

Conserve and rehabilitate Manila Bay's natural assets to sustain ecosystem services; undertake these activities within a holistic approach to economic development

Measuring ecosystem services and economically valuing them shows considerable benefits to society indicating the need to conserve the natural assets of the Bay. While the original study site was the LPPCHEA, interactions among the ecosystem services entailed analysis of the larger zone of influence of the proposed reclamation plan – the entire Manila Bay. This calls for situating any reclamation proposal within the broader plan for rehabilitating and preserving the Manila Bay. Such plan should include the identification of go and no-go zones for specific activities including land reclamation and serious steps to solve shallow water conversion to fishponds and the pollution of the Bay that emanates from Metro Manila and its surrounding areas.

Address equity

There will be inevitable gainers and losers from future changes in the uses land and marine ecosystems in Manila Bay. The anticipated gainers from reclamation are future real estate developers with new commercial and residential establishments, users of new roads and other transport facilities, and local government units earning higher revenues from prime property taxes. The likely losers are the informal settlers, fishers, hotels with diminished sunset views, and commercial establishments at the current, premium seaside locale. The high potential gains from reclaimed land could enable revenues to be generated for the compensation of the losers for which the payment mechanisms need to be properly designed.

Develop mechanisms for capturing all economic values

Only the provisioning and recreational values from ecosystems manifest in market transactions. The other values are un-appropriated; but they may be captured through policies on carbon payments, and mechanisms for capturing the willingness to pay for the avoidance of storm damage, continued existence of wildlife habitat, and bequest for the subsequent generations. Examples of such mechanisms are payments to local conservation trust funds as well as grants from the Global Environmental Facility.

Continue efforts to value ecosystem services

The significant outcome of this project is not only in determining the value of ecosystem services, but also the realization that in most decisions on projects affecting the ecosystem, the contribution of the ecosystem is, in many cases, ignored. Although the project team only managed to value only a sub-set of all the services provided by Manila Bay ecosystems, the benefit-cost ratios were nonetheless higher for the with-restoration options versus without-restoration. Also, the project highlighted the importance of including conservation and rehabilitation in reclamation projects in Manila Bay in view of the declining provision of ecosystem services that provide benefits to potential losers of the proposed reclamation.

This country study provided the process and tools for estimating the value of ecosystem services based on facts and science. There are ecosystem services that, at present, can be quantified and have monetary values. But they will require further assessments and scientific work.

The computed value under-measures total economic value since it does not yet include the global importance of migratory birds, as well as impact of sea-level rise. In addition, the existence and bequest values pertain only to a limited set of stakeholders in communities around the Bay and not the stakeholders among the general populace in the entire Manila Bay and the international community.

Reform the Philippine EIA and project evaluation systems

The Philippine EIA and project appraisal systems should be reformed in order to fully account for the environmental, economic and social impacts all together, identify the corrections to reduce negative impacts, and formulate mechanisms to enable the compensation of the losers.

Economic Value (US M)	Management Scenarios			
	No Reclamation		With Reclamation	
	Status quo, no added restoration 1	With added Restoration 2	No ecosystem rehabilitation 3	With ecosystem rehabilitation 4
Present Value of Benefits	10,364	14,933	104,593	106,393
Services Provided by Ecosystems	10,364	14,933	186	5,083
Provisioning	2,711	4,678	0	2,240
Regulating	3,592	6,168	177	2,768
Cultural Services	4,061	4,087	10	74
Reclamation/Land Development Benefits	0	0	104,407	101,310
Rental/Sale Value	0	0	59,065	57,337
Post-reclamation land development	0	0	45,342	43,973
Recreational Benefits	0	0	0	0
Present Value of Costs	4,912	5,176	19,841	11,847
Public and Private Costs	1,547	3,119	4,300	3,988
Administrative	288	1,631	1,645	1,639
Reclamation/Engineering Works	0	0	1,876	1,818
Defensive Expenditures	1,258	1,479	220	225
Mitigation	0	0	559	296
Restoration/Rehabilitation	0	9	0	9
Negative Externalities	3,365	2,058	15,540	7,859
Foregone Ecosystem Services	0	0	12,394	5,997
Mortality Morbidity Costs	9	4	17	22
Income Losses	3,356	2,053	3,130	1,840
PRESENT VALUE of NET BENEFITS (NPV) @ 6%	5,452	9,756	84,752	94,546
BCR	2.1		5.3	9.0
EIRR	n.e.	16%	125%	253%

