare per year)</li> <li>Coconut plantation yield (prevention of saltwater intrusion)</li> <li>Siltation in port area (inches)</li> </ul>
Revenue Generation KPIs	<ul style="list-style-type: none"> <li>Number of mangrove tours, snorkeling tours, SCUBA dive trips</li> <li>Fish catch on new aquaculture venture</li> <li>Revenue generated from these activities</li> </ul>

### Blended Finance

Typically, blended finance is used to attract private finance to projects that have been initially funded through public funds or grants. The reverse applies to HRC, with private funding as the catalyst to attracting complementary local public investment on coastal areas outside Hijo's property lines. The city government of Tagum and the provincial government of Davao del Norte created local climate change action plans that are complementary to Hijo's Trinity Project. The local government unit can protect the remaining coastline of the area by extending the project outside Hijo's property boundaries. Climate action that addresses environmental issues and protects the watershed in upland areas prevents upland erosion and the subsequent siltation and sedimentation of rivers and catch basins. Public project financing can be accessed by preparing a proposal for the People's Survival Fund or the local government of Tagum can borrow from government banks to finance coastal protection and rehabilitation. Government financial institutions can also utilize the sustainability-linked loan model in lending to local governments to ensure that public funds result in favorable sustainability outcomes, with KPIs linked to the future borrowing capability of the local government of Tagum.

## 9.7 REVENUE MODEL

The Trinity Project protects company assets, with mangroves act as a natural barrier against extreme weather, preventing further erosion and land loss, and aid in sand banking or land recovery. Mangroves protect the primary forest and safeguard the agricultural yields of the coconut plantation by preventing saltwater intrusion. Siltation from upland areas to the port area can be minimized, resulting in damage avoidance for cargo ships. The minimized losses generate positive cash flow for the company.

The primary value of Hijo is the land itself. Assuming the higher end of the required investment range at PHP 3.5 million per phase, the Trinity Project requires a total investment of PHP 14 million. Maintenance cost will be minimum once the mangroves are grown. Corals and seagrass can thrive as long as they are not disturbed, and the immediate environment is kept healthy. A quick search on online property market [MyProperty.ph](https://www.myproperty.ph) on 26 February 2021 resulted in a similar coastal property

within the Davao Gulf being sold at PHP 70 million per hectare. Just preventing one hectare of property loss from erosion would result in benefits that would outweigh the initial investment, with an estimated benefit-to-cost ratio of 5:1. This does not include additional revenue sources, which will further increase the benefit-to-cost ratio. Hijo's estimated benefit-to-cost ratio compares favorably with the mangrove planting project in Vietnam [see Box 4].

#### *Box 4. Mangrove Planting Project in Vietnam<sup>[79]</sup>*

A study on planting mangroves in Tam Giang lagoon in Vietnam cost USD 38,000 representing seedlings, planting, and equipment. Total benefits were estimated at USD 86,000 from reduced flood damage, increased fish harvest, and ecotourism. The resulting benefit-to-cost ratio was 2.3:1.

The EbA contributes to a more pristine natural environment, making it more attractive to Hijo's resort guests and residential lot buyers. New revenue streams can also be generated through aquaculture and operating tours and activities within the EbA project sites, such as mangrove boardwalks, snorkeling, and diving in the transplanted coral sites.

## 10. Conclusions and Recommendations

### 10.1 CONCLUSIONS

Nature is the most fundamental form of capital, yet the health of ecosystems is being threatened by exploitative anthropogenic behavior. Ecosystem-based adaptation is one of the nature-based solutions that integrates climate change adaptation with socioeconomic benefits. Engaging the private sector in investing for business resiliency by transforming their business operations to include ESG indicators requires financing.

Sustainable finance, which considers environmental, social and governance factors in investment decisions on sustainable projects, is one of the mechanisms for narrowing the finance gaps for EbAs. It is relatively new in the Philippines, with only a few commercial banks and government financial institutions currently issuing green bonds and green loans. However, the landscape is about to change as government regulation has made it mandatory for Philippine banks to develop their respective sustainable finance frameworks and allocate a portion of their total portfolio to projects that are eligible under these frameworks.



## 10.2 RECOMMENDATIONS

### *Develop a Simpler Taxonomy for Sustainable Finance*

Developing a simpler taxonomy and shared language for sustainable finance can localize sustainable finance to the Philippine context, lower the learning curve and make it easier for the private sector to understand the benefits of implementing and financing these kinds of projects. Mapping can match project categories to appropriate sustainable finance products.

### *Use Blended Finance to Attract Private Investment*

Borrowers need to first prove to banks that their EbA project is investable. Eligible proponents can make proposals for donor funding for the initial phase of the EBA project. Implementers can then approach banks for financing the operational phase.

### *Sustainability-Linked Loans Viable Option for both Borrowers and Lenders*

Sustainability-linked loans present the most potential for adoption by the banking and finance sector in the Philippines. Philippine banks will most likely be receptive to adopt this model because this is already a trend with commercial banks internationally. Sustainability-linked loans can also be adopted by government banks for development loans which cities and municipalities can use to finance public projects.



### *Grow and Nurture the Ecosystem for Sustainable Finance to Support EbA Projects*

Demand-side recommendations include:

- Educate the private sector on the benefits and mechanics of including ESG factors and integrating ecosystem-based adaptation in different business core functions.
- Co-develop with the banking industry a compendium of ESG factors and different levels of implementation to guide SMEs in assessing current business operations and selecting the most relevant and practical methods for transforming their business.
- Develop local uptake for green bonds, starting with institutional investors, then gradually to individuals looking for investments that mirror their own value systems. Making it to invest through online trading platforms and mobile applications.

Supply-side recommendations include:

- Customize capacity-building programs for banks depending on the needs of each tier discussed in Section 6.4 of Part I of this handbook.
- Complement training programs with the development of a knowledge platform and community of practice to facilitate a continuous exchange of knowledge within the industry.
- Initiate a pilot project to show proof of concept of EbA projects financed by sustainability-linked loans. Channel financing from a multilateral organization such as the IFC or ADB to a commercial or government bank with a business or a local government unit as the borrower. Develop cases to document these projects.

Regulatory recommendations include:

- Revisit and consult with banks on realistic timelines for implementing BSP Circular 1085 given the current pandemic situation. Use sliding scale timelines for compliance to the circular based on the bank tiers.
- Support the action items of the ASEAN Central Banks agenda on sustainable finance. BSP, SEC and DTI can explore the development of a joint facility for grants and incentives, for banks and SMEs.
- Creation of a category of awards related to sustainable finance to motivate banks in implementing sustainable finance.
- Form a high-level multi-stakeholder sustainable finance working group composed of representatives from the BSP, banking associations, key donor and multilateral organizations, civil society organizations, chambers of commerce, and academic and research institutions to open dialogues, address concerns, advocate solutions regarding sustainable finance, including lobbying for recognition that EbA is a critical issue that requires investments through sustainable finance.

