BIOFIN
The Biodiversity Finance Initiative

BAGONG PILIPINAS

WHY NATURE MATTERS:
ECONOMIC VALUES OF PHILIPPINE RESOURCES

Apo Island Protected Landscape and Seascape, Negros Oriental
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

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Bongsanglay Natural Park, Masbate
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In 2024, the Biodiversity Finance Initiative (BIOFIN), a project of the United Nations Development Programme (UNDP) and the Department of Environment and Natural Resources (DENR) updated, its 2017 report on the **Synthesis of Valuation Studies on Philippine Biodiversity.** This update entitled **"Why Nature Matters: Economic Values of Philippine Resources"** provides more recent data, information, and highlights of new studies. This review goes beyond conventional assessments, offering a nuanced understanding of the intricate relationship between ecological health and economic values.

Valuation of natural assets provides a strong economic basis for increasing biodiversity financing by translating ecosystem benefits into measurable monetary terms. When the value of forests, wetlands, coastal areas, and species is quantified, it becomes easier for government agencies and local governments to justify budget allocations for their protection, restoration, and sustainable use. These values can also guide the setting of resource user fees and payment schemes for ecosystem services, ensuring that users contribute fairly to maintaining the natural capital they benefit from.

The Philippine Ecosystem and Natural Capital Accounting System (PENCAS) Law and the forthcoming Natural Capital Accounting (NCA) Roadmap underscore the country's commitment to integrating the value of nature into economic planning and decision-making. By institutionalizing the measurement of ecosystem assets and services, these initiatives provide a framework for recognizing the true contribution of biodiversity and natural resources to national wealth. This technical brief supports this agenda by consolidating existing evidence on the economic value of the Philippines' natural assets—information that can inform policy, budgeting, and investment decisions.

According to the Changing Wealth of Nations[1] report, the Philippines has experienced substantial economic transformation, now categorized as a lower-middle-income country. The per capita natural wealth has surged to **US$35,135**, marking a 4.5-fold increase since 2010, and positioning the country at the 94th rank among 146 nations.

In terms of land resources, the Philippines encompasses a total land area of approximately 300,000 km^2, divided into forestland and alienable and disposable (A&D) land. Forestland constitutes 53%, while A&D land accounts for 47% of the total land area. However, urbanization and increased human settlements have led to significant changes in land cover. Notably, built-up areas have doubled from 302,340 ha in 2003 to 692,121 ha in 2010, indicating a substantial shift in land use.[2]

Freshwater resources are abundant, with 314 inland wetlands and 2,487 river systems. Groundwater resources are estimated at 260,000 m^3/year, with a net groundwater inflow of 33,000 m^3/year.[3] However, increasing water demand, coupled with a population of 109 million as of 2020, places substantial pressure on water resources. The country's estimated water availability per capita stands at 1,553 m^3/year, falling below the international "water stress" threshold.[4]

[1] World Bank. 2021. The Changing Wealth of Nations 2021: Managing Assets for the Future. Washington, DC: World Bank. doi:10.1596/978-1-4648-1590-4. License: Creative Commons Attribution CC BY 3.0 IGO
[2] Adapted from NEDA-Philippine Action Plan for Sustainable Consumption and Production (PAP4SCP) 2020-2040.
[3] Department of Environment and Natural Resources – Biodiversity Management Bureau
[4] United States Agency for International Development (USAID). 2018

The Philippine archipelago, with its 797,719 ha of coral reef area, 489,006 ha of seagrass beds, and 303,373 ha of mangrove forests, stands as a global epicenter of marine biodiversity.[5] Coastal and marine resources contribute significantly to the country's food supply, with 19% to 35% of food sourced from these ecosystems. However, threats such as overfishing, illegal practices, and pollution pose challenges to marine resource sustainability.

Mineral resources are a notable feature of the Philippines, with approximately 30% (9 million hectares) of its land area identified as having high mineral potential. The country ranks globally in the top tiers for gold, nickel and chromite deposits.[6] These mineral-rich zones are not only crucial for economic considerations but also play a role in shaping diverse ecosystems. These areas are also habitats for various flora and fauna that have adapted to the unique geological and environmental conditions associated with mineral-rich landscapes. The intricate interplay between geology and biology in these regions results in the evolution of specialized species that are often uniquely adapted to thrive in mineralized soils. Careful consideration should be given in mineralizing these areas as mining activities can lead to habitat destruction, soil erosion, and the release of pollutants, directly impacting the richness of plant and animal life in these regions, threatening the survival of the species due to the alteration of their natural habitats.