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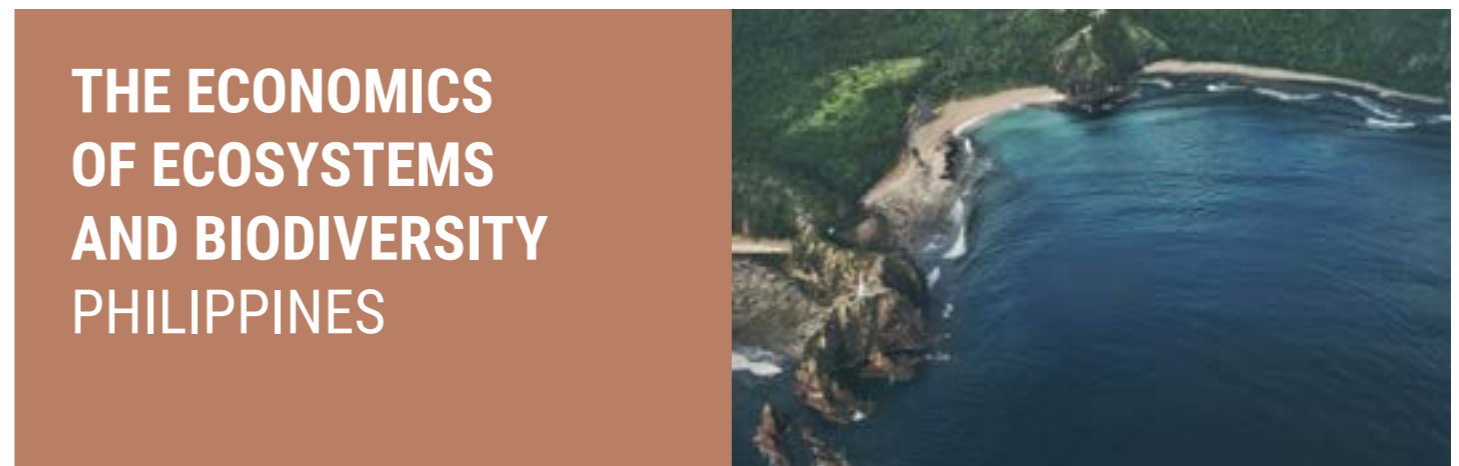
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THE LAS PIÑAS – PARAÑAQUE CRITICAL HABITAT AND ECOTOURISM AREA (LPPCHEA) AND ECOSYSTEMS OF MANILA BAY