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## APPENDIX 1: Green Bonds Issued by Philippine Banks and Corporations

Issuer	Issuer Type	Name of Bond	Year Issued	Amount	Term Year	Projects Financed
AP Renewables Inc / Aboitiz Equity Venture	Non-financial corporate	Climate Bond	2016	PHP 10.7 billion	2026	Rehabilitation of the Tiwi-Makban geothermal facility
International Finance Corporation	Multilateral organization	Mabuhay Bond	2018	USD 90 million	2033	Energy Development Corporation's capital expenditure program
China Banking Corporation	Financial corporate	Green Bond	2018	USD 150 million	-	Renewable energy, green buildings, energy efficiency, water conservation projects of the IFC (sole investor)
Banco de Oro Unibank	Financial corporate	Green Bond	2018	USD 150 million	-	Energy, buildings, waste management projects of the IFC (sole investor)
Bank of the Philippine Islands	Financial corporate	ASEAN Green Bond	2019	USD 300 million	2024	Renewable energy, energy efficiency, sustainable water and wastewater management, pollution prevention and control, green buildings.
Bank of the Philippine Islands	Financial corporate	Green Bond	2019	CHF 100 million	2021	Environmental projects through its Green Finance Framework
Rizal Commercial Banking Corporation	Financial corporate	ASEAN Green Bond	2019	PHP 15 billion	2020	Renewable energy, buildings, transport, and waste related project. Under the transport category, freight rail infrastructure is eligible only if not dedicated to the transport of fossil fuels.
Rizal Commercial Banking Corporation	Financial corporate	ASEAN Sustainability Bond	2019	PHP 8 billion	2021	Renewable energy, green buildings, clean transportation, energy efficiency, pollution prevention and control, sustainable water management, environmentally sustainable management of living natural resources and land use, affordable basic infrastructure, access to essential services, employment generation, affordable housing and socioeconomic advancement and empowerment

Issuer	Issuer Type	Name of Bond	Year Issued	Amount	Term Year	Projects Financed
Development Bank of the Philippines	Financial state-owned	ASEAN Sustainability Bond	2019	PHP 18.125 billion	2021	Projects in line with the Sustainable Development Goals
AC Energy Finance international Limited	Non-financial corporate	Green Bond	2019	USD 225 million	2024	Investments in new greenfield projects onshore and in Vietnam as well as the acquisition of additional stakes in renewable energy projects in the Philippines.
AC Energy Finance International Limited	Non-financial corporate	Green Bond	2019	USD 75 million	2024	Investments in new greenfield projects onshore and in Vietnam as well as the acquisition of additional stakes in renewable energy projects in the Philippines.
AC Energy Finance International Limited	Non-financial corporate	Green Bond	2020	USD 60 million	2024	Investments in new greenfield projects onshore and in Vietnam as well as the acquisition of additional stakes in renewable energy projects in the Philippines.
AC Energy Finance International Limited	Non-financial corporate	Green Bond	2020	USD 110 million	2029	Finance eligible green projects in accordance with AC Energy's green bond framework
AC Energy Finance International Limited	Non-financial corporate	Perpetual Green Bond	2020	USD 400 million	-	Renewable energy expansion across the Asia Pacific region to include the Philippines, Indonesia, Vietnam, Myanmar, India, and Australia, among others.
Arthaland Corporation	Non-financial corporate	ASEAN Green Bond	2020	PHP 3 billion	2025	Finance portfolio of projects related to green developments
Manila Water Company Inc.	Non-financial corporate	Sustainability Bond	2020	USD 500 million USD	2025	Sustainable water and wastewater management, terrestrial and aquatic biodiversity conservation, and affordable basic infrastructure.
Bank of the Philippine Islands	Financial corporate	Social Bond	2020	PHP 21.5 billion	2022	Restart and sustain micro, small, and medium enterprises amid challenges arising from the COVID-19 pandemic.

Source: Authors' compilation from desk review of financial news articles and bank disclosure documents.

## APPENDIX 2: Examples of EbA Projects Implemented by Philippine Corporations

Company	EbA Project	Business Benefit	Environmental Benefit	Social Benefit
Ayala Land, Inc.	Integrating forests into the masterplans of estates, including Lio Estate in El Nido, Palawan.	<i>Carbon Sequestration:</i> Carbon neutrality in all commercial properties by 2022.  <i>Revenue Generation:</i> Inclusion into the Dow Jones Sustainability Index will benefit stock price. Lio's award as the World's First Sea Turtle Friendly Tourism Certification will increase property values and attract more clients. Additional income stream through eco-forest trail.	Building site resilience to recover quickly from environmental stresses.	Nine livelihood programs in the El Nido site. Social Return on Investment: economic value created for beneficiaries is 26 times more than the cost.
CAVITEX Infrastructure Corporation; Metro Pacific Investment Corporation	Rehabilitating the mangrove forest along the coastline of Manila-Cavite Express Way (CAVITEX) and the Las Piñas-Parañaque Critical Habitat and Ecotourism Area.	<i>Asset Protection and Cost Avoidance:</i> Flood mitigation in the coastal expressway and protection of the against storm surges.  <i>Alignment to Corporate Strategy:</i> Achievement of MPIC's goal of providing safe and efficient road transportation.	Protection of marine habitat and bird sanctuary.	Community-based ecotourism
First Gen Corporation	Nationwide greening program	<i>Carbon Sequestration:</i> Displacement of over 380,000 tons of CO <sub>2</sub> as part of the Company's zero-carbon generation goal.	Vegetation absorbs close to five times the company's emissions. Preservation of native tree species	Agro-forestry livelihood programs for community.
First Philippine Holdings	Protection of natural, reforestation and development of green spaces	<i>Asset Protection and Cost Avoidance:</i> Climate change is covered by the enterprise risk management program. FPH Board recognizes sustainability as a fiduciary concern.	Protection of public forests	Alternative livelihood to forest dwelling communities
Manila Water	Watershed protection and rehabilitation	<i>Asset Protection and Cost Avoidance:</i> Ensure water supply sustainability and mitigate risks associated with the quality and quantity of water available for the concession.	Prevent soil erosion which affects the turbidity of raw water.	-



Company	EbA Project	Business Benefit	Environmental Benefit	Social Benefit
Pilipinas Shell Petroleum Corporation	Carbon sink management program with 83,000 seedlings of endemic and indigenous tree species	<i>Regulatory Compliance:</i> Stipulation for issuance of ECC  <i>Carbon Sequestration:</i> Contribution to Shell's Net Carbon Footprint targets and inclusion into the performance share awards of employees.	Mitigation of greenhouse gas emissions	Livelihood and employment for planting and maintaining the forest.
San Miguel Corporation	Planting a total of 190,000 mangroves in 76 hectares of shoreline in Bulacan and Central Luzon.	<i>Asset Protection and Cost Avoidance:</i> Flood mitigation for the P700 billion airport that SMC will be building.	Prevention of erosion and maintaining marine ecosystem.	Mud crab production within the mangroves as sustainable livelihood program for the community.
SM Prime Development	Preservation of more than 10,000 mangrove trees within the Hamilo Coast estate in Batangas	<i>Revenue Generation:</i> Increase the value of the development and economic activity through added tourism activities.	Enables a pristine coastal environment and protection of marine habitat	Employment for community

Source: Authors' compilation from various news articles, press releases, and annual reports.