The Philippines has abundant natural energy sources forming the foundation of its diverse and sustainable energy landscape. Abundant sunlight, harnessed through photovoltaic technology, and coastal wind resources contribute significantly to the country's renewable energy portfolio. Notably, the Philippines stands as a global leader in geothermal energy production, utilizing its volcanic landscapes to generate electricity from the Earth's natural heat reservoirs. Rivers and waterways across the archipelago support hydropower generation, further diversifying the indigenous energy mix. Embracing these natural sources aligns with the Philippines' commitment to reducing dependence on imported energy, ensuring energy security, and advancing environmentally conscious practices in its pursuit of a resilient and sustainable energy future. Energy resources in the Philippines have shown a steady increase in total primary energy supply (TPES), reaching 60.1 million tons of oil equivalent (MTOE) in 2019. The TPES is mostly supplied by imported fossil fuels, with oil accounting for about 32.1% followed by coal at 29%, and natural gas at 6%.[7] Renewable energy (RE) contributes 32.8% of the TPES, reflecting a growing emphasis on sustainable energy resources.[8]

The state of Philippine natural resources reflects a complex landscape where economic growth, ecological sustainability, and human well-being intersect. The challenges and opportunities in managing these resources underscore the need for informed policies, sustainable practices and collaborative efforts to ensure the preservation and responsible utilization of the country's diverse natural wealth.

[5] National Mapping and Resource Information Authority (NAMRIA). 2016
[6] DENR-Mines and Geosciences Bureau
[7] NEDA PAP4SCP
[8] Department of Energy

Mt. Hamiguitan Range Wildlife Sanctuary, Davao Oriental
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

Forest Ecosystem Values

Non-timber forest products (NTFPs), such as nipa shingles and bamboo poles, contribute to local economies. The forestry sector's contribution to the GDP, while relatively modest, encompasses various sectors, emphasizing forests' diverse economic significance. There are also indirect forest use values, highlighting forests' role in regulating climate, supporting biodiversity, safeguarding water resources, and maintaining soil fertility.

The economic value of wildlife, particularly blue-naped parrots, is underscored by an economic valuation study, estimating their combined total existence value at about US$3.5 trillion.[9] This emphasizes the need for conservation efforts, not only for economic reasons but also for the broader ecological balance, biodiversity preservation, and overall ecosystem health.

Forests impact hydrological dynamics of water resources, influencing water yields and stream discharges. A study in Upper Marikina River Basin Protected Landscape demonstrates the significant economic savings and expanded irrigation capabilities associated with forested landscapes.[10] Forests also contribute to the country's water supply and usage, with implications for GDP and household expenses.Furthermore, forests attract tourists and contribute to genetic resources, providing wild food plants and medicinal plants, which have economic value in various industries.

Tourism, genetic resources, and medicinal plants highlight indirect forest use values, contributing to local economies and biodiversity conservation. The Philippines' forested areas boast diverse wild and semi-wild food plants, providing sustenance and income opportunities. The country's forests are rich in medicinal plants, contributing to the pharmaceutical industry. Export values and natural health products, particularly herbal medicine products, reached approximately US$153 million in 2011.[11]

Indirect forest values extend to climate regulation, biodiversity support, and soil conservation. The total carbon stock value of the Philippines' forest is estimated to US$1.160 trillion.[12] In terms of the state of soil erosion in the Philippines, the average rate of erosion is estimated at 80.62 metric tons per hectare per year. In the paper of Francisco (1994) as cited in the book Soils and the Philippine Economy (2014), the asset value of soil and land resources ranges from PHP 22,830 to 32,778 on per hectare basis.

Lastly, watershed conservation is integral to maintaining ecosystems' health, biodiversity, and essential services. Prioritizing effective conservation strategies is crucial for the well-being of the Philippines and the entire planet. The holistic valuation presented underscores the multidimensional contributions of forests and natural resources to societal well-being and the imperative of responsible and sustainable resource management.