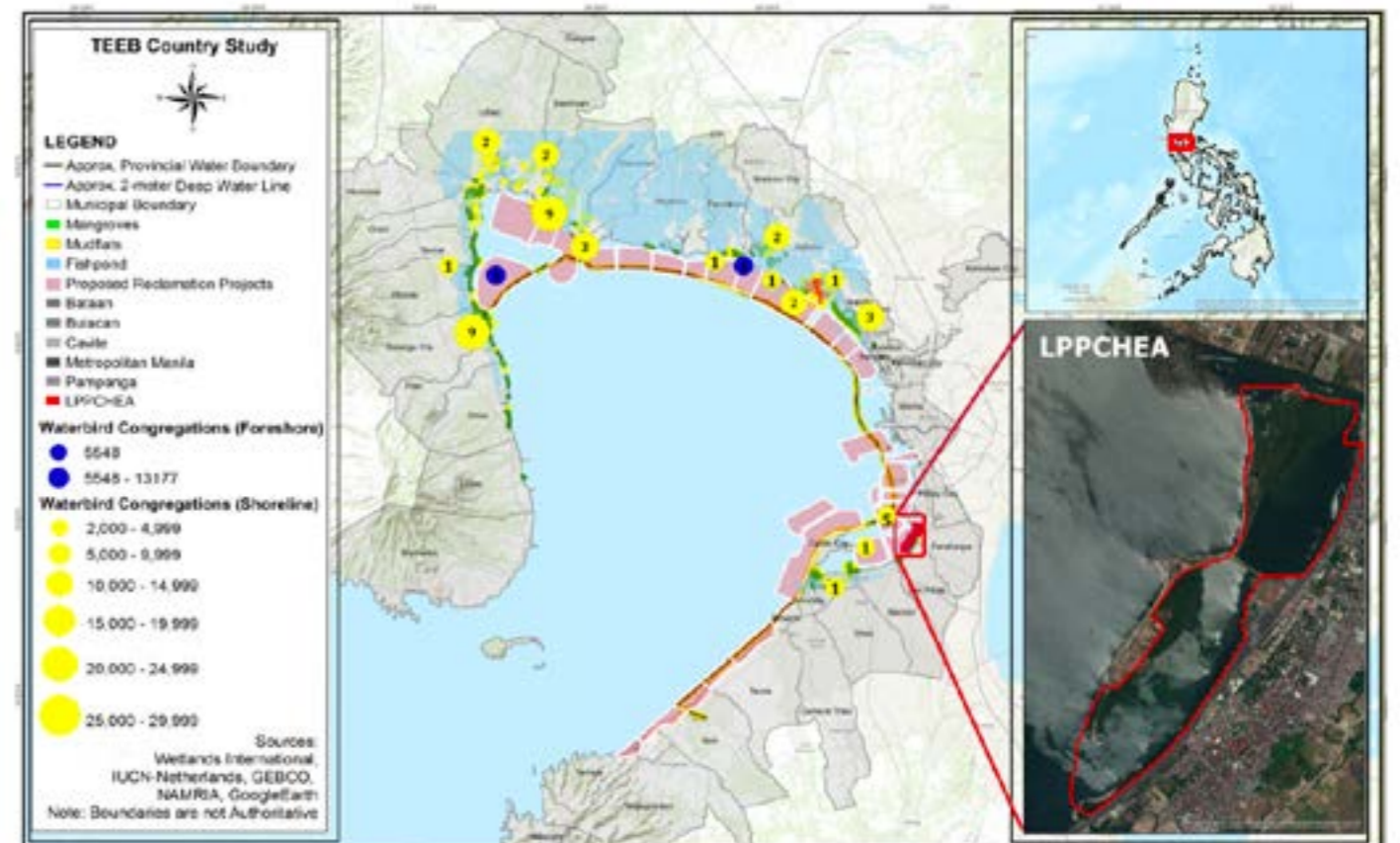
The TEEB Philippine Country Study is part of the cross-country effort to pilot the TEEB methodology that aims to make values of ecosystem services visible in policy and management decisions. Following the scoping and stakeholder consultation in 2014, the study is focused on policy and management decisions related to changes in coastal ecosystems in Manila Bay, particularly the 175-hectare, Las Piñas-Parañaque Critical Habitat and Ecotourism Area (LPPCHEA), the only natural, wetland sanctuary for waterbirds in the heart of Metro Manila.

Declared a “Critical Habitat” in 2007 by Presidential Proclamation No.1412, and a Wetland of International Importance (Ramsar Site) in 2013, LPPCHEA attracts migratory birds as well as indigenous and endemic species, including some that have been classified as threatened by the International Union for Conservation of Nature (IUCN). There are similar bird conglomeration sites within the Manila Bay.

These and the Bay's ecosystems have been affected and continue to be threatened by anthropogenic activities such as habitat encroachment, land reclamation, pollution, and risks from climate change and geologic hazards.