## PART 2

# Economic Valuation of Ecosystem-based Adaptation in the Philippines<sup>9</sup>

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<sup>9</sup> The second part of the handbook is a shorter version of the unpublished paper, “A Technical Analysis of Economic Valuation of Ecosystem-based Adaptation Approaches in the Philippines.”

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# 1. Introduction

While industrialization and technological innovation have benefited humanity for centuries, economic progress has also resulted in biodiversity decline and in the acceleration of the effects and adverse impacts of climate change.<sup>[1]</sup> The World Resources Institute, through the 2005 Millennium Ecosystem Assessment<sup>[2]</sup>, has determined the actions necessary for abating environmental degradation and pursuing adaptation, conservation, and sustainability by establishing the provisioning, regulating, cultural or aesthetic, and supporting services provided by nature that are integral and indispensable for survival. Since the environment has a huge capacity for abating and moderating the impacts of climate change through the regulating services of ecosystems, it is crucial that adaptation and mitigation actions account for the preservation, protection, and conservation of our natural resources.<sup>[3][4]</sup> Although the Philippine government has begun working on climate change adaptation and mitigation as guided by laws, policies, and action plans, the need for synergy and collaborative actions, and the involvement of the private sector, have yet to be realized.

Acknowledging that the degradation of environmental resources has enormous repercussions on food and health systems and supply chains, which will negatively impact future generations<sup>[5]</sup>, members of the World Economic Forum's multi-stakeholder community identified environmental concerns as among the top risks to consider over the long term.<sup>[6]</sup> The impacts of climate change are already being felt in the private sector through increased costs due to disrupted operations.<sup>[7]</sup> While entities like banks, institutional investors, major firms, and small to medium-sized enterprises will be adversely affected by climate change, they can also be potential sources of action, particularly through sustainable management and the provision of capital for biodiversity and ecosystem protection.<sup>12</sup>

Changes in rainfall patterns and droughts were the most common climate risks reported by 1,959 participating companies that responded to the 2016 CDP<sup>13</sup> climate change questionnaire. These companies represented 69% of the world's total market capitalization.<sup>[8]</sup> Most responded with the usual soft (e.g., planning, human resources development, knowledge generation) and hard (e.g., investments in technological or engineered infrastructure) approaches as an adaptation measure; only 0.1%, or 1 out of 1,630 companies that disclosed more than one climate risk exposure, is currently relying on nature-based solutions such as sustainable agriculture, watershed protection and restoration, and sustainable forest management, including coastal ecosystem management.<sup>[8]</sup>

The underestimation of the financial implications of climate change, limited view of climate impacts and consequent setbacks to society, failure to include nature in adaptation interventions, lack of articulation of all adaptation options, and difficulty in quantifying climate risks are key blind spots<sup>[8]</sup> that need to be addressed to help the private sector begin major operational adjustments to prepare properly for imminent climate catastrophes.

<sup>12</sup> UNDP (2020). Moving Mountains: Unlocking Private Capital for Biodiversity and Ecosystems (p. 6).

<sup>13</sup> CDP is a non-profit charity that provides a global disclosure system for public and private sectors for management environmental impacts.<sup>[52]</sup>

The second part of this handbook documents the economic valuation of ecosystem-based adaptation projects in the Philippines and recommends policy options for the government and other stakeholders to help mitigate the risks and negative impacts of climate change.

## 2. Natural Capital Risk Assessment Tools and Methodologies

A number of tools are available online (see Appendix 1) that can help the private sector in addressing blind spots and gaps in its assessment of and adaptation to climate change risks. Developed by various international institutions to help the financial sector assess their impacts and dependencies on nature, these free-access tools, methodologies, and frameworks are helpful for making better decisions on how to manage climate risks in business operations and for improving an organization's contribution to sustainable financing.

While the private sector is clearly responsible for its own negative impacts on the environment, the benefits it can derive from biodiversity and ecosystems conservation and restoration are not well understood.<sup>[9]</sup> Although transforming business operations into sustainable ventures can lead to healthy ecosystems that may result in a continuous flow of ecosystem goods and services, there is still a need to articulate the benefits and costs of mainstreaming protection and conservation into business operations.

## 3. Ecosystem-based Adaptation

Ecosystem-based adaptation (EbA) is a natural resource protection intervention that utilizes the services of nature to help communities and businesses adapt to the adverse effects of climate change.<sup>[10]</sup> Effective EbA actions increase the resilience of people and the environment against climate-related disasters and should be considered in development plans.<sup>[11][12][13][14]</sup> Combining EbA with engineered infrastructure projects, moreover, is more economically favorable in the long run compared to relying solely on engineered solutions. Coastal protection, water filtration, and protection from erosions and floods, for example, are EbA benefits that occur naturally without the need to invest large amounts of capital.<sup>[15]</sup> Such benefits even extend into poverty reduction, heritage conservation, and the preservation of local and cultural identities, thereby prolonging the lifetime of engineered measures and safeguarding ecosystems that capture greenhouse gas emissions.<sup>[11]</sup>

### *EbA and the Financial Sector*

Concessional capital, including bank financing<sup>[7]</sup>, can be an effective mechanism for producing impacts that can lead to the unlocking of private investments for EbA<sup>[9]</sup>, which will augment the limited subsidies and grants provided by public institutions, development organizations, and private companies for nature-based management interventions.<sup>[16]</sup> The Principles for Responsible Banking



framework of the UN Environment Programme Finance Initiative, for instance, which supports the vision of the UN Sustainable Development Goals (SDGs) and Paris Climate Agreement<sup>[17]</sup>, can help the Philippine banking industry invest more in the development sector, with a focus on climate action. The main challenge is the development of business opportunities that have attractive risk-return profiles amid intensified climate-related disasters.

## 4. Conservation Investment Blueprints

The coastal resilience and fisheries blueprints developed by the Coalition for Private Investment in Conservation (CPIC) is also applicable to the Philippines given that 60% of the country's population lives in coastal municipalities and cities.<sup>[18]</sup> The CPIC's customized financial instruments can help harness private sector finance to address climate change challenges in a developing nation rich in marine biodiversity but confronted with many natural and human-made threats.