Mt. Hamiguitan Range Wildlife Sanctuary, Davao Oriental
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

[9] DENR-ADB/GEF Project on Combating Environmental Organized Crime in the Philippines. (2021). Economic Valuation and the Conservation and Protection of Wildlife. Manila, Philippines. Retrieved from https://www.philchm.ph/wp-content/uploads/2022/02/2021-0917-Economic-Valuation-Brief-Final.pdf
[10] Forest Management Bureau
[11] https://industry.gov.ph/industry/natural-health-products/
[12] The monetary value of carbon was calculated by determining the product of total carbon content, carbon dioxide-to-carbon ratio (44/12 = 3.67) and the market value of CO2 (US$ 10 per Mg of CO2).

Apo Island Protected Landscape and Seascape, Negros Oriental
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

Coastal and Marine Ecosystem

The coastal and marine ecosystems of the Philippines, covering an extensive area of 2,200,000 km2 with a coastline of 36,298 km, are renowned for their biodiversity, hosting nearly 60% of the world's known species. These ecosystems are integral to the Philippine economy, contributing significantly to gross domestic product (GDP) through fisheries, tourism, and related activities. With traditional fishing communities relying on these resources for their livelihoods, the fisheries sector, divided into commercial, municipal, and aquaculture categories, accounted for 1.2% of the country's GDP in 2018, employing around 1.99 million fishers and 0.35 million fish farmers in 2019.

In terms of production output, the Philippines ranks globally, securing the 10th position in capture fishery and 11th in aquaculture in 2019, with a total fishery production value of about US$2.14 trillion.[13] Despite challenges, the marine biodiversity, particularly coral reefs, is a source of substantial economic value. A study estimates the Total Economic Value (TEV) of ecosystem services provided by Philippine reefs at US$4 billion annually or US$140,000 per square kilometer per year, emphasizing the need for improved management practices.[14]

Seagrass beds, covering 498,341 hectares contribute to coastal protection and are valued at around US$6.41 billion per year.[15] Mangrove forests, covering 311,400 hectares, provide essential ecological services, but their asset value decreased by 50% from 1995 to 2018. Recent studies estimate the annual economic value of mangroves at about US$1.47 billion.[16] Pristine beaches, a major tourism draw, contribute significantly to the national economy. The tourism sector, constituting 6,2% of the GDP in 2022,[17] recorded more than PhP480 billion (US$8.73 billion) in international tourism receipts in 2023.[18]

[13] Fishery Statistical Bulletin of Southeast Asia, 2019
[14] Tamayo, Anticamara and Acosta-Michlik, 2018
[15] DENR-ADB/GEF Project on Combating Environmental Organized Crime in the Philippines. (2021). Economic Valuation and the Conservation and Protection of Wildlife. Manila, Philippines. Retrieved from https://www.philchm.ph/wp-content/uploads/2022/02/2021-0917-Economic-Valuation-Brief-Final.pdf
[16] Roldan, R. (2022). Economic Valuation of Mangroves in Tawi-Tawi Islands, Southern Philippines: A Market Price and Contingent Valuation Approach. Retrieved from https://api.repository.upou.edu.ph/api/core/bitstreams/fb77c9e6-5bc7-41d7-89de-f5b4b8cfdd94/content
[17] https://psa.gov.ph/content/tourism-contributes-62-percent-gdp-2022
[18] https://www.adobomagazine.com/travel/philippines-exceeds-2023-tourism-goals-with-5-million-reported-visitors-and-php-480-billion-in-receipts

Tourism-related employment constitutes 11%[19] of total employment, stimulating local economies and supporting small businesses. Marine-based activities like diving contribute significantly to tourism revenues, with each diver spending approximately US$1,500 – US$2,000 annually.[20] The Philippines has around 1,800 marine protected areas (MPAs) covering 1.42% of the total sea area. However, recent studies indicate losses in coral cover and overfishing, emphasizing the need for sustainable coastal management.