Following the Philippine government's approval of the Philippine Reclamation Authority (PRA) Resolution 4161 in 2011, the PRA plans to implement, through Public-Private Partnership, thirty-eight (38) reclamation projects encompassing 26,234 hectares affecting LPPCHEA and mudflats, mangroves, ponds, and marine ecosystems.

This analysis seeks to examine the management of these continuing threats by applying TEEB analytical approaches including the economic valuation of erstwhile undermeasured, un-marketed, and unmonetized goods and services from the Bay's ecosystems, including the LPPCHEA. Such analysis helps ensure that the policy and decision-makers are better informed of the true economic value of natural capital and their ecosystem services that would lead to improved economic and environmental management.



Economic Values of LPPCHEA and other Ecosystems of the Manila Bay

Economic valuation that includes ecosystem services shows that the net benefits from the Bay's ecosystems, mudflats, fish ponds, mangroves and the marine waters, over the next fifty years, amount to U.S. \$5.4B net present value at 6% interest rate (Table 1). These benefits under status quo management are generated by three ecosystems - mangroves (69%), brackish and marine waters (20%), and mudflats (10%) that serve both local (60%) and global stakeholders (40%). Fish production from brackish waters dominates provisioning services, while regulating services such as carbon capture by mangroves, and filtering functions by mudflats and mangroves are the major indirect values. Since these ecosystems are degraded, the damage mostly from algal bloom results in income foregone by shellfish gatherers and traders.

Table 1. Economic Values of Ecosystems Services

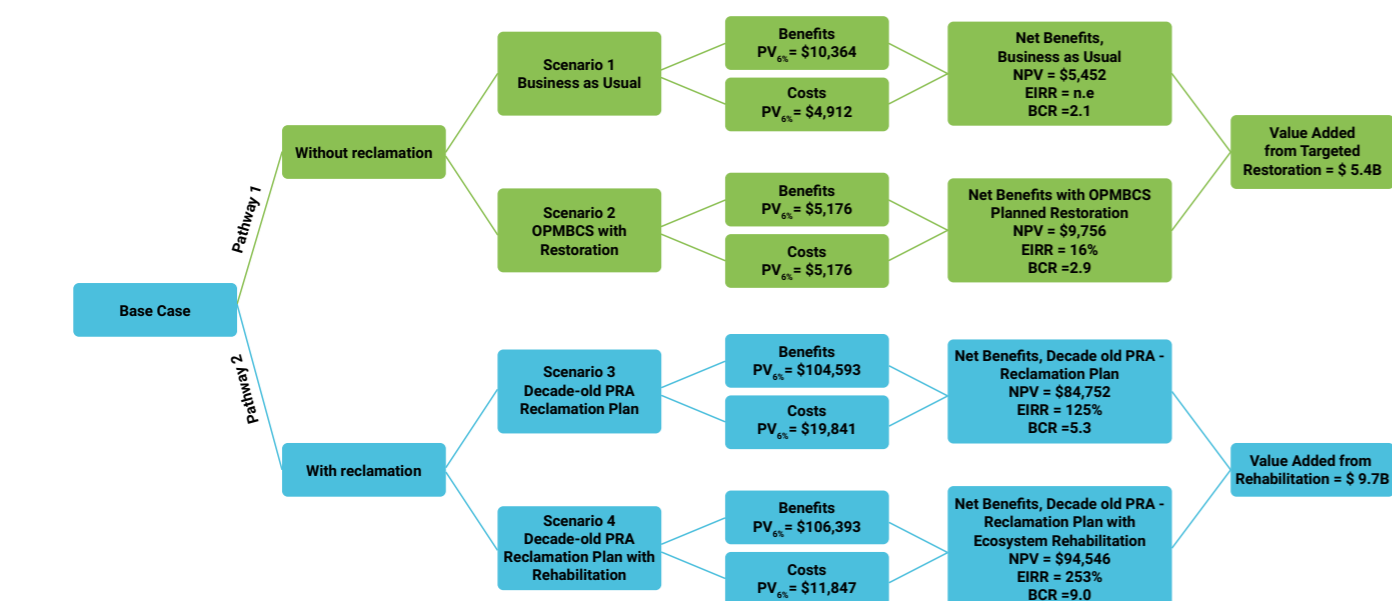
(Net Present Value at 6% at 2016 prices, 2018-2050)	
Social Net Benefits	\$ 5,452 M
Benefits, net of production costs	10,364 M
Aquaculture and fishing	2,121 M
Mangroves: carbon capture; filtering; cultural	7,146 M
Mudflats: filtering; shellfish; recreation	1,087 M
Coral Reefs, sea grasses, sea weeds	Insignificant
Beach Areas for Recreation	9 M
Transactions and Social Costs	4,912 M
Governance Costs	289 M
Water Pollution Control	1,258 M
Damage Costs of Algal Bloom	3,356 M
Damage Costs of Storm Surge	9 M