### *Channelling Private Finance into Marine Protected Areas—Coastal Resilience Sector*

This blueprint, which includes an innovative management lease for marine protected areas (MPAs), is a debt instrument with a two-year grace period and a minimum six-year term based on a public-private partnership approach between a Special Purpose Entity and the government. Impact investors and donors provide a blend of debt and grants while financial development institutions provide de-risking options. Income is generated from visitors' fees, ecotourism, sustainable fisheries, and blue carbon credits earned through effective MPA management. The government maintains its functions in usage regulation, zoning, enforcement, compliance, and in the validation of annual workplans and budgets and management of fishery resources.<sup>[19]</sup>

This blueprint is currently active in the Caribbean where impacts measured include improvements in coral reef ecosystem health and increases in, or the creation of, income generating activities (or livelihood opportunities) that benefit MPA communities, especially from increased fishery productivity. Such an instrument can be tested in and adapted for the Philippines since there is no similar financial arrangement to date for the 35 currently legislated and nationally managed marine protected areas in the country, much less for the 1,500 other MPAs that are locally managed.<sup>[20]</sup>

### *Blended Finance Facility for Fisheries Improvement Projects (FIPs)—Sustainable Coastal Fisheries Sector*

Serving as a special purpose vehicle for blended capital from public and private investors, FIPs are anchored on the principles of effective management, which aim to ensure sustainable fish stocks and minimize environmental impacts. A blended public-private finance facility, which began with two to three FIPs in two years and with the intention to scale up (expand or increase the number of FIPs), has already been implemented.<sup>[21]</sup> Such a financing model, which has 10-year concessional debt providing 70% of the funding with the remaining 30% as equity, has been reported to have made double digit returns.<sup>[21]</sup>

## 5. Economic Valuation of EbAs

Developing the economic case for EbA in terms of its adaptation capacity and multiple benefits over purely engineered measures remains a challenge. Certain gaps, such as inadequate evidence of its effectiveness and minimal available information about processes that generate wider benefits<sup>[22]</sup>, make it difficult to prove that EbA will yield a worthwhile return on investment. It is imperative, therefore, to develop relevant economic models, evaluation processes, and metrics especially in light of these existing challenges.<sup>[23]</sup>

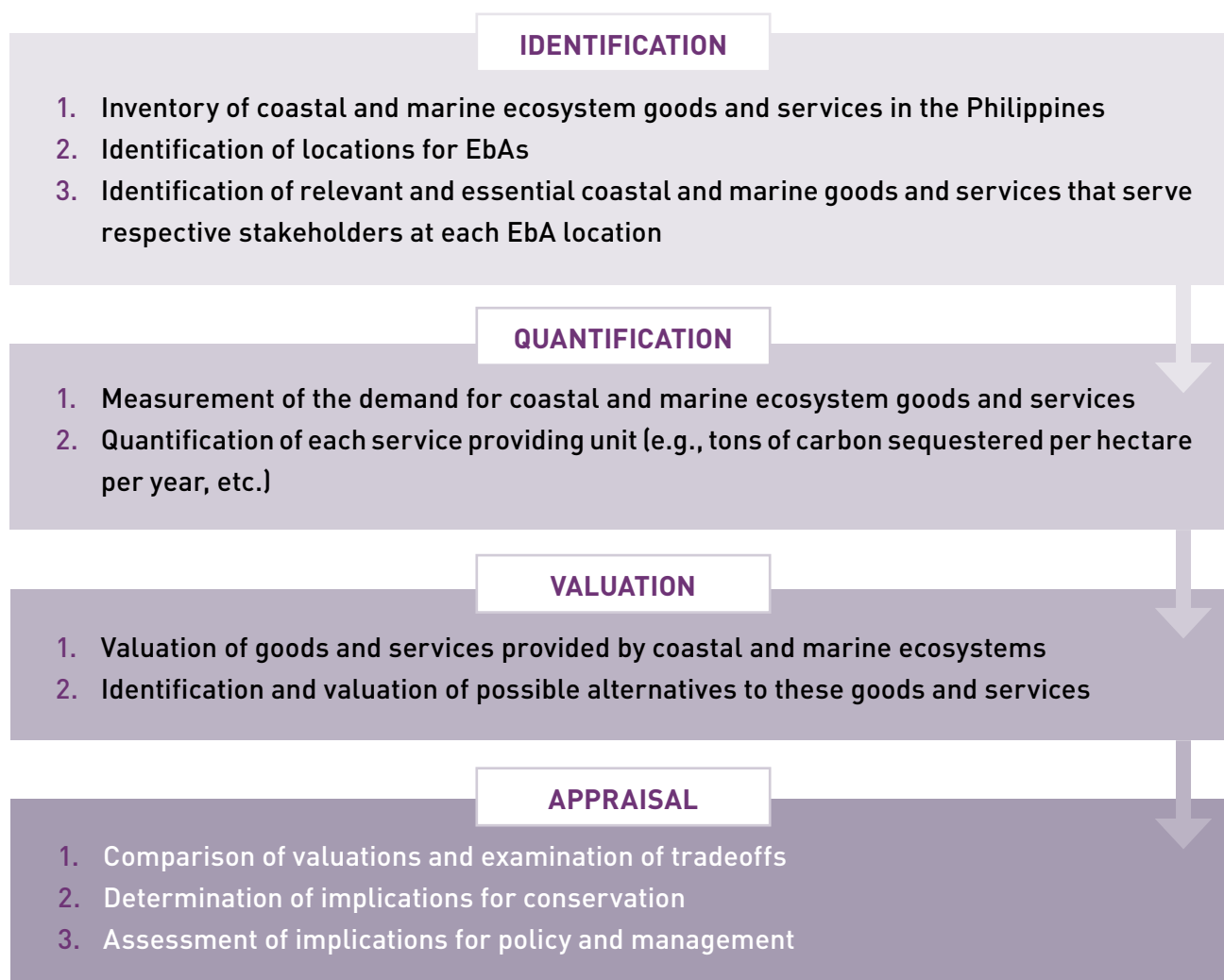
Environmental economic valuation can be one of the ways to address these gaps. EbA valuation is the “process of describing, measuring and analysing how the benefits, costs and impacts arising from the implementation of ecosystem-based approaches to adaptation are generated, received and perceived.”<sup>[24]</sup> EbA valuation “seek[s] to capture wider values and place them on a common footing to allow [for] direct comparison” and “call[s] for the collation of a significant amount of underpinning scientific data.”<sup>[25]</sup>

