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Looking at Payments for Ecosystems Services in the Philippines

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*Sonny N. Domingo, Arvie Joy A. Manejar,
and John Joseph S. Ocbina*



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Looking at Payments for Ecosystems Services
in the Philippines

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PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

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Abstract

The payment for ecosystem services (PES) emerges as part of an arsenal of tools for innovative domestic financing for otherwise absent markets relating to natural resource management. Its traditional framework aspects of conditionality, voluntary transaction, at least one buyer and seller, and an identified ecosystem service. However, most domestic cases in the Philippines do not meet the first two criteria. Further to this, existing templates remain dispersed and not harmonized. Common barriers that contribute to these are negotiation bottlenecks, missing policies, and institutions, weak sustainability measures, and data unavailability. Stronger integration with sector-specific initiatives involves pursuing in the long run a legal platform for PES at NGA and subnational levels alongside natural capital management, framing sustainable mechanisms, capitalizing on evolving definition, and riding on ongoing efforts at the national level.

Keywords: payments for ecosystem services, environment, ecological integrity, ecosystem services

Table of Contents

1. Introduction	1
1.1. Background of the Study	1
1.2. Objectives	1
2. Methodology	2
2.1. Conceptual Framework	2
2.2. Data Sources	2
3. Results	3
3.1. Relationship of environment and ecological integrity and sustainable development	3
3.1.1. Overview of natural capital accounts	3
3.1.2. Ecosystem services	5
3.2. Evolution of PES templates	6
3.2.1. Changing definitions: Context and history	6
3.2.1. Categories and scales of schemes	7
3.2.2. PES Actors and Design	9
3.2.3. Enabling conditions for PES	9
3.2.4. Policy and institutional foundations	10
3.3. PES interventions in the Philippine landscape: Then and now and future	13
3.3.1. National PES-like mechanisms	15
3.3.2. Vietnam's PES Policy	19
3.3.3. Subic Bay Freeport Zone	19
3.3.4. Tubbataha Reefs National Park	20
3.3.5. Puerto Princesa Subterranean River National Park (PPSRNP)	21
3.3.6. Other local templates in the Philippines	23
3.3.7. Insights from domestic cases	23
3.3.8. Spatial comparison	26
4. Barriers to PES	30
4.1. Negotiation bottlenecks	30
4.2. Management and fiscal limitations	30
4.3. Missing policies and institutions	31
4.4. Weak sustainability measures	31
4.5. Data unavailability	32
4.6. Evolving definition	32
4.7. Key insights	32
5. Conclusion	33
6. Recommendations	34
6.1. Capitalize on evolving PES definition and increased interest from government ...	34
6.2. Frame sustainable PES templates	34
6.3. Link PES to natural capital management and CCA/CCM efforts	34
6.4. Augment accounting and auditing rules to reflect PES and natural capital accounts	34
6.5. Institute PES transparency platform and data management, explore performance- based monitoring and evaluation	35
6.6. Pursue legal platform for PES at NGA and subnational levels	35
7. References	36

List of Tables

Table 1. Data sources.....	2
Table 2. Types of ecosystem services.....	5
Table 3. Comparison of major PES components.....	7
Table 4. Potential impact of PES programs on the poor.....	8
Table 5. List of enabling conditions.....	10
Table 6. Enabling PES provisions in national policies.....	10
Table 7. Institutionalization of PES in local cases.....	12
Table 8. Comparison of PES case studies in the Philippines.....	13
Table 9. List of fees collected by PPSRNP.....	22
Table 11. Comparison of traditional PES components across case studies.....	24
Table 12. Summary insights from case studies in the Philippines.....	25
Table 13. Percentage changes in land cover in specific sites.....	29

List of Figures

Figure 1. Conceptual framework.....	2
Figure 2. Relationship of total wealth and natural capital across regions.....	3
Figure 3. Asset accounts per capita across income regions, in million USD.....	3
Figure 4. Natural capital per capita in the Philippines.....	4
Figure 5. Critical ENR areas in the Philippines as of 2022.....	5
Figure 6. Process flow in draft PES DAO.....	15
Figure 7. Presentation of total IPAF in national protected areas.....	16
Figure 7. Cumulative IPAF (in million PHP) and land area (in thousand ha) disaggregated by regions, 2016-2021.....	17
Figure 8. Disaggregated IPAF by region, 2016-2021.....	18
Figure 9. Treemap comparison of PACBRMA counts, per region and protected area type.....	18
Figure 11. PPSRNP Tourist Arrival 2011-2021.....	22
Figure 12. Land cover changes in Palawan, 2003, 2010, 2015, and 2020.....	27
Figure 13. Land cover changes in Zambales, 2003, 2010, 2015, and 2020.....	27
Figure 14. Land cover changes in Region 2, 2003, 2010, 2015, and 2020.....	28

Looking at Payments for Ecosystems Services in the Philippines

Sonny N. Domingo, Arvie Joy A. Manejar, John Joseph S. Ocbina¹

1. Introduction

1.1. *Background of the Study*

Multifaceted risks from climate change and anthropological acts exacerbate environmental degradation. Global indicators on ecosystem extent and condition decreased 47 percent from their natural baselines and will continue to decline by at least 4 percent per decade while severe alteration of terrestrial environment reached 75 percent (United Nations 2019). This presents dire forecasts for the Philippines which topped the World Risk Report² in 2022.

Missing environment markets hinder the full capture of immediate and slow onset damages from disasters and climate change and the extent of repercussions to national accounts. This weakness facilitates the emergence of valuation approaches for economic contributions, one of which is payments for ecosystem services (PES).

As evaluation and empirical data contribute to the greater inclusion of environment in economic development, it becomes integral to look at how financing tools inform management and conservation mechanisms. This study looks at the varying templates and mechanisms of PES in the Philippines and how these applications contribute to shaping environment and natural resource initiatives.

1.2. *Objectives*

The study generally looked at how payments for ecosystems services as an approach contribute to sustainable development and ecological integrity initiatives.

Specifically, it conducted the following:

1. Examine how PES contributed to sustaining environment sector development and protection initiatives;
2. Identify existing examples and templates of PES and their applicability in the case of the Philippines;
3. Determine underlying incentives of actors/stakeholders in the conduct of PES; and
4. Determine how PES-related interventions inform policy and shape environment sector outcomes

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² Index components include exposure, vulnerability, susceptibility, coping, and adaptation.

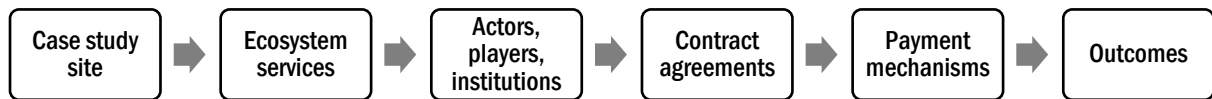
2. Methodology

2.1. Conceptual Framework

The study employed a mixed-methods approach within the case study framework. PES components as defined by Wunder (2004) were identified for each site for comparison analysis: ecosystem services, and actors (buyers, sellers), players, institutions, and their motivations whereas presence of volunteerism and conditionality were assessed through contract agreements, payment schemes, and outcomes.

Data sources ranged from desk review, key informant interviews, and focus group discussion with both public and private entities. Table 1 lists the details of data from each agency.

Figure 1. Conceptual framework



2.2. Data Sources

Table 1. Data sources

Agency	Data	KII/FGD
DENR-Biodiversity Management Bureau	Integrated Protected Area Fund, FY 2016 to 2021	x
	Protected Area Community-Based Resource Management Agreement (PACBRMA), 2020	
	Shapefiles	
DENR-Forest Management Bureau	Manual for the development of PES	✓
Puerto Princesa Underground River Natural Park (PPURNP)	Tourist Arrival, 2011-2021	✓
Tubbataha Management Office (TMO)		✓
Resources, Environment, and Economics Center for Studies (REECS)		✓
Palawan Council for Sustainable Development (PCSD)		✓
SBMA Ecology Center	Permits and environmental clearances	✓
World Wildlife Fund (WWF)		✓
PSA	Environmental compendium	x
NEDA	Natural capital accounting roadmap	x
World Bank	Natural capital accounting	x

Source: Author's list

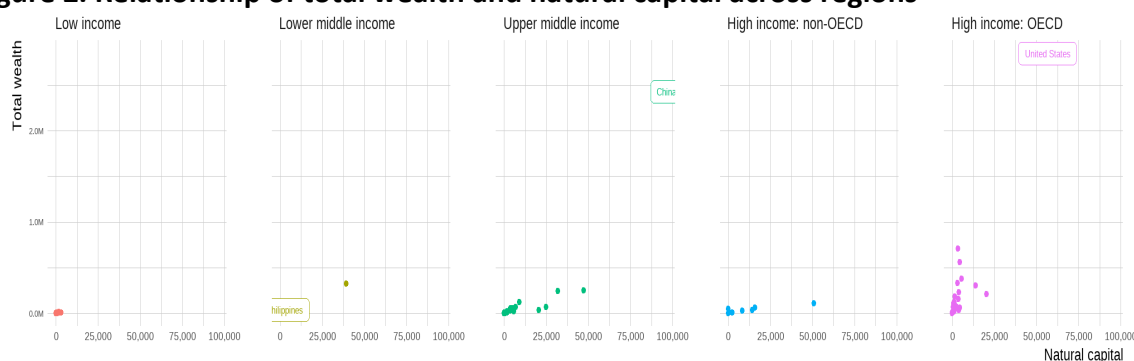
3. Results

3.1. Relationship of environment and ecological integrity and sustainable development

3.1.1. Overview of natural capital accounts

The Philippines' share of natural capital to total wealth is low even among lower middle income countries. Upper middle income region exhibits low wealth but generally higher natural capital. On the other hand, high income countries have an inversely proportional relationship with their total and resource wealth. China and United States pose as outliers in their respective regions, amassing more than USD 50,000 in natural capital.

Figure 2. Relationship of total wealth and natural capital across regions



Source: World Bank 2018

Methodologies used to reflect these figures only capture productive assets and not ecosystem services as seen in the table below. Universal valuation systems are still up and coming from different institutions, and the concept is yet to cascade across regions. What is presently evident is the consistent undervaluation of natural resources, particularly in low to upper middle income countries which are resource rich but do not have established industries for value adding mechanisms. Rather, these productive assets are captured in high income countries where raw materials are processed.