Benefit Cost Analysis of Alternative Management Social Scenarios for Manila Bay

The prospective social benefit cost analytical framework entails the economic valuation of future benefits and costs from the perspective of society, including environmental externalities. It was conducted by a transdisciplinary team that implemented assessments of natural assets and ecosystem services, socio-economic conditions and the prospective impacts of policy and management options that were explored through four scenarios discussed with multi-stakeholders:

Pathway 1: Without Future Reclamation

Scenario 1 - Business as usual: (a) status quo, site management plan



is partially implemented incomplete enforcement of Presidential Proclamation No.1412-A with current budget; (b) no additional restoration; (c) decade-old PRA reclamation plan is not pursued. Scenario 2 - Improved site management with restoration: (a) natural assets are restored to past levels; (b) the Operational Plan for the Manila Bay Coastal Strategy (OPMBCS) is fully budgeted and Presidential Proclamation No. 1412-A is implemented; and (c) the decade-old PRA reclamation plan is not pursued.

Pathway 2: With Reclamation in the Future

Scenario 3 - Decade-old PRA reclamation plan is implemented: (a) with infrastructure development that includes the buffer zone; and (b) remaining LPPCHEA is conserved but without rehabilitation. Scenario 4: Decade-old PRA reclamation plan is implemented: (a) the LPPCHEA buffer zone is preserved and biodiversity enhanced; and (b) mangroves and mudflats are conserved to reduce storm surges risks.

RESULTS

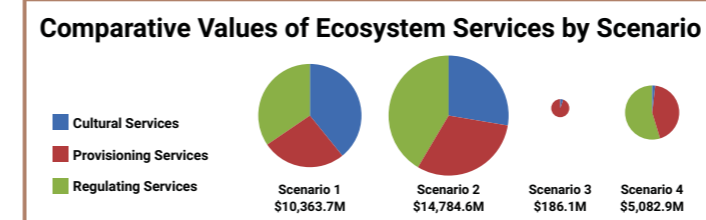
The more efficient outcome, land reclamation, comes with considerable risks

Using efficiency criteria alone, as measured by the present value of net benefits (NPV), benefit-cost ratio (BCR), and economic internal rate of return (EIRR), implementing the decade-old PRA reclamation plan yields higher values over the scenario where improved management of the Manila Bay ecosystems is done in terms of the OPMBCS. However, sensitivity analysis of the results for Scenario 4 indicates that higher development costs to address increasing risks from climate change and geologic hazards and 40% lower estimates of the future value of reclaimed land could make this option unviable. The PRA reclamation plan is a decade old, implying that the information used for preparing it is dated and most likely underestimates the risks that were mentioned; it is also associated with dated reclamation technology. In addition, the Plan's Environmental Compliance Certificate that was granted in March 2012, or six years ago, has expired. Thus, there is a need to update the information required for assessing proposals to reclaim land at the Bay. In addition, there are several factors that may contribute to less optimistic demand for reclaimed land, such as: (a) increasing awareness of climate risk and geologic hazards and (b) lack of confidence that the pollution management targets would be attained. These may deter future investments in real estate whether for residence, recreation, or commercial uses.