The relevance, credibility, and legitimacy of valuation results, however, stem from a multidisciplinary, multi-thematic, and cross-sectoral process, and demand the involvement of various stakeholders and extra financial inputs to ensure its significance.<sup>[11][24][26][27]</sup> While such requirements make the economic valuation exercise resource-intensive in terms of time, effort, and money, EbA has long-term benefits that go beyond climate impact adaptation and mitigation, yielding wider co-benefits in the areas of public health, aesthetics, recreation, air quality control, and waste treatment.<sup>[28]</sup> Long-term adaptation benefits will also result in more sustainable operations for businesses and the private sector.<sup>[29]</sup>



### *Economic Valuation of EbA in the Philippines*

Figure 1 is a step-by-step process for the conduct of economic valuation of ecosystem services for EbAs that cover coastal and marine ecosystems in the Philippines. This simplified framework guides the valuation procedure from identification of ecosystem services up to the determination of the implications of valuation results to conservation, policy, and management.<sup>[30]</sup>



*Figure 1.* Adapted from the general framework for the quantification and valuation of ecosystem services of tree-based intercropping systems.<sup>[30]</sup>

The methods for the economic valuation of ecosystem services are categorized into three types: stated preference, revealed preference, and value or benefit transfer.<sup>[25]</sup>

Stated and revealed preferences, which are primary economic valuation methods, are more acceptable to concerned stakeholders, users of information, and decision makers as these methods yield more direct and accurate results compared to value or benefit transfer.<sup>[31]</sup> A mix of terrestrial and marine economic valuation studies shows that techniques for both stated and revealed preference have already been applied in the Philippine context. See Appendix 2 for a summary of the strengths, limitations, and applicability of different valuation techniques relative to different coastal and marine ecosystem services.

Stated preference methods, which involve eliciting responses from relevant stakeholders or respondents through surveys and interviews<sup>[32]</sup>, include contingent valuation and choice modeling, both of which are used for the estimation of non-use values<sup>14</sup>.<sup>[25]</sup> Revealed preference methods are not as straightforward and obtain insights through related activities that can reveal the preferences of respondents. Techniques for revealed preference methods include travel cost, hedonic pricing, avoided cost (or avertive expenditure), replacement cost, and direct market valuation.<sup>[25]</sup>

The value or benefit transfer method uses the results of primary valuation studies in dealing with affordability and length of time<sup>[25][33]</sup> and involves transferring an estimated value from original studies (or study sites) to a new application (or policy site)<sup>[33]</sup> in estimating benefits and costs, which is done using the best information available that can guide decision making in the establishment of EbAs such as MPAs.<sup>[33]</sup>

In the context of EbA, ecosystem services are commonly valued using avoided damage cost and replacement cost techniques, which are related to climate change under the regulation function. These methods are also less demanding in terms of time, money, and technical expertise. Benefit transfer, for instance, can be performed in urgent situations, such as to provide value for damages caused by ship grounding and oil spills, and can also help determine gross estimates on a national scale and provide inputs for decision making and policy development. Appendix 3 lists primary economic valuation studies that have been done in the Philippines, which may be useful for performing the benefit transfer technique for other sites.

Since there is currently no licensure examination in the Philippines for a career or profession in the economic valuation of ecosystem services, entities in the private sector that need to conduct economic valuation studies for various purposes (e.g., decision making for business ventures) may opt to hire individual experts (such as ecologists and economists) to do the research.

### ***Application of the Benefit Transfer Valuation Method in the Siargao Islands***

With a total of 48 islands and islets, the Siargao Islands Protected Landscape and Seascape (SIPLAS), or the Siargao Islands, is a rising tourism destination located in the northeastern part of Mindanao in the Philippines. The Department of Tourism recorded 180,880 (foreign and domestic) tourist arrivals in the Siargao Islands for 2018, with 162,923 of those in General Luna alone. One of the nine municipalities in SIPLAS, General Luna is where 70% of the tourism facilities are located, composed mainly of beachfront resorts, hotels, restaurants, and home stays, and has the greatest number of tourist attraction sites in the entire island group.<sup>[34]</sup>

SIPLAS is home to diverse coastal and marine ecosystems with a total coral reef cover of 11,289.41 hectares, seagrass meadows covering 638.61 hectares, and 13,569.66 hectares of mangrove forests.<sup>[35]</sup> Table 1 shows a summary of the values obtained for SIPLAS after performing the benefit transfer

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<sup>14</sup> A collective term for Altruistic, Bequest, and Existence Value.<sup>[25]</sup>

technique, which applied values derived from a selection of primary valuation studies taken from the list in Appendix 3. General similarity was assumed in terms of demographics, site characteristics (tropical), and currency exchange rates, among others.

**Table 1.** Estimates of the monetary value of coastal and marine ecosystem services in SIPLAS as obtained through the benefit transfer valuation method

Valuation Method	Ecosystem and Services	Unit Value	Total Monetary Value
Avoided Damage Cost	Mangrove forests (13,569.66 hectares)—regulating services such as reducing flood damage caused by tropical cyclone surge events	USD 4,000 per hectare per year <sup>[36]</sup> in annual flood protection value	USD 54.29 million
		USD 1,839 per hectare per year <sup>[37]</sup> in annual disturbance regulation value, including flood protection or damage reduction	USD 24.95 million
Tourism Value based on Contingent Valuation	Cultural services (tourism)—recreational value of the islands	PHP 188 per tourist (USD 3.87) <sup>15[38]</sup>	PHP 34.01 million (USD 707,521)
Total Economic Value	Coral reefs (11,289.41 hectares)—provisioning services such as for fisheries, food, income, livelihood, and the preservation of the traditional way of life for fishers and consumers	PHP 67,288 (USD 1,400) per hectare per year <sup>[39]</sup>	PHP 759.64 million (USD 15.81 million)

Source: Authors' analysis and compilation from studies and reports.

Primary valuation studies, however, still need to be conducted to get more accurate results given that these monetary values are rough estimates due to the method used (benefit transfer). Nevertheless, this exercise provides a general valuation overview for national and local governments and other stakeholders, such as the private sector, to consider when planning and implementing possible nature-related interventions (such as for avoiding future damage from projected flooding in 2050;

<sup>15</sup> USD 1.00 = PHP 48.5452 as of 15 April 2021 from <https://www1.oanda.com/currency/converter/>.





see Appendix 4) and firming up development plans and strategies. Numerous studies that similarly convey the value of coastal and marine ecosystem services have been conducted in other countries, the results of which were targeted to help policymakers understand the implications of conservation action or inaction. The private sector can also use such monetary values when exploring bankable ventures that involve nature-based actions such as EbAs.