Figure 3. Asset accounts per capita across income regions, in million USD

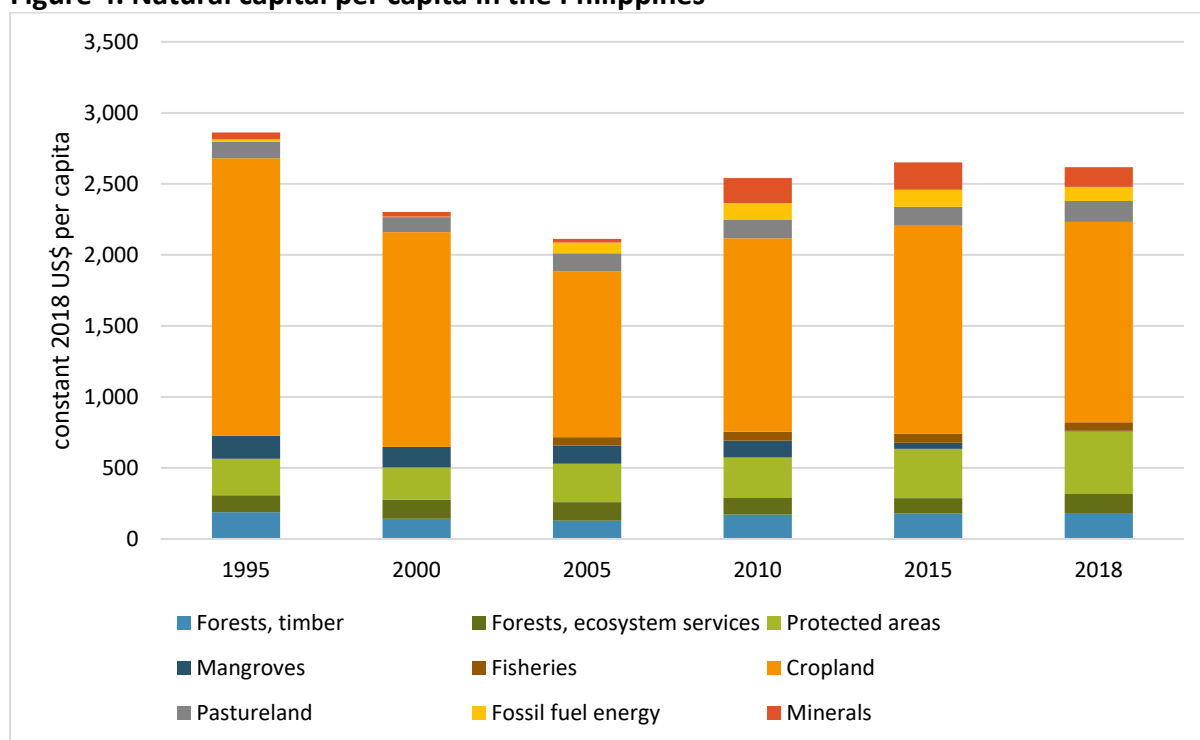
Per Capita, constant 2018 USD	Philippines	Low income	Lower middle income	Upper middle income	High income: non-OECD	High income: OECD	World
Total wealth	35,135	11,462.46	27,107.69	141,681.62	400,891.49	621,278.29	160,166.88
Produced capital	8,468	3,176.38	7,368.23	36,605.57	93,159.66	217,189.62	49,950.02
Human capital	24,559	5,726.41	16,847.21	93,794.49	134,603.70	396,221.63	101,797.18
Natural capital	2,618	2,937.16	3,653.24	11,185.06	123,316.88	13,059.13	8,973.47
<i>Renewable natural resources</i>	2,380	2,665.71	2,750.91	6,039.69	3,288.20	9,522.24	4,947.58
<i>Forests, timber</i>	182	646.42	222.30	445.66	191.85	502.55	379.32
<i>Forests, ecosystem services</i>	134	287.14	173.45	950.04	707.48	3,964.17	1,036.85
<i>Mangroves</i>	4	7.52	68.39	96.73	125.33	81.67	76.13
<i>Fisheries</i>	60	5.59	28.05	20.89	39.93	61.49	28.77
<i>Protected areas</i>	441	316.52	185.06	671.02	408.74	1,171.95	521.02
<i>Cropland</i>	1,410	962.01	1,494.35	2,875.60	913.98	2,172.45	2,041.95
<i>Pastureland</i>	148	440.51	579.32	979.76	900.89	1,567.96	863.54
<i>Sub-soil assets</i>	238	271.45	902.33	5,145.36	120,028.69	3,536.89	4,025.89
<i>Oil</i>	32	107.74	352.69	3,212.35	113,264.87	1,061.72	2,656.67

Per Capita, constant 2018 USD	Philippines	Low income	Lower middle income	Upper middle income	High income: non-OECD	High income: OECD	World
Natural gas	53	29.09	150.08	782.43	6,649.58	293.62	457.21
Coal	15	16.29	257.63	613.30	-	1,066.02	484.11
Metals and minerals	138	118.33	141.93	537.28	114.24	1,115.53	427.90
Net foreign assets	-	-	-	96.51	49,811.25	-	-
	510	377.49	760.99			5,192.09	553.79

Source: World Bank 2018

Further examination shows that croplands comprise bulk of natural capital accounts. Their production is more visible and easily valued compared to its other counterparts. Mining industry contributions also start to pick up in 2010 and fossil fuel in 2005. Meanwhile, mangrove values exhibit indicative dips which may signal encroachment and land conversion over the years.

Figure 4. Natural capital per capita in the Philippines

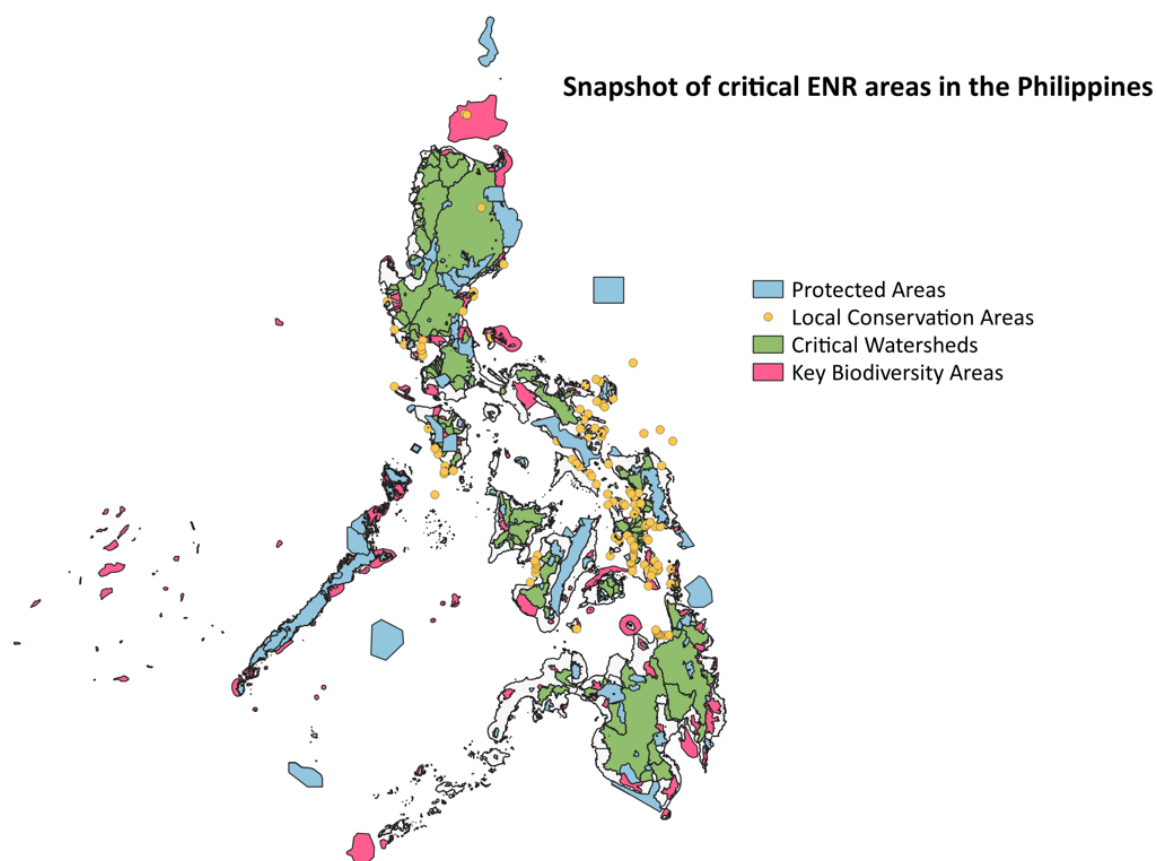


Source: World Bank 2018

In a similar vein, around 248 nationally declared protected areas in the country have been declared under Enhanced and National Integrated Protected Areas System (E/NIPAS) Acts³ as of 2022. Local governments also declare protected areas through ordinances and resolutions, thereby establishing local conservation areas as other effective area-based conservation measures (OECM). The map in Figure 5 also shows critical watersheds and key biodiversity areas which are included in the Philippine Development Plan's sectoral indicators. These can serve as possible entry points for resource management interventions.

³ National protected areas are categorized into national parks, natural parks, natural monuments, protected landscapes and seascapes, game refuge and bird sanctuaries, resource reserves, and natural biotic areas.

Figure 5. Critical ENR areas in the Philippines as of 2022



Source of basic data: Biodiversity Management Bureau (BMB) ; Forest Management Bureau (FMB)

3.1.2. Ecosystem services

The Convention on Biological Diversity defines an **ecosystem** as a "complex of living organisms and the abiotic environment with which they interact in a specific location" (United Nations 2014, p.3). It provides **ecosystem services (ES)** which the Millennium Ecosystem Assessment divides into four major categories: provisioning, regulating, supporting, and cultural services (Constanza et al. 2017).

Table 2. Types of ecosystem services

	Definition	Forests	Oceans	Agricultural lands
Provisioning	Product and material benefits obtained from ecosystems	Food, fresh water, fuel, fiber	Food	Food, fuel, fiber
Regulating	Benefits derived from regulating ecosystem processes and functions	Climate regulation, flood regulation, disease regulation, water purification	Climate regulation, disease regulation	Climate regulation, water purification
Supporting	Processes required to produce other services	Nutrient cycling, soil formation	Nutrient cycling, primary production	Nutrient cycling, soil formation
Cultural	Nonmaterial benefits, for aesthetics, cultural identity, or spiritual well-being	Aesthetic, spiritual, educational, recreational	Aesthetic, spiritual, educational, recreational	Aesthetic, educational

Source: Millennium Ecosystem Assessment 2005

While GDP is a robust metric for development, its presentation of natural capital is limited to flows of income and output and excludes natural services⁴ (Philips 2017). The total contribution of natural capital like forests, wetlands, and agricultural land does not show up, but the economic value of economic services is vast (Thompson 2011).

Unlike most goods and services, these services are not traded in traditional markets due to their public good qualities⁵ and their nature as externalities beyond the purview of producers and consumers (Summers et al 2018). The market's inability to directly price the environment communicates its benefits as non-monetary and immaterial which eventually leads to overconsumption and exploitation (Quah and Tan 2019). While it is ideal to use public sources for ES management, fiscal resources are limited, dwindling, and unsustainable. This is where payments for ecosystems services comes in.

3.2. *Evolution of PES templates*

3.2.1. Changing definitions: Context and history

Eco-certification, park entrance fees, and tradable development rights described Payments for Ecosystem Services (PES) in its earlier conception. Wunder narrowed this down to its traditional definition as **“a voluntary transaction where a well-defined ecosystems service (or a land-use likely to secure that service) is being bought by a (minimum one) ES buyer from a (minimum one) provider if and only if the ecosystems services provider secures ecosystems services provision (conditionality)”** (Wunder 2007, p.50; United Nations Economic and Social Commission for Asia and the Pacific 2016, p.8).

The Convention on Biological Diversity (CBD) later adds additionality, anti-leakage, and permanence. Additionality refers to environmental benefits that would not have been realized in the absence of payment. Permanence ensures that any intervention will not be readily reversible while anti-leakage prevents degradation of other ES elsewhere.

Among the essential features of the PES agreements is preserving the flow of a certain ecosystem "service" in exchange for an item of economic worth. Common ecosystem services included in market schemes are (1) carbon sequestration in biomass or soils, (2) provision of habitat for endangered species, (3) protection of landscapes, and (4) water provisioning (Katoomba Group, United Nations Environment Programme and Forest Trends 2008; Gomez-Baggethun et al. 2009; Dissanayake and Jacobson 2021).

It is crucial to note that PES captures only a percentage of the values offered by natural systems. Existence values, choice values, and many public goods benefits are often outside the purview of PES processes (Salzman et al 2018).

Further, Schomers and Matzdorf (2013) stated that the PES idea has more policy significance in developing nations than in developed countries, despite the latter having history of various financial incentives and market-based tools. PES appears to be an appropriate technique for creating new financial environment incentive schemes in nations with no past experience of such interventions.

⁴ Forestry is an example — timber resources are counted in national accounts, but the other services of forests, like carbon sequestration and air filtration, are ignored. GDP may provide an incomplete picture of a country's economic performance and well-being.

⁵ Non-excludability and/or non-rivalry

Global practice patterns show large documentation of services from carbon, watersheds, biodiversity, and scenic beauty. Usual service vehicles include bundling, layering, and piggy-backing. Table 6 compares several schemes and configurations found across literature.

Table 3. Comparison of major PES components

PES payment scheme	
Public	Government pays resource managers in behalf of general public
Private	Service providers in direct contact with service providers; self-organized deals
Public-private	A combination of both government and private funds as payment to resource managers
<i>*Quasi-public</i>	A group (CSO/NGO/PO) behaves like the government in behalf of the general public
Possible configurations of buyers and sellers	
One to one	Company to one resource manager/landowner
One to many	Single seller to multiple buyers (e.g. water utility to irrigation and water district)
Many to one	Multiple buyers to single seller (e.g. multiple businesses invest in development of urban green space)
<i>*Many to one</i>	Multiple sellers to single buyer (e.g. group of companies paying fees to an indigenous group)
Many to many	Government pays on behalf of general public
ES packaging	
Bundling	Single or consortium of buyers pay for package of ES arising from same parcel of land or body of water
Layering	Multiple buyers pay separately for different ES in a single habitat (e.g. Making forest supplying aesthetic values, wildlife habitat, water quality)
Piggy-backing	Single service is treated as an umbrella package while other ES benefits free-ride and remain free of charge

Note: Authors' additions are denoted in (*).