The Mandamus by the Supreme Court directs several government agencies to clean up, rehabilitate, and preserve Manila Bay, and restore and maintain its waters to make them fit for swimming, skin-diving, and other forms of contact recreation. These require full implementation of the Operational Plan for the Manila Bay Coastal Strategy (OPMBCS).

Preventing further losses in ecosystem services is a mandate that needs to be implemented

Considerable ecosystems had already been lost from past reclamation activities, pollution, and encroachment: coral reefs and sea grasses are nil, fish productivity declined, and mangrove restoration is targeted to attain its 1990 conditions. More ecosystem services would be lost should the decade old PRA reclamation plan be implemented in toto.



This need not happen. An alternative, reclaiming a smaller area while respecting the LPPCHEA buffer zone and existing mudflats and mangroves, reduces the benefits of reclaimed land from \$104B (Scenario 3) to \$101B (Scenario 4). But such loss is more than compensated by the higher ecosystem services (\$186M versus \$5B) that are rehabilitated and protected.

PROCLAMATION NO. 1412-A (PP No. 1412-A), or the Amendment to PP. 1412 (2007) entitled "Establishing a Critical Habitat and Ecotourism Area within the Coastal Lagoon of Las Piñas and Parañaque," mandates all relevant executive government agencies to ensure the protection and preservation of floral and faunal biodiversity, habitats (including lagoons, mangroves, salt marshes, and tidal areas), fisheries productivity, and ecological systems present within and around LPPCHEA, upon the undertaking of any reclamation activity. In particular, the Amendment requires that at least 15% of the 1,500 ha- Bay City/ Boulevard 2000 Project be maintained for existing wildlife habitats and protection of its functions such as wintering, foraging, breeding, roosting, and nesting area for waterbirds; and that all environmental impact and risk assessments highlight the biodiversity aspects that will be affected by projects. The Proclamation further states that the DENR convene and chair a Manila Bay Critical Habitat Management Council composed of representatives from PRA, DOT, Las Piñas and Parañaque LGUs, environmental NGOs, and POs. The Council will be tasked to prepare and implement a DENR-approved Critical Habitat Management Plan, in accordance with the Manila Bay Action Plan, and consisting of 1) a Master Plan establishing a science-based criteria and environmentally sound development guidelines, and 2) an Ecotourism Business Plan outlining actions toward sustainable ecotourism and management. In addition, the council, led by DENR, will also be responsible for the ground-truthing of assessments to be conducted in LPPCHEA.

Whether or not reclamation proceeds, sustaining ecosystem services from natural assets in Manila Bay through conservation and rehabilitation benefits society