A repository called the Ecosystem Service Value Database (ESVD)<sup>[40]</sup> serves as a ready reference for those performing the benefit transfer valuation method and contains over 1,350 data points from 300 case studies carried out across the world that used primary valuation methods to estimate the monetary values of ecosystem services.<sup>[41]</sup>

### ***Gaps in the Economic Valuation and Financing of EbAs***

There are currently no appropriate incentives provided by the Philippine government for the employment of ecosystem-based approaches as priority adaptation measures in response to climate change. Also less popular are specific policies that can encourage private sector investments in EbAs and guide the utilization and mainstreaming of valuation results toward the improvement of natural resource management and conservation. Banks may also not be guaranteed reliable and credible valuation results (in contrast, for instance, with the conventional appraisal of property) given that the practice of economic valuation of ecosystem services is not licensed in the Philippines. There is also no organized network of economic valuation professionals in the country.

A local government official in Siargao, moreover, relayed the challenge of accessing long-term financing from banks due to the need for collateral. Natural resources are the property of the state and considered common resources, hence the need to obtain a tenurial instrument in addition to estimated monetary values.

## 6. Enabling Policies

There are currently five major policies in the country (see Table 2) that strongly support private sector involvement in climate change adaptation and mitigation initiatives as well as the use of EbA as one of these approaches.

**Table 2.** Philippine laws and policies that support EbA and private sector involvement in climate change adaptation

Year	Law and Policies	Components that Can Support the Private Sector's Involvement in EbA Initiatives
2009	Climate Change Act of 2009 (RA 9729), RA 9729 IRR	Create an enabling environment that shall promote broader multi-stakeholder participation and integrate climate change mitigation and adaptation. (Section 9.h) <sup>[42]</sup>
2010	Philippine Disaster Risk Reduction and Management Act of 2010 (RA 10121)	Section 6.n. In coordination with the Climate Change Commission, formulate and implement a framework for climate change adaptation and disaster risk reduction and management from which all policies, programs, and projects shall be based. (Section 6.n) <sup>[43]</sup>
2010-2022	National Framework Strategy on Climate Change	One of the 14 guiding principles of the framework: "Policy and incentive mechanisms to facilitate private sector participation in addressing adaptation and mitigation objectives shall be promoted and supported." (2.14) <sup>[44]</sup>  One of the six means of implementation: "Install policy and incentive mechanisms to facilitate and leverage private sector investments in climate change." (11.3) <sup>[44]</sup>
2011-2028	National Climate Change Action Plan	The plan provides for a policy environment that will encourage the participation of the private sector in optimizing mitigation opportunities toward sustainable development. One of its key actions is to adopt "the total economic valuation of natural resources while ensuring biodiversity conservation." (p. 5) <sup>[45]</sup>
2017-2022	Philippine Development Plan	Ecosystem-based actions and area-based management practices have been considered as priority areas to intensify the protection, conservation, and rehabilitation of natural resources, thereby sustaining biodiversity and ecosystem services <sup>[46]</sup> .

*Source: Authors' analysis and compilation of the climate change-related laws and policies in the Philippines.*

The National Climate Change Action Plan (2011–2028) recognizes the conduct of economic valuation while ensuring biodiversity conservation as well as the country's overall plans to advance several socioeconomic agenda. The Plan also acknowledges EbAs as instrumental in the rehabilitation and protection of biodiversity and ecosystem services in the Philippines.<sup>[46]</sup> Such laws and policies serve as

the foundation and legal bases for the drafting of policy instruments specific to the broader conduct and utilization of economic valuation studies for EbA as one of the priority adaptation measures that also involve the private sector. When crafting such policies, the provision of appropriate incentives for employing EbAs as priority adaptation measures in response to climate change should also be considered.<sup>[10]</sup>

## 7. Conclusion and Recommendations

In advancing the conduct of economic valuation of goods and services provided by the natural environment, specific strategies and plans need to be in place to support and institutionalize this effort while ensuring the active participation of all stakeholders, especially the private sector. The following are recommendations for the different sectors in the country.

### Government

- Establish a firm policy for the conduct of economic valuation of ecosystem services that is anchored on the laws and policies in Table 2 and other related environmental policies, particularly through the Climate Change Commission, National Disaster Risk Reduction and Management Council, Department of Environment and Natural Resources, National Economic and Development Authority, Philippine Statistics Authority, and other key agencies. Explore the provision of incentives and improved ease of doing business with regard to EbA activities to unlock private capital investment for environmental conservation and protection.
- Explore the possibility of regulating and licensing the conduct of economic valuation of ecosystem services through the Professional Regulation Commission or consider it as one of the specialties under the Environmental Planning licensure.
- Partner with the academe and private sector in the creation of a knowledge management system (KMS) or database dedicated to the storing and processing of data collected from past economic valuation studies (as well as from studies still to be carried out in the future).
- Produce popularized communication materials for traditional and new media, in cooperation with the academe and the private sector, to convey information on the monetary value of terrestrial, coastal, and marine ecosystem services provided by the natural environment. Explore science and public policy interfaces with the academe to ensure that research results are well-incorporated and considered in the decision-making processes within government, the private sector, and other stakeholders.
- Spearhead engagement with the private sector on possible public-private partnerships in the implementation and management of EbA programs and projects.

### Academe

- Maintain the economic valuation of ecosystem services as one of the recommended research agendas for graduate students and researchers.

- Develop a KMS, in partnership with the government and the private sector, that will serve as a central repository for all the economic valuation studies done in the Philippines by local and international researchers and experts.
- Provide training in the conduct of economic valuation of ecosystem services for EbAs and other related topics as needed by the government and the private sector, which may facilitate the gradual involvement of the private sector in the exploration of the business potential of EbA projects in the Philippines.
- Convene economic valuation experts and practitioners for a series of discussions on EbA. Create a registry and formal network that can be consulted by stakeholders, especially the private sector, on matters relating to financing and investing in EbAs.

### **Private Sector**

- Conduct internal company or organizational assessments to evaluate impacts and dependencies on nature and make better decisions on how to manage the risks of climate change impacts on business operations.
- Explore the need to switch to sustainability-linked business operations and the potential financing of EbAs in cooperation with the national and/or local government and other stakeholders. The fintech forerunner in the Philippines, GCash, is an example. As a successfully operating business model, GCash is linked to reforestation efforts in partnership with the World Wide Fund for Nature and the Biodiversity Finance Initiative Philippines through its GForest component.<sup>[47]</sup> Ford Motors in the United Kingdom is another example—the company supports forest conservation efforts to sustain the flow of goods and services and ensure a conducive living space for their employees.<sup>[25]</sup>
- Provide support for the creation of a KMS of valuation study results in the Philippines by incorporating data science, analytics, and technology into the system, making data and information readily accessible when needed for business decision making and the crafting of relevant policy.

Achieving environmental sustainability for both people and the economy will require a strong synergy from policymaking, knowledge-generating, and wealth-building efforts. Cooperation among the government, academe, and private sector is fundamental to ensuring strategic solutions that can reduce the negative impacts of climate change.

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**APPENDIX 1:** Free-access tools, methodologies, and frameworks for assessing impacts and dependencies on the natural environment.