Source: Adapted from Smith et al. 2013, Wertz-Kanounnikoff et al. 2011

3.2.1. Categories and scales of schemes

Salzman et al. (2018) grouped PES mechanisms into three broad categories namely, voluntary PES, subsidy PES, and compliance PES. In a **voluntary PES**, the beneficiaries of an ES agree to compensate landholders for activities that maintain or enhance ES delivery⁶. **Subsidy PES** structure involves a buyer, a public entity, acting on behalf of the public good and not necessarily a direct beneficiary of ecosystem services enhancement or protection⁷. Parties facing regulatory obligations compensate other parties for activities that maintain or enhance comparable ES in exchange for a standardized credit or offset that satisfies their mitigation requirements in a **compliance PES**⁸.

⁶ This includes the purchase of biodiversity offsets and carbon offsets by extractive industries and companies motivated by corporate social responsibility to reduce their habitat or climate change impacts.

⁷ Costa Rica's and China's government programs pay landholders to reduce deforestation or afforestation activities that enhance flood protection, water quality, or other ecosystem services.

⁸ This includes water quality trading, wetlands mitigation banking, and the European union's emissions trading scheme for greenhouse gases.

PES mechanisms can be implemented in an international, national, catchment, and local or neighborhood scale. State-funded approaches tend to be habitat-centric (Noe et al. 2017). However, ecosystem services values are not significant by location per se but by their perceived performance in the location which is likewise linked to the institutions and regulations in place. The benefit zone is also related to the size of the conservation area; for instance, protection zones along the upper watershed deliver more benefits downstream than those lower in the watershed zone. Overlapping services across habitats and locations are observed to provide multiplicative welfare and greater environmental equity (Interis and Petrolia 2016; Villamagna, Mogollón, and Angermeier 2017).

In other cases, PES is treated as a poverty alleviation tool⁹, but this depends on how it is framed within conservation goals. In Nieratkaa, Bray, and Mozumber (2015), PES was found to strengthen social capital, and foster regional action and organization in inter-community relationships. The high participatory level of agricultural landowners facilitated a modest positive effect to poverty. While other designs introduce livelihood and enrich economic opportunities such as in the Palawan case studies below, contracts can become a poverty trap where long-term commitments cannot churn out benefits for the poor. A better reframing would be to treat PES as economic incentives for a more efficient use of services.

Table 4. Potential impact of PES programs on the poor

Group	Potential impact	Influencing factors
Impact on sellers		
Landowners with secure tenure	Income from PES +	Amount of payment + Opportunity cost –
Landowners with insecure tenure	Income from PES +	Amount of payment + Opportunity cost – Ability to participate –
Tenants	Income from PES +	Amount of payment + Opportunity cost – Benefit distribution with owner or risk of eviction –
Downstream service users	Payment for PES – Receipt of services +	Amount of payment – Consequences of lack of PES system +
Impact on non-sellers		
Farm workers	Change in labor demand (+/-)	Labor needs for current and PES-promoted practices (+/-) Alternative livelihood (+/-)
People dependent on non-timber forest product collection (+/-)	Change in availability and access to NTFPs (+/-)	Nature of current and PES-promoted practices (+/-) Local context

Note: NTFP = Non-Timber Forest Products

Source: Pagiola et al., 2005 and USAID PES Brief 3.5

The study adopts the terms **PES** and **PES-like** presented during the Payments for Water Ecosystem Services National Stocktaking Workshop. PES arrangement pertains to a setup fulfilling Wunder's five criteria while PES-like exhibits noncompliance with one or two criteria

⁹ Tools like pareto criterion, equity gap principle, and fairness principle can be used to assess the effectiveness of PES on poverty alleviation.

in the traditional definition. Absence of voluntary transaction and conditionality have been noted particularly in Southeast Asia (Franciso 2022).

3.2.2. PES Actors and Design

Buyers refer to those willing to pay for ES to be safeguarded, enhanced or restored (Smith et al. 2013) under a traditional PES scheme. Potential buyers range from government, corporations, consumers, to non-profits among others. If the ecosystem service is a public good or there are numerous beneficiaries, the government will step in. However, buyers under PES-like fulfill compliance payments which are imposed on the general public or as mandated by law (e.g. entrance fees, user fees).

Their motivations revolve around access to ecological services (water supply, aesthetic values, entertainment and recreation), natural capital (land, water resources, forest products), and disincentive to noncompliance.

Sellers or providers can either be from the private or public (Velde 2016) so long as they have clear mandated authority and property rights. In some cases, PES can generate extra revenue sources for landowners, pushing management objective toward conservation rather than development. Successful PES requires clear establishment of ownership and use rights otherwise it could trigger conflicts (Fripp 2014). They are usually part of stakeholder communities or interest groups thus engagement helps build trust, dialogue, and commitment to the process. Free, prior and informed consent (FPIC) under the Indigenous Peoples Rights Act (IPRA) is a useful blueprint in ensuring decision making avenues especially for indigenous peoples.

Alternative sources of livelihood, continued traditional practice, and natural capital protection are some of the significant drivers of their participation.

Intermediaries bridge actors and institutions across spatial levels, balance decision-making powers, and ensure equity and justice. They may be involved in PES setup, negotiations, and transactions (Fripp 2014). Resource management experts, valuation specialists, land use planners, regulators and business and legal advisors act as **knowledge providers** to PES scheme development, particularly on data collection and analysis (Velde 2016). They intervene because of shared goals and interests and to steer proper resource stewardship and policy compliance.

Negotiation outputs are usually memorandum of agreement (MOA) where arrangements, payment mechanism, payment instrument, and financial instructions are specified. This is ideally followed by annual monitoring and evaluation which most cases tend to gloss over.

3.2.3. Enabling conditions for PES

Ideal conditions facilitate the intended changes in governance, strategy, or management, and support the emergence of a particular environmental policy whereas the absence of which can hinder appropriate actions. Table 8 lists common factors across literature; however other works have seen opposite results on other indicators (e.g. intermediaries). The conditions may also only be relevant at particular stages of the process with respective level of stakeholder engagement (Huber-Stearns et al. 2017).

PES schemes are most likely to thrive where there is a clear demand for ES that is financially advantageous to one or more parties. A PES contract becomes feasible if resources are visibly depleting to the point of scarcity because of a decreased ES. It can also be successful when

contract rules exist and are enforced, and resource tenure is well defined. The supplier must have authority over the area where the PES agreement will be implemented, and the buyer must have assurance, as well as redress, that the deal's contract conditions are safe (Katoomba Group, United Nations Environment Programme and Forest Trends et al. 2008).

Table 5. List of enabling conditions

Biophysical conditions	Economic conditions	Governance conditions	Social-cultural conditions
Small resource area	Significant value of ES	Presence or absence of intermediaries	Trust and transparency among actors
Resource location and arrangement	Low opportunity costs	Strong capacity among actors	Stakeholder communication and engagement
Well-defined boundaries	Manageable transaction costs	Influential champion	Preexisting market-based culture
Baseline data	ES as economic good or services	Strong existing institutions	Participant willingness
Linkages between ES provision and management practices	Economic growth	Clear, well-defined, and secure land tenure and property type (Legal preconditions)	Proximity of actors to each other
Clear threat or risk to ES		Governance structure fit with PES scale Multiple/single PES objectives	Large/small number of actors

Source: Huber-Stearns et al. 2017

3.2.4. Policy and institutional foundations

The country lacks a definitive national policy and framework on PES but enabling provisions for similar mechanisms are lodged in several policies. Table 3 shows relevant issuances. However, most are skewed towards watershed services and upland protected areas, and only one represents coastal/marine protection.

Table 6. Enabling PES provisions in national policies

Law	Title	Provisions supportive to PES
PD 198	Provincial Water Utilities Act of 1973	Sec 32 states that a water district is allowed to “commence, maintain, intervene in, defend and compromise actions, and proceedings to prevent interference with or deterioration of water quality or the natural flow of any surface, stream, or ground water supply...”
RA 7638	Department of Energy Act of 1992	Sec 5 provides powers and functions to DoE to devise ways and means of giving direct benefits to province/city/municipality which hosts an energy-generating facility

Law	Title	Provisions supportive to PES
RA 7160	Local Government Code Act of 1991	LGUs can create own sources of revenues and levy taxes, fees, and charges for the development of wealth and resources within their jurisdiction
RA 9136	Electric Power Industry Reform Act (EPIRA) of 2001	Energy Regulatory Commission will impose environmental charge equivalent to one-fourth of one centavo per kilowatt-hour (P0.0025/kWh) accruing to an environmental fund
RA 7586	National Integrated Protected Areas System (NIPAS) Act of 1992	Establishes the Integrated Protected Areas Fund, disbursements from funds solely for protection, maintenance, and management of system and PAMB projects
RA 8371	Indigenous Peoples' Rights Act	ICCs/IPs have the right to benefit and share profits from natural resources within domains, negotiate terms, and receive just and fair compensation for any damages
EO 318	Promoting Sustainable Forest Management in the Philippines of 2004	Provision for incentives for enhancing investments for forest-based industries. Sec 2.5 pertains to proper valuation and pricing of forestry resources and financing SFM
RA 10067	Tubbataha Reefs Natural Park (TRNP) Act of 2009	Establishment of TRNP Trust Fund, all income generated from operation or management of flora and fauna, visitor/tourist fees, other resources, registration and lease, tourism concessions and contributions shall accrue to the fund Significant provisions on penalties and violations ¹⁰ , damages to the reef, non-payment of conservation fees

Source: Lasco et al. 2021

LGUs with PES programs turn to RA 7160 to enact ordinances for the collection and utilization of user or environmental fees, but fund amount and process are arbitrary. Some LGUs enact environmental protection fund, some channel the money towards rehabilitation, while others realign it for general or trust fund.

In the case of water provisioning, imposition of fees is limited by design of water districts. Local Water Utilities Administration only allows added costs to water bill with a clear legal basis hence negotiations tend to be more successful when there is available baseline information. Notice that the presence of legal documentation sustain commitment in PES mechanisms because of compliance payments.