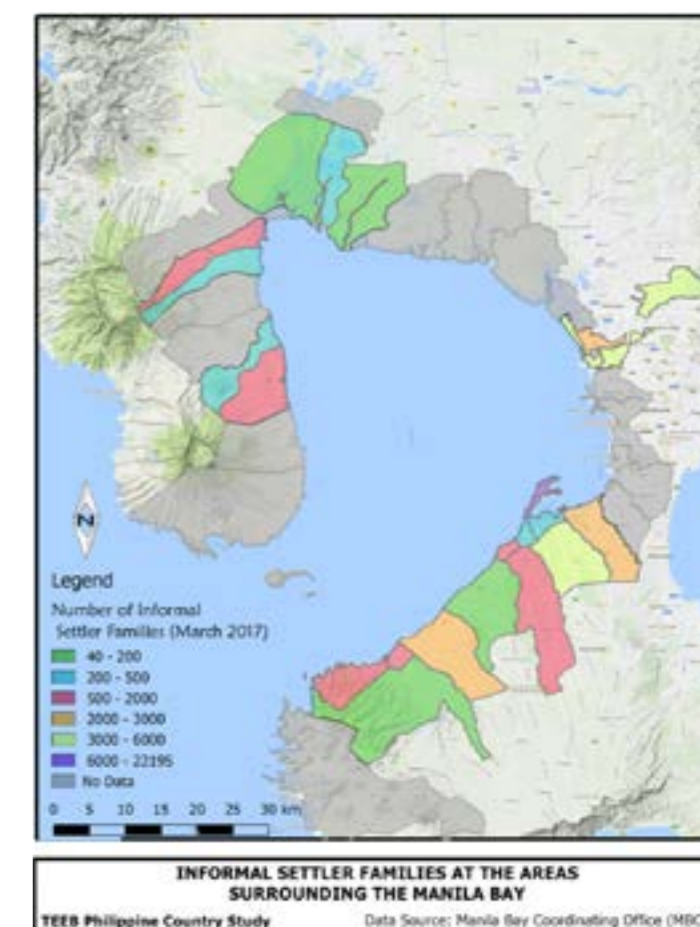
The results indicate that, for either pathway, the option that includes rehabilitation and/or restoration of ecosystems increases the benefits to society. Without additional land reclamation at the Bay net benefits almost double from \$5.4B (Scenario 1) to \$9.8B (Scenario 2) with the restoration of ecosystem services. Implementing the decade-old reclamation plan could result in net benefits of \$84.8B, albeit with the risks mentioned earlier. But avoiding the LPPCHEA buffer zones and maintaining and rehabilitating the mangroves and mudflats could increase the net benefits by eleven percent to \$94.5B with ecosystem rehabilitation (Scenario 4). Thus, respecting the declaration of LPPCHEA as a RAMSAR site through on-site conservation and rehabilitation of its surrounding ecosystems is imperative and should be adequately financed.

Future actions need to directly address inequity

Various equity concerns are important to raise. First, the groups currently benefiting from the valued ecosystem services of Manila Bay largely include the informal economy (gleaners, shell fish gatherers, charcoal producers, fishers, and bathers) and the growing middle class of bird watchers, students/researchers, and aquaculture operators. In contrast, the groups that are expected to benefit the most from reclamation are the rich and upper middle classes - real estate developers, businessmen, and travelers.

If the empirical estimates were weighted by income classes, for example, by applying a factor of ten to the benefit estimates of Scenarios 1 and 2, the resulting numbers would be at least at par with those of Scenarios 3 and 4. Hence, a more equitable outcome could be achieved if the gainers of reclamation would compensate the losers by more than the anticipated loss. High economic returns estimated for Scenarios 3 and 4 imply that this is feasible as well as equitable.

Second, the location value of informal settlers around the Bay was likely undervalued in the estimates of relocation costs, whose current practice is not at par with the current international standards for resettlement. This means that potentially inequitable and inadequate compensation values are implied in the decade old- reclamation plan. Third, a land reclamation plan for Manila Bay that spans more than 26,000 hectares needs to explicitly plan for meaningful labor-intensive activities and decent housing, in view of the fact that there are considerable informal settler families in the Manila Bay surrounding areas.



POLICY AND MANAGEMENT IMPLICATIONS

Reexamine the land reclamation plans

Past land reclamation activities and pollution into Manila Bay have caused considerable decline of its natural assets particularly the mudflats, coral reefs, sea grasses, mangroves, water quality, and marine life. If these threats continue - a decade-old proposal to further reclaim Manila Bay could generate high net benefits. But this encroaches into the buffer zone and reduces water flow around the LPPCHEA, other mudflats and mangroves. This would eventually cause decimation of wetland habitat and wipe out the protection that it provides against storm surges. Reexamination of land reclamation plans is needed to lower risk to the Bay's ecosystems, strengthening rehabilitation efforts and enhance protection from climate change and reduce risk from geological hazards. The expiration of the Environmental Clearance Certificate for the decade-old reclamation plan offers the opportunity for better planning for the future of Manila Bay. This should ensure that environmental and social safeguards at par with international best practices are implemented to minimize damages on ecosystems and livelihood losses by the poor.