Economic valuations of specific MPAs, such as the Bohol Marine Triangle, reveal net benefits of US$11.54 million or US$103 per hectare per year, with tourism and municipal fisheries being major contributors.[21] Similar studies on MPAs in San Jose, Antique and Tubbataha Reefs Natural Park highlight substantial economic benefits, emphasizing the importance of these ecosystems not only economically but also ecologically. These valuations underscore the critical need for sustainable management practices to preserve coastal ecosystems for future generations.

Cave Ecosystems

Cave ecosystems in the Philippines, concealed beneath the Earth's surface, play a crucial role in the nation's natural heritage. These subterranean environments, shaped by complex geological processes, contribute significantly to biodiversity conservation and ecosystem services. With about 3,138 caves recorded in the Philippines,[22] many of which remain undiscovered, they host unique flora and fauna adapted to challenging subterranean conditions. The country's cave classification system categorizes them into Class I, II, and III based on their ecological sensitivity and cultural significance. Class I caves, like Nical Cave in Pangasinan, have delicate geological, scientific, and cultural values, and are closed to ecotourism. Class II caves, such as those in Sultan Kudarat, require controlled access for experienced cavers, while Class III caves, lacking significant values, are open to guided visitors.

Samar Island Natural Park
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

[19] tourism.gov.ph/PTSA Derived Indicators
[20] retrieved from https://www.pna.gov.ph/index.php/articles/1083275
[21] Samonte, G. White, A., Tercero, M., Diviva, J., Tabara, E., Caballes, C. (2007). Economic Valuation of Coastal and Marine Resources: Bohol Marine Triangle, Philippines
[22] Retrieved from http://www.philchm.ph/list-of-classified-caves-of-the-philippines/

Despite the ecological and cultural importance of caves, there is a gap in economic valuation studies. While studies like Caranza and Calderon (2022) provide insights into the sensitivity of cave resources to human activities, economic aspects are often overlooked. Gonzales and Miraflores (2023) conducted a study in Quezon, Palawan, estimating the existence value attributed to Tabon cave, revealing a mean Willingness to Pay (WTP) of approximately PHP1 million annually for its conservation. Initiatives like the Center for Cave Ecosystems Research (CAVES), launched by the University of the Philippines Los Baños (UPLB) Museum of Natural History, aim to explore the unique conditions inside caves, acting as refuges for various bat species. However, the distribution of caves within protected areas lacking assessments and management plans underscores the urgent need for dedicated efforts and resources to ensure their conservation and sustainable use, contributing to both economic and ecological value.

Agricultural Biodiversity Values

Agricultural biodiversity in the Philippines, reflecting the variety of plant and animal life within agricultural ecosystems, plays a pivotal role in sustaining the nation's agricultural sector. This diversity, nurtured by the country's unique geography and climate, supports the cultivation of various crops and rearing of diverse livestock species, contributing to food security, environmental stability, and cultural heritage. The Philippine Statistics Authority reported that the crop sector alone reached a production value of approximately PhP995 billion in the first three quarters of 2023, peaking at PhP1.0 trillion in 2021. In the livestock industry, the production value amounted to approximately PhP257 million in 2022,[23] with the sector contributing about PhP1.66 billion or 14% to the country's overall value of production in the first quarter of 2023.

Agroforestry, the integration of trees with agricultural crops and livestock, can play a crucial role in promoting biodiversity and sustainable practices.

While destructive agroforestry practices like the "kaingin" system contribute to deforestation, appropriate management of agroforestry systems can create diverse and resilient environments. The study of Baliton, et. al. in 2020 demonstrated the economic and ecological value of diverse agroforestry practices, emphasizing their role in delivering ecological services, contributing to biodiversity, enhanced biomass production, and efficient carbon sequestration. Additionally, the conservation of wild relatives of cultivated crops, microbial diversity, and traditional farming practices are vital components of agricultural biodiversity, contributing to global efforts for sustainable and resilient food systems. The value of products derived from genetic resources is estimated at approximately US$500 billion annually,[24] highlighting the economic significance of conserving agricultural biodiversity.

Urban Ecosystem Values

Urban ecosystems play a vital role in sustainable urban development, contributing significantly to the well-being of residents and the overall resilience of cities. These ecosystems provide essential services such as improved air and water quality, climate regulation, biodiversity support, and recreational spaces, creating a healthier and more livable urban environment. The recognition and prioritization of urban ecosystem values are crucial for sustainable urban planning and management, allowing cities to integrate these values into policies and development strategies.