Tool	Description	Developer
ENCORE (Exploring Natural Capital Opportunities, Risks, and Exposure) (2020)	ENCORE helps users understand and visualize how the impacts of environmental change affect businesses across all sectors of the economy	Natural Capital Finance Alliance in partnership with UNEP-WCMC; available at <a href="https://encore.natural-capital.finance/en/">https://encore.natural-capital.finance/en/</a>
InVEST (Integrated Valuation of Ecosystem Services and Trade-offs) (2020)	InVEST helps users assess trade-offs related to alternative management choices as well as identify areas where investments in natural capital can enhance human development and conservation	Natural Capital Project (NatCap); InVEST tool and guide available at <a href="https://naturalcapitalproject.stanford.edu/software/invest">https://naturalcapitalproject.stanford.edu/software/invest</a>
Impact Three Sixty—I360X™ (2020)	I360X™ is a do-it-yourself online platform for large organizations that combines advanced sustainability analytics and sustainability impact assessment capabilities	GIST; I360X™ access available at <a href="https://i360x.gistimpact.com/">https://i360x.gistimpact.com/</a>
Nat Cap Credit Risk—Agricultural Lending (2019)	Nat Cap Credit Risk helps financial institutions conduct natural capital credit risk assessment across various agricultural sectors and locations	Dr. Francisco Ascuí (University of Edinburgh Business School) and Theodor Cojoianu (Michael Smurfit Graduate Business School, University College Dublin); guide available at <a href="https://bit.ly/3msr3U1">https://bit.ly/3msr3U1</a>
Drought Stress Testing Tool (2017)	The Drought Stress Testing Tool helps financial institutions incorporate drought scenarios in the risk assessments of their own loan portfolios	Natural Capital Financial Alliance (NCFA) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; the free Excel-based tool can be accessed through email at <a href="mailto:drought@natcapfinance.org">drought@natcapfinance.org</a>
Watershed Ecosystem Services Tool (WESTool) (2017)	WESTool helps users explore and understand the potential environmental impacts of land use policies and actions by incorporating complex spatial datasets and hydrological modelling into interactive maps and analyses	Winrock International under the United States Agency for International Development Supporting Forests and Biodiversity Project; free access is available at <a href="https://winrock.org/westool/">https://winrock.org/westool/</a>
Natural Capital Protocol (2016)	Natural Capital Protocol helps users generate information to improve business decision-making	Natural Capital Coalition; available at <a href="https://naturalcapitalcoalition.org/natural-capital-protocol/">https://naturalcapitalcoalition.org/natural-capital-protocol/</a>
Standard on Biodiversity Offsets (2012)	The Standard on Biodiversity Offsets helps users assess projects against the principles of the Business and Biodiversity Offsets Programme (BBOP)	The Business and Biodiversity Offsets Program; guidance notes available at <a href="https://bit.ly/3rYMdL7">https://bit.ly/3rYMdL7</a>
Guide to Corporate Ecosystem Valuation: A Framework for Improving Corporate Decision-making (2011)	<i>The Guide to Corporate Ecosystem Valuation</i> helps users assess the associated environmental, social, economic, and financial issues of projects	The World Business Council for Sustainable Development (WBCSD); available at <a href="https://www.wbcsd.org/contentwbc/download/573/6341">https://www.wbcsd.org/contentwbc/download/573/6341</a>

Source: Authors' compilation from studies and reports.



**APPENDIX 2:** Different economic valuation methods and techniques for obtaining the monetary value of coastal and marine ecosystem services.

Approach or Technique	Ecosystem Service	Description	Examples	Strengths	Limitations
<b><i>Revealed Preference/Market Demand-based</i></b>					
Market prices	Provisioning	Sales value or cost of an ecosystem service (goods or products)	Market prices for goods such as food (e.g., fish, etc.), timber, and water	Availability of market data on prices	For trades services only; prone to market distortions or shadow prices
Travel cost	Cultural (recreational value)	Time and money spent per visit to an ecosystem for leisure or recreation	Cost of transportation, accommodation, and environmental fees when visiting a tourist destination	Based on actual and observable consumer behavior; not expensive to perform	Subject to variations in people's motivations to travel; some go on multiple visits in one trip; needs rigorous statistical analysis
Hedonic pricing	Cultural (aesthetic value)	Differences in property prices attributed to consumers' preferences for environmental quality and value	Price differences between properties or rooms with nature scenery/ views and those without	Availability of market data on prices	Used mostly for property prices or accommodation rentals; needs rigorous statistical analysis
<b><i>Revealed Preference/Cost-based</i></b>					
Replacement cost	Regulating	Cost of replacing ecosystem services with substitutes such as artificial, human-made structures and systems	Cost of establishing coastal protection and water filtration systems to compensate for the degradation or loss of natural ecosystems	Based on actual, observable behavior of individuals and readily available market data on prices; requires only basic statistical analysis	Prone to underestimation of value and failure particularly in factoring in all benefits derived from degraded ecosystems due to insufficiency of data
Avoided damage cost	Regulating	Value of expenditure related to (potential) damage to property and other assets due to degradation or loss of an ecosystem's protective services	Damages to infrastructure such as houses, buildings, roads, bridges, and farms due to coastal erosion, saltwater intrusion, and flooding resulting from the degradation or loss of thick mangrove forests	Availability of market data on prices; requires only basic statistical analysis	Difficulty of estimating actual damages to ecosystem service quality; prone to over- or underestimation of value

Approach or Technique	Ecosystem Service	Description	Examples	Strengths	Limitations
<b>Stated Preference/Demand-based (non-market)</b>					
Contingent valuation	All services	Determination of ecosystem values through surveys on people's willingness to pay for ecosystem services or accept compensation for the loss of such	Willingness to pay to maintain healthy coral reef conditions in an area (e.g., Tubbataha reefs, etc.)	Can obtain use and non-use values	Highly biased, based on each individual's preferences; resource intensive (surveys) and requires rigorous statistical analysis; hypothetical in nature
Choice modelling or experimentation	Cultural or recreational	Selection of preferences from a set of alternative resources or ecosystem use options (i.e., sets of attributes at different levels)	Assessing the values individuals hold concerning the conservation and protection of a particular ecosystem	Can obtain use and non-use values	Highly biased, based on each individual's preferences; resource intensive (surveys) and requires rigorous statistical analysis; hypothetical in nature
<b>Benefit transfer</b>					
Unit value	All services	Transferring values obtained from primary economic valuation studies to a comparable site or location (adjusted for differences in site characteristics, demographics, exchange rates, etc.)	Recreational value of a beach in Indonesia (based on primary study's respondents' willingness to pay) applied to a similar beach in the Philippines. If applied to a non-tropical and developed country, adjustments must be made to ensure transferability.	Can easily capture gross estimates; not resource intensive; can address urgent valuation data requirements (such as gathering inputs for policy- and decision-making)	Less accurate data; prone to over- or underestimation of values; requires particular guidance and expertise