¹⁰ Anchoring, dumping of waste and littering, bioprospecting without permit, introduction of exotic species; hunting, catching, fishing, killing, taking, gathering, removing, destroying, disturbing, or possessing resources, poaching by foreigners, violation of environmental impact assessment, violation of standards, obstruction to law enforcement officer

Table 7. Institutionalization of PES in local cases

LGU	Ordinance No.	Title	Ecosystem service	Salient provisions
San Carlos City, Negros Occidental	City Ordinance No. 37 series of 2004	Regulating operation of City Waterworks and creating Watershed Development and Protection Fund	Watershed	Environmental fee of PHP 0.75 charged on every cubic meter water billed. Amount collected for at least 15 years will be transferred to the fund
Benguet Province	Provincial Ordinance No. 91 series of 2004	Enacting the local environmental code	Multiple	Creation of Benguet Environment and Natural Resources Office Establishment of water resources trust fund and environmental guarantee fund
Lantapan, Bukidnon	Municipal Ordinance No. 114 series of 2009	An ordinance on incentive-based program	Multiple	Provision of incentives (e.g. subsidies, crop insurance, microfinancing, infrastructure, awards, and recognition, extensions and marketing support) for adopting sustainable farming practices
San Carlos City, Negros Occidental	City Ordinance No. 8 series of 2012	An ordinance enacting the environment code of the City of San Carlos	Watershed	PHP 100 for every cubic meter of water billed, to be transferred to watershed development and environmental protection fund
Bago City, Negros Occidental	City Ordinance No. 16 series of 2015	Imposing environmental protection fee	Watershed	Php 0.50 per cubic water consumed from households connected to BACIWAD, while those that are not, a fixed rate of Php 5 per month
Libona, Bukidnon	Municipal Ordinance No. 17 series of 2015	PES Act	Watershed	Levies on water and production assessment charges for all commercial, agricultural, and industrial groundwater users for watershed rehabilitation
Bauko, Mountain Province	Municipal Ordinance No. 014-C	Bauko Tourism Code of 2015	Multiple, aesthetic/cultural	Minimum Php 100 per tourist, 50% for maintenance of scenic spots, 50% LGU general fund
Cagayan de Oro City, Misamis Oriental	City Ordinance No. 13682 series of 2019	Promotion of environmental rehabilitation and conservation network and creation of ecological services and protection committee (ESPC)	Multiple	Creation of trust fund from financial grants: 80% for watershed conservation, protection and restoration, urban greening, and green pockets; 10% for IEC and research; 10% for administrative expenses

LGU	Ordinance No.	Title	Ecosystem service	Salient provisions
Palawan	PCSD Resolution No. 21-791	Approving the guidelines in the implementation of the payment for ecosystem services (PES) in Palawan	Multiple	
Palawan	PCSD Administrative Order No. 13 series of 2021	Guidelines in the implementation of the payment for ecosystem services in Palawan	Multiple	Covers ECAN zones, provides details on how to establish landscape-seascape PES systems ¹¹ Shall allocate funds for coordinating planning and implementation of PES systems in Palawan

Source: Lasco et al. 2021; supplemented by KII/FGD data

3.3. PES interventions in the Philippine landscape: Then and now and future

The PES schemes in the country traces back to the late 1990s courtesy of the Philippine Environment and Natural Resources Accounting (PEENRA) Project as a response to deficiencies in System of National Accounts.

Capturing economy and environment exchanges eventually led to various program offshoots, one of which is the Integrated Natural Resources and Environmental Management Project (INREMP funded by ADB and GEF, and implemented by DENR-FMB and ICRAF (Lasco et al. 2021). There was also the Philippines Wealth Accounting and Valuation of Ecosystem Accounts (Phil-WAVES) Project in 2014 to 2017, resulting to roadmap formulation (NEDA Roadmap). Current initiatives include Sustainable Interventions for Biodiversity, Oceans, and Landscapes (SIBOL) between DENR and USAID, and ongoing asset and flow accounts development.

The earlier limitation of government-led efforts resulted to an offshoot of private and NGO-led mechanisms. Lasco et al. (2008) classifies these cases into three tiers on the basis of determining payments.

Table 8. Comparison of PES case studies in the Philippines

Tier	Advantages	Disadvantages	Examples
Tier 1 Payments based on established ecological principles and local knowledge	Entry level approach, breaks the barrier to participation of quantification and attribution of ES	Simplistic approach, may not lead to biodiversity conservation	Baticulan Watershed, Negros Island Manupali Watershed, Mt. Kitanglad Range

¹¹ (1) Pre-planning PES activities; (2) Landscape-Seascape Analysis as inputs to establishing PES systems; (3) Conducting valuation and cost and revenue analysis (CRA); (4) Discussion of valuation and CRA including negotiation and initial agreements on key provisions of PES agreements; (5) Signing of PES agreements with the users of ecosystems goods ad services; (6) PES revenue re-investments and implementation

Tier	Advantages	Disadvantages	Examples
	Stakeholders treated in learning and adaptive mode, room for trial and error	Lack of metrics for attribution unable to confirm ES delivery	Natural Park, Northern Bukidnon
	Participatory		
Tier 2 Payments based on simulation modeling and limited site information	Scientific, local, and public ecological knowledge used to create transfer mechanisms Important for resource areas with lps Given quantitative estimates, possible long range projections, feasible attribution, lower costs Cost-effective marketing	Simulation models are only as good as input data and assumptions	Bakun Watershed, Benguet Kalahan Carbon Sequestration Project, Nueva Ecija-Nueva Vizcaya
Tier 3 Payments based on site-specific quantitative measurements of environmental services	Most accurate measurement Actual monitoring and measurements possible Payments can be done on a per unit basis	Only applicable for existing markets e.g. Kyoto Protocol driven markets High cost required for implementation	LLDA Tanay Streambank Rehabilitation Project

Source: Lasco et al. 2008

National PES undertakings primarily deal with watersheds¹² and carbon sequestration relative to National Greening Program, but these have not been cascaded regionally yet.

Initial PES institutionalization is underway with DENR-FMB's draft PES DAO on watershed management. The DAO covers watersheds with no existing PES schemes or arrangements. It identifies DENR as the lead facilitator during development stage while regional offices will serve as intermediaries. The undertaking will be anchored on FMB's PES toolkit.

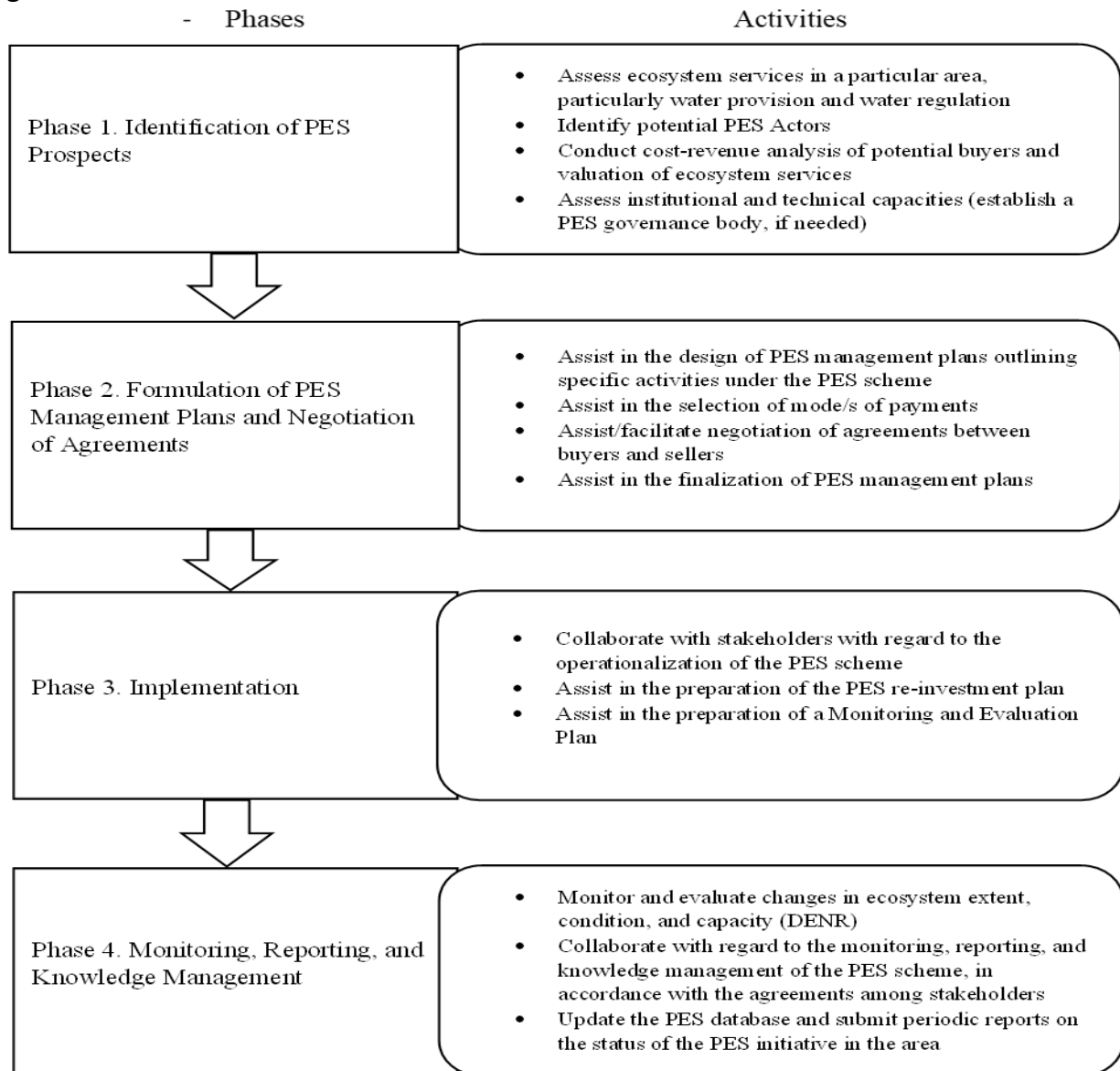
DENR-FMB's toolkit combines methodologies from various studies with initial focus on forest ecosystems and watershed services. It divides the PES process into four: (1) identification of

¹² Current computation uses national default factor but can be improved using species-specific data.

PES prospects; (2) formulation of PES management plans and negotiation of agreements; (3) implementation of PES scheme; and (4) monitoring, reporting, and knowledge management.

The policy also proposes establishing a PES initiatives database, reflecting lessons learned and good practices for monitoring and knowledge management, under FMB’s supervision.

Figure 6. Process flow in draft PES DAO



The next sub-sections look at international and local case studies to examine varying PES templates.

3.3.1. National PES-like mechanisms

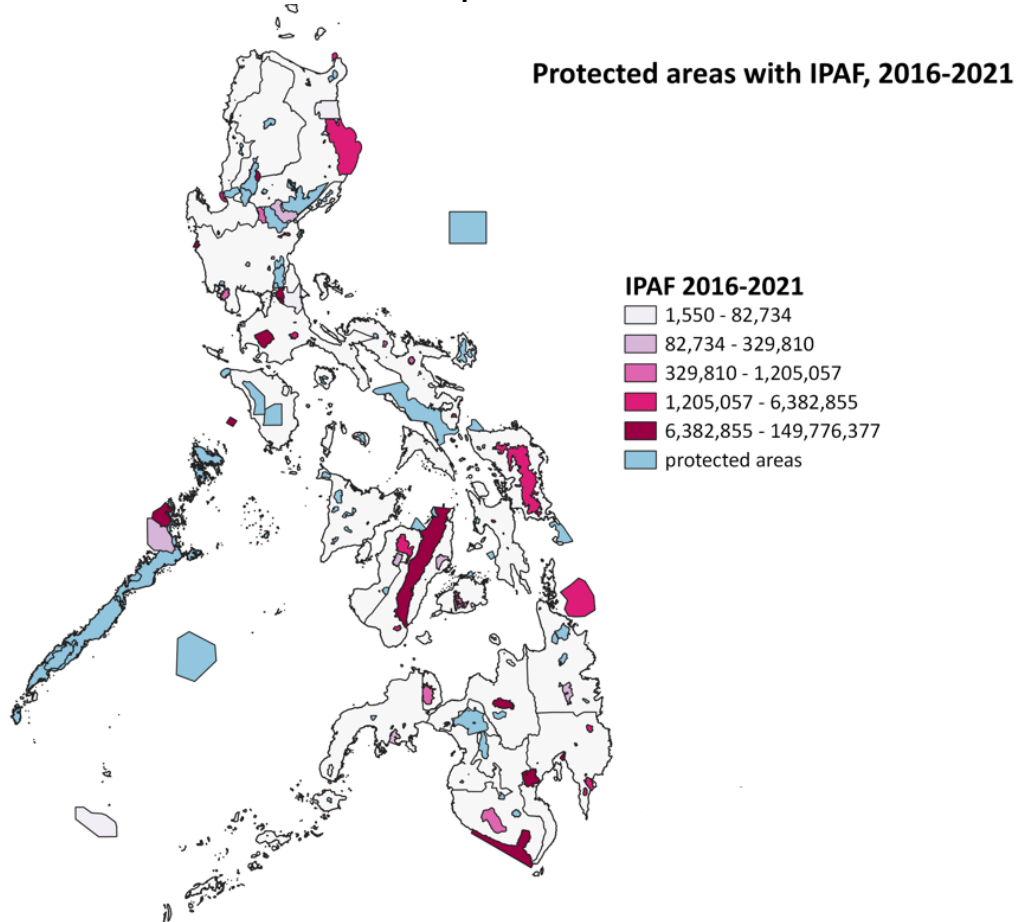
NIPAS subsequently established Integrated Protected Area Fund (IPAF) as a financing mechanism for a protected area’s continued operations and maintenance. It pools fees, donations, endowments, and grants, but out of 248 PAs in the country, only 93 PAs are able to generate IPAF.