One significant contribution of urban ecosystems is in carbon sequestration, particularly through urban forests. Mature trees in urban areas can absorb about 48 lbs of carbon dioxide per year,[25] contributing substantially to air quality improvement and climate regulation. Sustainable transportation alternatives, such as electric vehicles (EVs), also play a role in reducing environmental impact. In the Philippines, under the Public Utility Vehicle (PUV) Modernization Program, the adoption of e-PUVs is estimated to save up to 5.28 – 7.93 million barrels of gasoline and 8.81 – 12.33 million barrels of diesel per year.[26] This represents a potential annual savings of around US$3 billion (approximately PHP144 billion) from importing petroleum products, showcasing the economic and environmental benefits of transitioning to sustainable transportation.

Mts. Timpoong-Hibok-Hibok Natural Monument, Camiguin
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

[23] Statista 2023

[24] Kate and Laird, 1999
[25] Common reference for carbon sequestration capacity of trees is the US Forest Service and their research on urban forests.
[26] Agaton, C.B. et al. (2020). Socio-Economic and Environmental Analyses of Sustainable Public Transport in the Philippines. Sustainability 2020, 12(11). Retrieved from https://www.mdpi.com/2071-1050/12/11/4720

Mts. Timpoong-Hibok-Hibok Natural Monument, Camiguin
Photo Credit: Department of Tourism and the Department of Environment and Natural Resources

Moreover, urban greening, including parks and tree-lined streets is a multi-faceted solution to combat air and noise pollution. Studies indicate that urban trees can filter substantial amounts of particulate matter annually, contributing to cleaner air. Economic valuations in the Philippines reveal that even a modest reduction in travel time, facilitated by sustainable transportation, can result in substantial savings. For example, a seven-minute reduction in travel time in downtown Baguio could lead to savings of approximately PhP98.3 million (about US$2 million) in opportunity costs.[27] These economic implications emphasize the importance of urban ecosystem values for the overall well-being of both residents and the environment.

Valuing natural assets enables local governments and protected areas to make informed, evidence-based financial decisions by showing how ecosystems contribute to development priorities such as water security, food production, and disaster risk reduction. These valuations justify budget allocations for conservation, support the design of resource user fees and payment for ecosystem services schemes, and help attract national and external financing. By recognizing nature as part of local wealth, valuation also strengthens accountability, encourages sustainable revenue generation, and ensures that conservation spending delivers tangible social and economic benefits.

[27] https://newsinfo.inquirer.net/724090/baguio-la-trinidad-traffic-solvers-hope-for-e-trains

Summary of Economic Valuation by Ecosystem Services in the Report

Ecosystem Services	Economic Value (in billion US$)	Equivalent in PhP at US$1: PhP55 conversion rate (PhP billion)
Mineral Resources	**1,357.000**	**74,635.000**
Direct Forest Uses		
- Timber	0.104	5.720
- Fuelwood	0.004	0.220
- Water use	2.890	158.950
- PA Tourism Receipts	0.001	0.055
- Forest Genetic Resources	0.153	8.420
Indirect Forest Uses		
- Carbon Stock	1,160.000	65,937.000
- Soil erosion control (USD6.88/ton) - (value of soil and land resources range from PHP 22,830 to 32,778 on per hectare)	516.000	28,380.000
- Wildlife Non-Use	5.680	312.400
Coastal & Marine		
- Fishing & Aquaculture	2,140.000	117,700.000
- Coral reefs (USD140k/sq km/year)	5.100	280.500
- Mangroves (USD4,733/ha/year)	147.000	8,085.000
- Seagrass (USD12,857/ha/year)	6.41	352.550
- Beachscape	8.730	480.150
- Marine-based activities	0.700	38.500
- MPAs	0.323	17.770
Agrobiodiversity		
- Crop	17.890	983.950
- Livestock	4.600	253.000
- Crop Wild Relatives	90.000	4,950.000
Urban Biodiversity	6.910	380.050
Total	**5,469.495**	**272,470.615**

The combined valuation of selected ecosystems in the country provides an even bigger economic value at 5.47 trillion US$, higher than the US$3.97 trillion wealth of nation estimates.