Source: Authors' analysis and compilation from studies and reports, [24], [25], [32], [48]

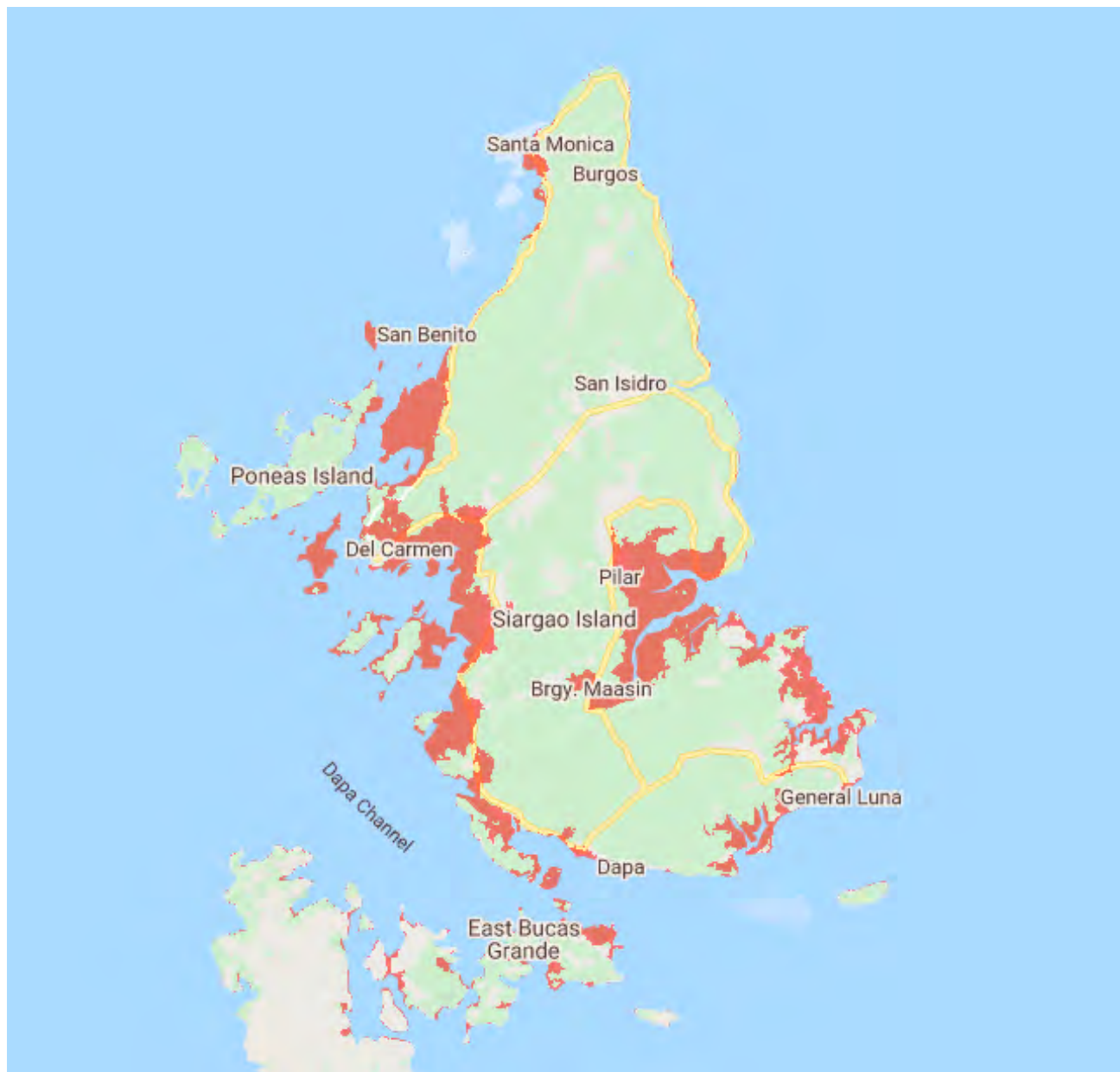
### APPENDIX 3: Primary economic valuation studies done in the Philippines.

Valuation Method and Ecosystem	Research Area	Scope	Rationale/Objectives	Valuation Method	Results
Choice modelling for non-market benefits of coral reef restoration <sup>[31]</sup>	Dagupan City and selected cities in Metro Manila	National	Report estimates of non-market values of coral reef restoration to address information inadequacy as most cost-benefit analyses conducted for coral reef investments in the Philippines use non-marginal values, proxies, and benefit transfers as benefit estimates	Choice modelling	Nationwide scale value estimates for the Manila sample: PHP 8.70 and PHP 8.13 for coral cover and fish species, respectively (PHP 33.06 and PHP 27.05 for the local sample)
Recreation-al value of the Philippines' Malabugot Protected Landscape and Seascape based on travel cost <sup>[49]</sup>	Malabugot Protected Landscape and Seascape (MPLS) in Garchitorena, Camarines Sur	Local	Respond to the lack of information on the estimated recreational value of MPLS; set up sustainable ecotourism in MPLS and establish a user fee system as a key environmental rent capture mechanism	Travel cost	Individual consumer surplus: PHP12,413 per visit  Overall annual recreational value of MPLS: PHP 30 million
Avoided damage cost of protection services of mangroves at the national scale <sup>[36]</sup>	Mangroves	National	Help national government integrate the value of mangroves into their national accounting systems; publicize socio-economic benefits of mangroves for people and property	Expected annual benefits from averted flood damage cost	USD 4,000 per hectare per year
Contingent valuation for the conservation of ecotourism resources in Sohoton Cove, Surigao Del Norte, Philippines <sup>[38]</sup>	Sohoton Cove	Local	Obtain values for ecotourism services such as jellyfish encounters, snorkeling, etc. as multi-stakeholder fora often neglect the importance of tourists' perceptions and views for the conservation of resources	Contingent valuation/Willingness to pay	PHP 188 per visit (US\$3.90)

Valuation Method and Ecosystem	Research Area	Scope	Rationale/Objectives	Valuation Method	Results
Total economic value based on contingent valuation and direct market value for national value estimates of Philippine reef ecosystem services <sup>[39]</sup>	Coral reefs; fisheries	National	Contribute to ecosystem services assessments of Philippine reefs on a national scale given that most assessments are focused on fisheries and tourism and only in a few areas in the Philippines	Total economic value using contingent valuation and direct market value	USD 14 million per hectare per year

*Source: Authors' analysis and compilation from studies and reports.*

**APPENDIX 4:** Climate Central's CoastalDEM map showing significant flood threats to coastal areas of Siargao in 2050<sup>[50][51]</sup>





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