Seventy five percent of the fund is retained by the PAMB under the PA-Retention Income Account (PA-RIA) while the rest of the fees revert to the National Treasury as Special Account

in the General Fund (IPAF-SAGF). This new setup also reduces transaction leakages and bureaucratic delays from the initial arrangement of depositing the full IPAF to National Treasury which can only be accessed upon request or approval of proposed activities stated in the PA management plan.

Entrance fees and user fees generally comprise the revenues, but only 18 percent of the total PAs have entrance fees, and 13 percent imposes user fees.

Figure 7. Presentation of total IPAF in national protected areas



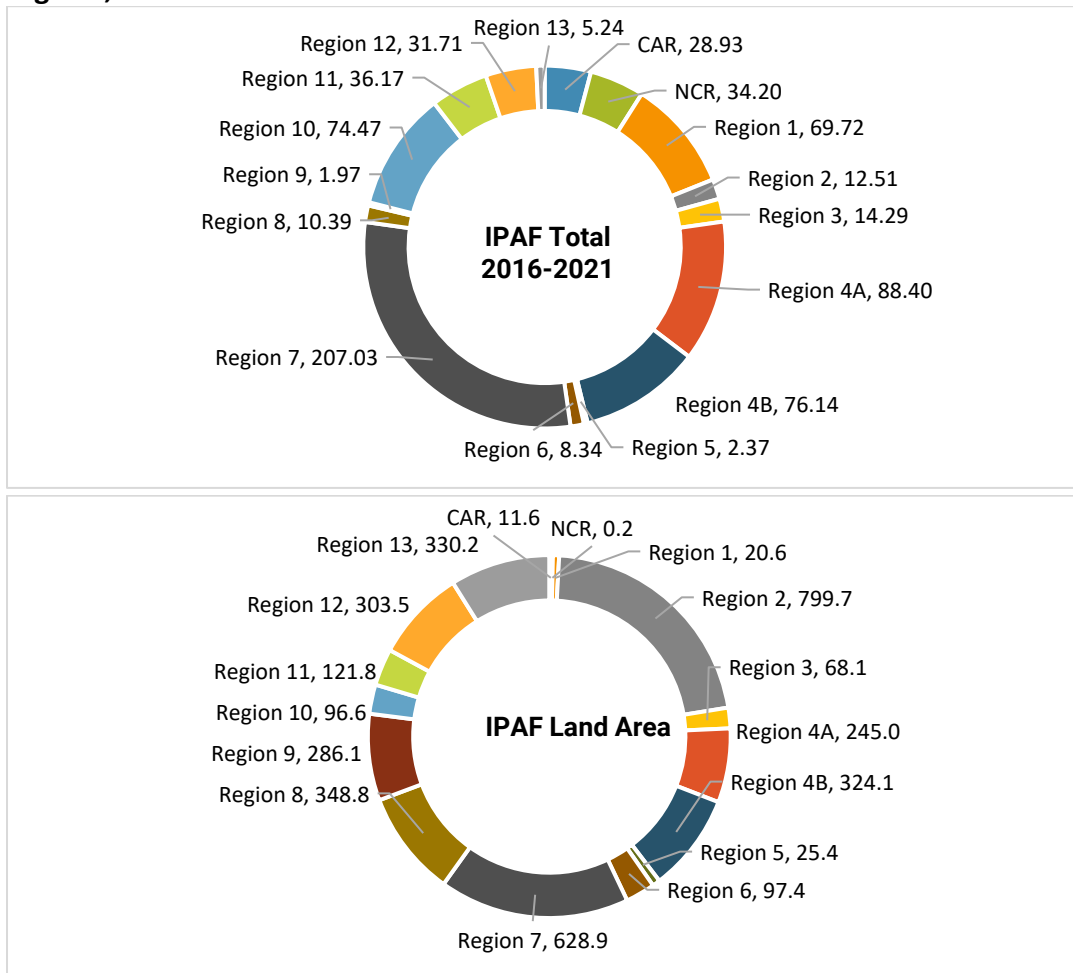
Notes: Not in the map are Kaliwa Watershed Forest Reserve (Region 4A), Juban-Magallanes Watershed Forest Reserve (Region 6), and Pangangan Mangrove Forest Swamp Forest Reserve/Calape Group of Islands, but they generate IPAF.

Source of basic data: BMB

Region 7 has the highest cumulative IPAF between 2016 and 2021, followed by Regions 4A, 10, and 4B. Meanwhile, Regions 13, 5, and 9 have the lowest revenue generations despite substantial protected area coverage. This indicates that not all PAs have financing mechanisms in place to ensure their operational sustainability.

IPAF as a financing mechanism exhibits PES-like behavior with national government as the ES provider whereas the general public acts as the buyer through compliance payments (e.g. entrance/user fees). This provides a certain level of fiscal support to inform ENR management at the national level.

Figure 8. Cumulative IPAF (in million PHP) and land area (in thousand ha) disaggregated by regions, 2016-2021

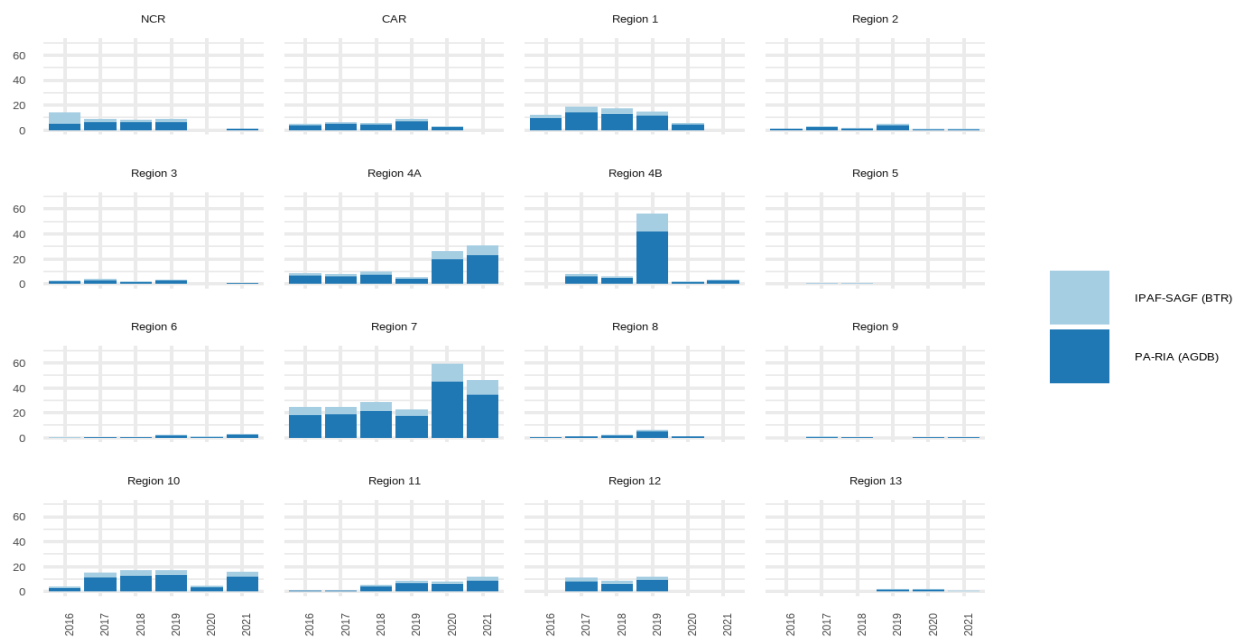


Source of basic data: DENR-BMB

Regional IPAF breakdown in Figure 8 shows compliance in the percentage sharing between the two fund components. Pandemic impacts are illustrated in the sudden dip in tourist hotspots like Region 4B (Palawan), CAR (Baguio), and Region 10 (Cagayan de Oro).

The following graph shows the breakdown of total IPAF in regions. Compliance is evident in the 75 percent share of PA Retention Income Account (PA-RIA) while pandemic impacts are illustrated in the sudden dip in tourist hotspots like Region 4B (Palawan), CAR (Baguio), and Region 10 (Cagayan de Oro).

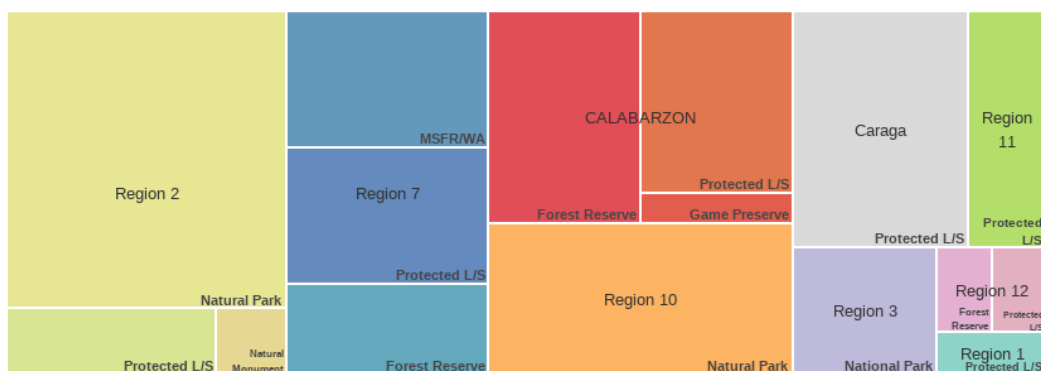
Figure 9. Disaggregated IPAF by region, 2016-2021



Source: DENR-BMB

Other protected areas host tenurial agreements called the PA community-based resource management agreements (PACBRMA). Beneficiaries are granted land management privileges in exchange for ENR stewardship which fits in the PES-like nature. Cagayan Valley secures the most count of tenurial agreements due to Sierra Madre Natural Park, followed by Central Visayas comprised of watersheds, protected land/seascapes and forest reserves, and CALABARZON which is home to the same PA types with the addition of game preserve.

Figure 10. Treemap comparison of PACBRMA counts, per region and protected area type



Source: DENR-BMB

3.3.2. Vietnam's PES Policy

To address increasing economic pressures to their forest ecosystems and services, the Government of Vietnam issued Decree 99 on the Payments for Forest Environmental Services (P-FES). It mandates payments from ES users (e.g. hydropower and tourism companies) to suppliers (households, ethnic minorities, forest owners). On average, each household is contracted to protect around 20 ha of forestland. The policy primarily covers the following services, specified as such (Vietnam Forest Protection and Development Fund 2014):

- Watershed protection (Provisioning)
- Natural landscape beauty protection and biodiversity conservation for tourism (Aesthetic)
- Forest carbon sequestration and the prevention of deforestation and forest degradation (Regulating)
- Provision of hydrological services for spawning in coastal fisheries and aquaculture (Supporting)

Forest protection and development funds (FPDFs) have been established in at least 36 provinces for payment plan preparation and collection. Payment scheme follows a layering setup wherein water regulation, soil protection, and scenic landscape have different fees. These are adjusted for the K-coefficient (carrying capacity) of a forest.

PFES implementation resulted in a 50 percent decline in forest illegal violations from 2008 to 2012; increased livelihood support for half a million local households, mostly ethnic groups; and total collection of USD 505M for 6.7M ha from 2011-2020 (Francisco 2022).

The government-run PFES recognizes several gaps despite the relative success of the policy. Weak inter-agency communications of implementers slow down PFES disbursement. Opportunity costs are still higher compared to PFES levels so government may consider marrying other economic support programs into the initiative. Absent monitoring and evaluation systems hinder transparency of benefits and costs. Thus, monetary returns are difficult to capture with the limited data (Loft, Pham and Lutrell 2014, Vietnam Forest Protection and Development Fund 2014).

3.3.3. Subic Bay Freeport Zone

The Bases Conversion and Development Act of 1992¹³ established the Subic Bay Metropolitan Authority (SBMA) to protect and maintain forestlands in the area. The 12,000 has (10,000 has terrestrial, 2,000 has MPA) were soon declared as Subic Watershed Forest Reserve through Proclamation No. 926. SBMA also covers the 67,000 ha freeport zone where residential and business districts, and conservation zones coexist.

This prompts the creation of an Ecology Center focused on environmental management service and management zoning and whose functions are independent from DENR-PAMB. Their institutional structure comprises divisions on Policy and Monitoring, Regulatory Permitting, Social Development, and Protected Area.

¹³ It also created the Subic Bay Freeport Zone (SBFZ)

Funds allocated per annum are disbursed from an Environment and Tourism Fund managed by Tourism Department. This supports operations detailed in Protected Area Management Plan which has not been updated since 2001 due to financial constraints, and approved projects for that year. Initial assistance has also been provided to indigenous peoples in the area, particularly Pastolan Aetas of the Pamulaklakin Forest Trail.

Tourism appears to be an anchor for this PES setup, and Tourism Department has the leverage over fee structures with limited recommendations from the PA Division. Stronger coordination might be explored moving forward to properly account for the ecosystem services beyond the aesthetic values of tourism.

3.3.4. Tubbataha Reefs National Park

Tubbataha Reef comprises 100,000 hectares of marine ecosystems, sustaining around 360 corals, 700 fish species, and one of the region's few surviving breeding seabird population.

The paramount importance of the reef's marine biodiversity in global fisheries systems enacted several legislations for its protection, one of which is Republic Act No. 10067 or the Tubbataha Reefs Natural Park (TRNP) Act of 2009. Tubbataha Management Office (TMO) serves as the operating center of the TRNP in August 2010 under the immediate oversight of Tubbataha Protected Area Management Board (TPAMB)¹⁴. Their central functions are geared towards conservation management¹⁵, awareness, ecosystem research, and sustainable resource management, particularly in Cagayancillo which is TRNP's partner community. The law also establishes the Tubbataha Trust Fund.

TRNP's fee structure evolved along with institutional and bureaucratic evolution. The multistakeholder task force organized in 1995 introduced the initial fee system, and the World Wildlife Fund (WWF) revised it in 1999 based on willingness to pay¹⁶. Dive, vessel entry, and permit fees pooled in the trust fund¹⁷ which was only accessible upon PAMB's approval of study plan, but this unfortunately atrophied during the pandemic. TMO had to use their pooled savings amounting to PHP 36M to sustain operations. No regular support or annual appropriation came from the national government whereas provincial LGUs provided fiscal assistance for a time (annual PHP 4 million for three years). Operations were also largely supplemented by external funds from private or corporate donors.

In addition to this, Palawan's unique institutional structure insulates Tubbataha from the NIPAS user fee system. However, the same benefit also results to a standstill as TMO's jurisdiction wavers between DENR and Office of the President. This allows TMO to act like a foundation in a quasi-public behavior.

While TRNP operated on abundant biological science expertise, it lacked tangible social research. The declaration established no fishing zones in the area, including that of Cagayancillo. Fishers resisted the decision, given their high opportunity costs in livelihood. Compensation structure should be able to capture not only displacement but revenue loss. Current package is comprised of 10 percent conservation fees distributed across various

¹⁴ It is the policy-making body for TRNP. It was created in 1999 and has 21 members from the national and local government, the academe and the private sector.

¹⁵ Includes tourism, enforcement, collaboration, and institutional development (which is the most expensive in the operations).

¹⁶ This model was eventually applied to different dive areas in Luzon and whale shark watching hotspots. It generated revenues for LGUs which covered protection services. Conservation fees from tourists were primarily utilized for project implement and personnel salaries.

¹⁷ Dive operators pay entry permits that range from PHP 2000-6000, depending on the weight of the boat. Each entry requires a separate vessel entry permit fee. Current dive fee is PHP 5000/person. TRNP does not distinguish between local and foreign divers anymore.

livelihood support (e.g. MPAs, seaweed farms, and road infrastructure, training opportunities, capital for small businesses, community development projects, ranger positions) however it cannot be ascertained whether these benefits went to displaced communities or whether the amount accurately reflects foregone income.

The same discussion plagued the USS Guardian Minesweeper case back in January 2013. The ship damaged 2,345 square meters of coral reefs out of 10,000 ha. IRR penal provision required PHP 24,000 per affected square meter, bringing the total to around PHP 56 million. TMO settled for Conservation International's estimates which rounded off to USD 12,000 for coral damage and another USD 12,000 for restoration (~PHP 1.41 million) to circumvent possible bureaucratic and legal bottlenecks¹⁸ that could drag for years and hinder disbursement of rehabilitation funds.

The aforementioned case highlights the absence of national standards on damage compensation to marine ecosystems. As sustainable fiscal resources become more critical for park operations, TMO gears more towards endowment fund than IPAF.

3.3.5. Puerto Princesa Subterranean River National Park (PPSRNP)

PPSRNP spans roughly 22,202 hectares of mountain-to-sea ecosystem and is home to the 8.2-kilometer underground river. DENR declared it as a national park in 1971, devolved the management to the LGU in 1992, and became a world heritage site in 1999 which expanded the coverage from 3,900 to 22,202 has. Limited development occurred prior to its latter declaration. Palawan province's Strategic Environmental Plan also governs the management of the park.

The presence of the Palawan Council for Sustainable Development (PCSD) on top of subnational DENR offices make Palawan unique. The province's status as the country's last ecological frontier highlights the institution's critical role in resource management and conservation initiatives. PCSD's current involvement stays within policy recommendations and inter-agency engagements with substantial influence in crafting Palawan's management plans in line with the Strategic Environmental Plan (SEP) Act.

In 2020, the Council institutionalized PES applications for landscapes and seascapes through a resolution. Recently concluded Phil-WAVES project prompted the creation of a Natural Capital Accounting (NCA) monitoring and evaluation body under the ECAN division of PCSD with initial focus on watershed management, land cover accounting, crop provisioning, carbon sequestration and storage, and provincial land accounting hence working datasets are largely fragmented.

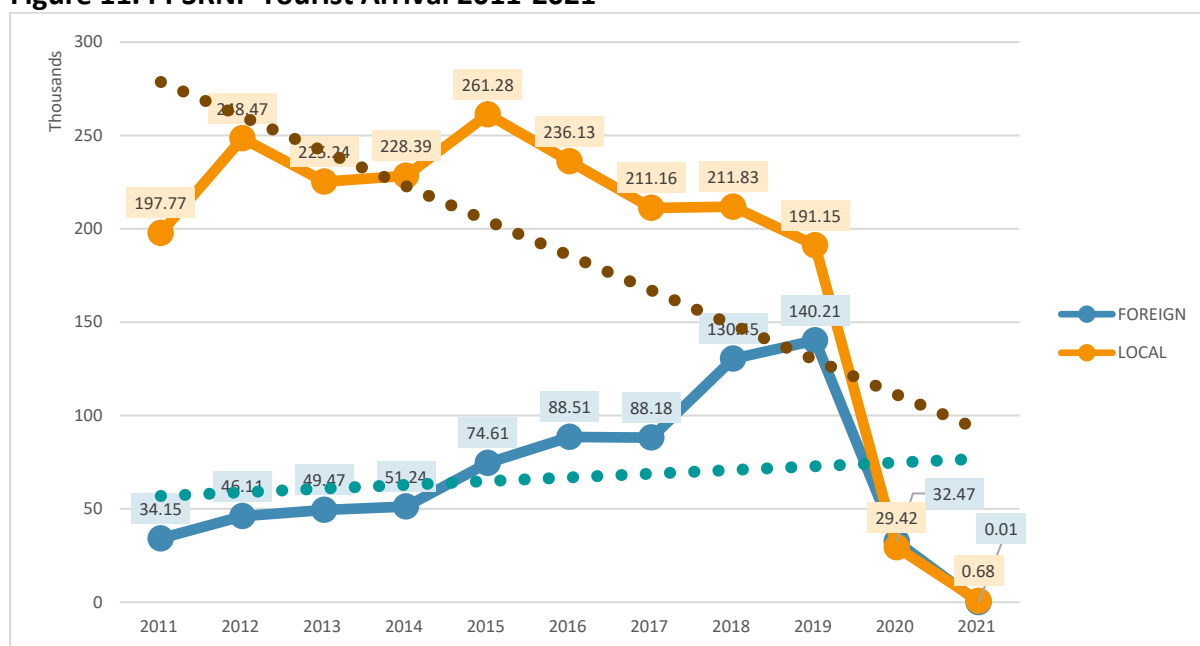
Notably missing in the Council's roster however are technical guidance for PES set-up, including advice on user fee system and streamlining with development plans despite holding a seat in PAMB, and data management. LGUs may have authority and directive under the Local Government Code, but vertical upscaling harmonizes efforts across fronts and scales.

This is particularly needed in light of pandemic shocks to the tourism sector. Drastic decline is observed for both foreign and local tourists in PPSRNP when lockdowns ensued in 2020, but general trendlines show inversely proportional outcomes for tourist turnouts (local decreasing, foreign increasing). Protected areas whose operations are anchored on ecotourism should explore mechanisms to facilitate insulation from shocks. Ecosystem services are still

¹⁸ TRNP's similar case on damages in 2007 is still not concluded as of writing.

continuously supplied even without tourism fees; operations should likewise continue for their conservation and management.

Figure 11. PPSRNP Tourist Arrival 2011-2021



Source of basic data: PPSRNP

PPSRNP considers itself self-sustaining since 2008 without DENR allocations. They only operate using entrance fees and distribute a portion to IP-managed community-based sustainable tourism (CBST) areas. The table below shows the type of fees collected, their evolution over the years, and where they accrue.

Table 9. List of fees collected by PPSRNP

Fee	Amount	Definition
Environmental fees	PHP 175 (initial), PHP 250 (revised), PHP 500 (revised in 2016)	Covered by the city ordinance Revised by the revenue code in 2016 Deposited in the general fund
User fee	<i>Not disclosed</i>	Deposited in the trust fund
Royalty shares		Expenditure guidelines are provided for guidelines
IPAF	PHP 110 million in 2019	Highest earning PA Distribute shares directly to LGU, natives/IPs, barangays, and other projects
Annual revenue	PHP 119 million (average)	Goes to admin, operations, infrastructure, facilities, services, and social development Community-based areas have to pay business taxes to LGUs
Community share	PHP 500,000 (per year, for three CADTs) PHP 1 million (per year, barangay)	CADTs located in Batak and Tagbanua

Fee	Amount	Definition
	~ PHP 5.5 million (per year, since 2014)	5 CBST sites within PPSRNP and 26 sites in the city All shares are halted in 2019 due to the pandemic

Source: Author's list

3.3.6. Other local templates in the Philippines

San Carlos City Watershed

The San Carlos Development Board mediated between landowners, and LGU, water districts, and water consumers to preserve the city's watershed. This resulted in Water Ordinance No. 2004-37 where compliance payment of PHP 1 per cubic meter was levied per household. Fee structure is attained under Tier 1 with a piggy-backing scheme and PPP arrangement. Collected fees are channeled into the Watershed Development and Environmental Protection Fund.

Bago City River Watershed

This local case presents a good example of layering scheme. The partnership arranged by USAID B+WISER between water users group as buyers, and upland farmers, POs, knowledge generators as sellers, bore fruit to City Ordinance No. 15-16. Under this legal basis, different fees are mandated per type of buyer. The pooled money goes into the Environmental Protection Fund which appears broader in scope compared to the previous site.

Manupali Watershed

Indigenous peoples take center stage in this PES-like agreement with the significant contribution of Hineleban Foundation. Just payment from land production within ancestral domains trigger a binding **sacred customary compact** instead of a MOA between the Talaandig IPs and Unifruitti Tropical Philippines, Inc. Payment primarily covers provisioning of banana and pineapple crops, fitting the piggy-backing scheme and describing a one-to-one buyer-seller configuration. While this is a step forward in recognizing IP rights, payments were eventually halted due to absent monitoring metrics. No specific fund was also established, compromising transparency and accountability of fees.

3.3.7. Insights from domestic cases

Subic bay, TRNP, PPSRNP, and Vietnam fit under PES-like arrangements with the noticeable absence of voluntary transactions and conditionality. The three PES case studies have a well-defined environmental service; the TRNP is a marine protected area, while the PPSRNP has a forest and an underground river in the park. SBFZ has various environmental services within forest and mangrove areas.

Since a tourism fee is being collected from the case study sites, the environmental services is being bought by more than one buyer. The management of these sites, however, are being done by the respective assigned agency. Aesthetic values come across as easier to capture and monetize, but fees paid may not fully reflect benefits from regulating services, and existence and bequest values among others due to piggybacking.

It appears that protection of these sites is supported with legal basis hence the continued fund generation. Embedding PES mechanisms in national and local policies seem to increase success

and sustainability of arrangements. Passing ordinances¹⁹ does not only provide legal basis for transactions but also prevents leakages in the agreement. One cannot simply opt out unless they risk not receiving the ecosystem service.

Table 10. Comparison of traditional PES components across case studies

	Subic Bay Freeport Zone	Tubbataha Reefs National Park	Puerto Princesa Subterranean River National Park	Vietnam
A voluntary transaction	x	x	x	x
A well-defined environmental service	✓ ²⁰	✓	✓	✓
Being bought by a (minimum) ES buyer	✓	✓	✓	✓
From a (minimum one) ES provider	✓	✓	✓	✓
If and only if the ES provider secures ES provision conditionally	x	x	x	✓

Source: Authors' list

¹⁹ Brooke's Point, Palawan passed an ordinance adopting additional one peso per cubic meter in residential monthly water bills for BAWASA to help maintain watersheds.

²⁰ Among the areas with well-defined services in the Subic Bay Freeport Zone is the Ilanin Forest East, Ilanin Forest West and Minanga Area in the Subic Bay Forest District (Subic Bay Metropolitan Authority n.d.-a).

Table 11. Summary insights from case studies in the Philippines

Case study	ES	ES packaging	Buyer and motivation	Seller and motivation	Intermediary	Payment scheme	Fund	Legal basis	Category
SBMA	Provisioning Regulating Cultural	Bundling	General public (GP) – aesthetic values, water supply	SBMA – mandated by law to protect watershed against disruptive land use IPs – ancestral land and livelihood	None	Environmental fees Public-private, Tier 1	Environment and Tourism Fund (Tourism Department)	RA 7227; Proclamation No. 926 s. 1992	PES-like
PPSRNP	Cultural Provisioning	Layering	GP – aesthetic and cultural values	PPSRNP – mandated by law to protect biodiversity IPs - ancestral land, livelihood IPs – ancestral land	DENR LGU	Varied fees Public-private, Tier 1	Trust Fund (PPSRNP) General Fund (LGU) IPAF (PPSRNP, PAMB)	Proclamation No. 212 s. 1999	PES-like
TRNP	Provisioning Cultural Regulating	Bundling	GP – aesthetic and provisioning values	TMO – mandated by law to conserve area against degradation and overexploitation Cagayancillo – partner LGU, livelihood and provisioning	WWF	Varied fees Public-private, Tier 2	Tubbataha Trust Fund (TMO)	RA 10067	PES-like

Note: Tier 1 - set up based on current level of ecological knowledge

Source: Author's list

Key Takeaways

Active engagement and collaboration with IPs and local communities increases onboarding with the PES scheme. This entails multiple consultations for awareness building and scope out possible entry points as well as challenges to the agreement.

External support from private entities, CSOs, NGOs, and international development organizations help facilitate PAs without consistent government funding towards the path of sustainability. TRNP and PPSRNP heavily relied on tourism revenues and were cushioned by trust fund savings, and grants. This finding further highlights the vulnerability of ecotourism-driven protected areas considering pandemic shocks and similar events in the future. Oversight agencies, as early as now, must prepare strategies addressing emergent concerns.

Buyers and sellers do not enter into or hold up the agreement willingly but are compelled by policy. San Carlos and Bago City cases prove that enclosing PES in local ordinances, thereby allowing transparency of exchanges, increase participation and enforce conditionality.

The apparent lack of monitoring metrics, particularly on fee allocation and utilization, and biodiversity and socioeconomic indicators, constrain attribution of PES mechanisms to sustainable development and ecological integrity. All three cases in this study do not have datasets for post-assessment.

Arrangements tend to fall through, and buyer motivations (i.e. willingness to pay) are dampened when evidence of conditionality remains unprovided. This occurred in Manupali Watershed where the company withheld payments to IPs due to missing transparency checks, and similar circumstances can occur in other areas without physical, ecological, and fiscal metrics. Further, poor awareness and understanding of ecosystem services, PES mechanisms, and their potential benefits lowers WTP (George et al. 2009).

In a similar vein, weak legal enforcement persists, particularly with regards to damages. Solutions lie in DENR's finalization of administrative orders for compensation protocol.

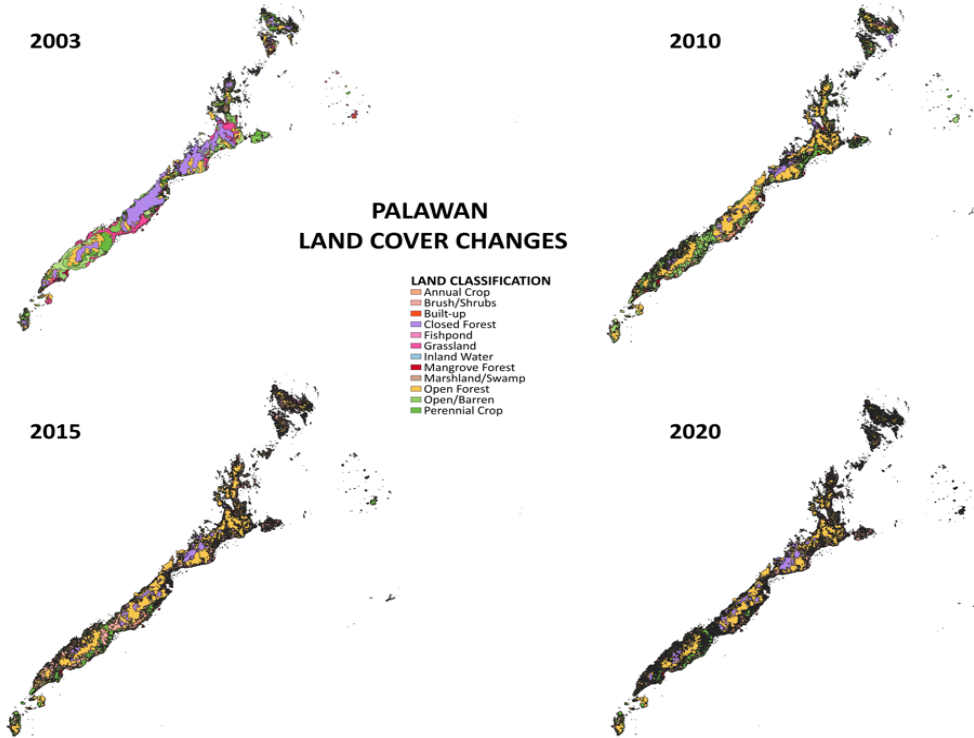
Accounting and auditing policies restrict flexibility in fees on top of arbitrary setting. Generally, domestic cases explored in this study follow the Tier 1 payment mechanism where trial and error are allowed, hence the indulgent use of willingness-to-pay. However, narratives on the ground show that fees implemented are not the fees estimated, possibly reflecting present realities of buyers and capacities of institutions and structures.

3.3.8. Spatial comparison

The study conducts a spatial comparison of areas with PES cases to examine changes in land classifications over the years. Certain caveats apply such as that land changes are not solely attributed to PES schemes, and that many variables affect activities in the area.

The first map looks at Palawan which is home to Tubbataha Reefs and Puerto Princesa Underground River. Several LGUs, as mentioned by key informants, are engaged in PES schemes on watershed management. Between 2003 and 2020, marshlands, closed forest, and grasslands see biggest losses in their areas whereas built-up, inland water, and open forest have the greatest increases.

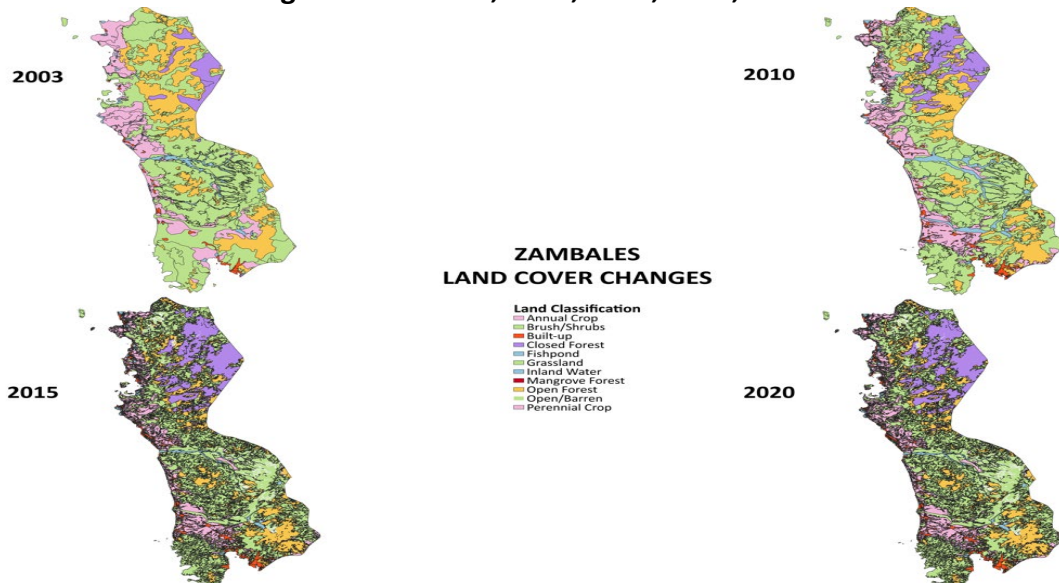
Figure 12. Land cover changes in Palawan, 2003, 2010, 2015, and 2020



Source of basic data: NAMRIA

The second map focuses on Zambales where Subic belongs under. It should likewise be noted that four adjacent mine operations are currently ongoing in the province. Area losses are noted for open /barren, open forest, inland water, cropland, and other wooded land while mangrove forest, built-up, and closed forest exhibit big increases.

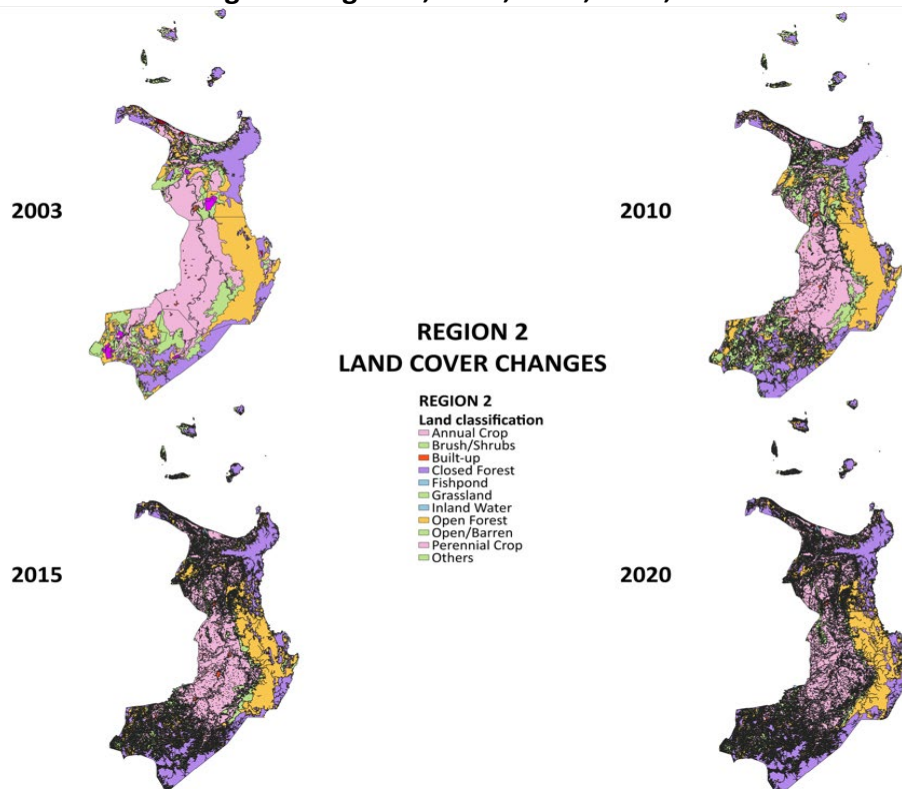
Figure 13. Land cover changes in Zambales, 2003, 2010, 2015, and 2020



Source of basic data: NAMRIA

The last map features Region 2 where the biggest protected area is located. In 17 years, the biggest decrease in area is in marshlands, followed by mangrove forest, and other wooded land. Fishponds report quite a leap with almost a 2,000-percent increase due to the regional thrust in aquaculture. It is trailed by build-up, and grassland.

Figure 14. Land cover changes in Region 2, 2003, 2010, 2015, and 2020



Source of basic data: NAMRIA

Encroachment is evident with the increase of built-up percentage in the analysis despite marginal improvement in forestlands. The figures signal growing presence of population and anthropogenic activities which would mean demand for resources. Thus, environment and natural resource management becomes paramount in addressing these matters, and PES can be one of the tools used for this undertaking. Current schemes are dispersed but indicatively working. Oversight and bureaucratic consolidation are key in harmonizing the strategies towards a more effective environment and natural resource management.

Table 12. Percentage changes in land cover in specific sites

Land cover	Summary: 2003-2020			Region 2			Zambales			Palawan		
	Region 2	Zambales	Palawan	2003-2010	2010-2015	2015-2020	2003-2010	2010-2015	2015-2020	2003-2010	2010-2015	2015-2020
Built-up	383.38	202.81	354.75	348.96	29.47	-16.84	142.72	27.72	-2.32	171.95	19.38	40.07
Closed Forest	0.91	160.89	-71.21	-3.55	0.57	4.04	91.94	10.39	23.12	-79.12	5.81	30.31
Cropland	-3.57	-17.67	28.10	-11.88	13.11	-3.26	-1.69	-16.36	0.12	43.24	-4.16	-6.68
Fishpond	1883.04	46.48	47.67	1472.46	-4.79	32.45	50.67	-1.02	-1.78	25.06	30.00	-9.17
Grassland	139.54	30.07	-59.75	128.11	-6.64	12.48	46.47	1.13	-12.19	-80.18	31.42	54.53
Inland water	109.16	-22.48	678.75	85.39	10.10	2.47	97.35	0.00	-47.43	474.78	30.70	3.66
Mangrove forest	-36.52	322.25	11.16	-31.39	-2.70	-4.91		293.61	7.28	16.76	-6.43	1.75
Marshland	-54.56		-99.99	-63.54	27.57	-2.29				-99.98	40.03	-49.88
Open Forest	-6.56	-25.30	101.20	-8.40	0.63	1.37	-18.22	6.38	-14.14	110.60	0.50	-4.94
Open/Barren	88.58	-43.18	77.57	-1.30	46.42	30.49	-77.46	48.19	70.11	-26.89	111.81	14.66
Other wooded land	-25.88	-4.82	32.15	9.74	-30.37	-3.01	-14.49	0.34	10.93	41.64	-2.35	-4.46

Note: Cropland includes annual crop, perennial crop, and fallow land; Other wooded land – forest plantation, shrubs, wooded grassland

Source of basic data: NAMRIA

4. Barriers to PES

4.1. *Negotiation bottlenecks*

Ecosystem services, while site-specific are complex and interconnected. The combination of multiplicity, nonlinear relationships, and market variability heightens uncertainty. Complete information on these aspects is difficult to gather and codify and would require high costs (Muradian 2013).

Literature denotes high bottleneck occurrence during the transaction or negotiation process. Blurry stakeholder identification (e.g. informal settlers, free riders) and added regulatory layers (indigenous peoples' free, prior, and informed consent) contribute to duration. Political seasons, conflicts, jurisdictions, and administrative transitions are likewise critical in crafting agreements.

PES concept remains intangible to LGUs and policymakers. Communication of process and benefits should be well-packaged with concrete and actionable ways forward, but the success of this rests on the assumption of trust among parties. The evolving concept and definition of PES also requires a unique case of communication and tweaking.

4.2. *Management and fiscal limitations*

Being declared as a protected area does not ensure provision of support (technical, institutional) and resources. Moreover, not all protected areas are candidates for ecotourism; some are categorized as resource reserve with no-go zones. Tourism is not a perfect money-making scheme, and it should not be the only tool to rely on permanently. Further, not all PAs are capacitated. The landscape should explore mechanisms beyond fund generation to still deliver environmental protection such as contingency and trust funds.

At the moment, LGUs have no present mechanisms to receive fund from non-government entities, but public finances are limited and unsustainable. Even NIPAS' integrated area protected fund (IPAF) is affected by COA's stringent accounting guidelines. The increasing templates of user fees remain a gray area in the fiscal landscape which calls for imminent standardization of methodology. While its institutionalization is also encouraged, setting the process in stone might have several setbacks.

Ordinances and revenue codes constrain fee increase, especially in cases where payments do not accurately capture the critical importance of ecosystems in light of intensifying threats and degradation.

Fund utilization becomes a common concern with the apparent lack of monitoring and evaluation aspects in existing PES schemes due to high transaction costs. Innovative mechanisms like remote sensing, validation, and citizen monitoring may be explored to mitigate costs.

While IPAF needs management plans for disbursement, other excluded areas utilize fees arbitrarily, most of which are spent in administrative purposes.

Uniform user fees are also not advisable. This refers to DENR's technical bulletin on user fees and recent directive to establish PES in all PAs, but the low threshold, even with the seed money of PHP 300,000, would not be feasible for large scale operations like TRNP and would only be able to sustain small-scale and locally declared ones.

4.3. *Missing policies and institutions*

The scattered pattern of PES cases in the country implies absent vertical and horizontal coordination and bureaucratic oversight for singular harmonization of ENR management efforts. While policies and legal instruments abound, gray areas surround legal accountabilities and ownership which in turn, connects with weak enforcement.

Absent institutionalization contributes to discontinuation of schemes after one to three years of implementation since sellers cannot provide and buyers do not see the improvement in service provision. Glossing over one or two principles inadvertently contribute to ongoing conflicts. These principles should be embedded in both agreement and in legislation (Bhatta et al. 2014).

Unclear policy link, arbitrary methodology, lack of ownership, and limited capacity and resources hound institutionalization attempts for PES and natural capital accounting in both international and local scales. Particularly for Philippines, the legal bottlenecks are in open data infrastructure, exchange, and transparency; human resources; standards; and local adaptation of international frameworks (NEDA Roadmap).

4.4. *Weak sustainability measures*

Cole (2010) documents weak project management and local level interaction in one project in Costa Rica. Lack of technical assistance and training becomes an obstacle to further forest management while the absent transparency of payments exacerbate the lack of stakeholder trust.

The presence of external agents, particularly at the subnational level, might break ground for PES arrangements, but project completion does not ensure continuity and sustainability. This could be best addressed through institutionalization and policy mainstreaming, and turnover of adaptable knowledge products (handbooks, manuals, guidelines) on account preparation, modeling, and tool evaluation, among others.

Sustainability of PES schemes also depend on concrete legislative framework and policies to operationalize the tool in national and subnational institutions. In cases where certain policies contain enabling provisions on PES, local governments still maintain directives in their respective jurisdiction. This flexibility does not compel investment in environment and ecosystem management. Shifts in administration without prior institutionalization threaten continuity of programs²¹.

²¹ Succeeding mayors in PES areas did not honor the earmarking for the sites thus they were unable to generate revenues for continued operations. This broke the trust of both buyers and sellers in the sector.

Absent vertical and horizontal coordination also limits benefits to the area and does not inform sectoral targets and goals (Bhatta et al. 2014). The missing layer of regulations and violations make enforcement difficult during implementation (Ngoc et al. 2021).

4.5. *Data unavailability*

China's PES programs show patterns of uneven spatial and ecosystem distributions (i.e. greater focus on watershed and carbon), rare quantification and evaluation, understudied habitats with equally significant ecosystem services, and low economic efficiency (Yang and Lu 2018). Data unavailability exacerbates this problem in the Philippines. Collected fees are difficult to trace in relation to their contributions to ES provision, protected area management, and sustainability. There is increased reliance on literature, proxies, and alternative methods.

4.6. *Evolving definition*

Emerging mechanisms, particularly in the Asian region, barely fit traditional PES definitions. Local case studies presented earlier do not highlight voluntary transactions and usually resort to levying fees. What is common is a command and control of resources where benefit transfers are directed by national and subnational policies (Prasetyo et al. 2009).

Voluntary mechanisms, while ideal, will not work in the Philippine landscape. It assumes an arrangement built on trust and understanding, but necessary checks and balances do not exist. Given mandates are unaccompanied with guidance and capacity tools.

4.7. *Key insights*

Several studies note the complementation of PES and natural capital accounting as part of ways forward. In countries where this integration is underway, United Nation's System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA EA) is used as a standard. However, UN SEEA-EA requires both monetary accounts and associated biophysical data e.g. ecosystem changes and conditions to provide for a dynamic policy interpretation and application.

PES success requires a holistic perspective which allows disaggregated efforts (due to ES' site-specific nature) but harmonizes these as a singular thrust under a common framework and goal.

The linkage and integration of monetary and resource data can provide more accurate and up-to date insights on environmental protection expenditure, industry value added, employment, and population, national plans (e.g. Philippine Development Plan, sectoral targets of CCC/DENR), international commitments (e.g. Sustainable Development Goals, UN agreements, greenhouse gases removals), and IUCN assessment frameworks (UN et al. 2021).

A standardized method can streamline flow of services and set prices for services. Implementors for natural capital accounting can turn to resources like UN SEEA-EA for uniform orientation on the process. This could cover ES performance indicators for monitoring and evaluation aspects too provided their alignment with sectoral and national goal metrics.

The current definition relies on the voluntary component, but given its rarity, institutionalization will be the biggest agency to compel agreements and implementation, and

facilitate sustainability and bureaucracy documentation. Ngac et al. (2021) notes that presence of relevant institutions at the local level can increase conservation effectiveness. In particular, community-level organizations are instrumental in bridging beneficiary perception on implementation, success, and value of the program.

Orientation of the mechanism should likewise be studied as it delves into questions of who guides the invoicing and who directs the valuation – from the frontline or rent seekers, among others (Sharife and Bond 2013).

There are PES foundations in place in the Philippines which just need scaling up. This means streamlining in local development plans, networking with academic institutions and local experts, and cascading mandates from central to regional offices.

Primary movers in the current landscape are NEDA's roadmap, and PSA's Task Force on natural capital accounting which are good medium-term interventions while waiting for institutionalization (passage of PENSAS Bill). Natural capital accounts²²; natural capital-adjusted macroeconomic indicators; and policy use and applications comprise the roadmap's major components. This is supported by ancillary ones for data management systems, capacity development, and dissemination.

5. Conclusion

Valuation enables fund generation for natural resource management and protection, just compensation, and direct appropriate investments commensurate to the level of threats and priority. Payments for ecosystem services emerge as a financing mechanism for undervalued and nonmarketed goods. Its traditional framework describes PES as conditional, voluntary, has one buyer and one seller, and one identified ecosystem service, but applications in the Philippines only meet the last three criteria.

Mechanisms in the country adapt what is applicable in a certain locality. Institutional structures, policy landscape, resource, and political and socio-economic environment influence the set-up and its sustainability.

Spatial comparison in particular areas show increasing percentages of build-up with marginal increase in forestlands. This signal growing encroachment and demand for resources which could be better managed with PES and other related ENR management tools. Recommendations below break up specific ways forward on how to improve the landscape and optimize their benefits.

²² Further divided into asset accounts, flow accounts, ecosystem accounts

6. Recommendations

6.1. Capitalize on evolving PES definition and increased interest from government

Several policy proposals and movements have been underway in various sectors. Leading the prospective legislations is PENCAS Bill which allows for wider coverage and greater powers in time for the implementation of Mandanas Ruling. Funds will be downloaded directly to the LGUs, allowing for bigger fund base for resource management. DENR's issuances on PES guidelines, carbon sequestration methodology, and technical bulletin for ES data collection can help jumpstart interested LGUs in setting up schemes in their jurisdictions.

BSP also recently launched its circular on environmental social resource management for firms to report related risks, threats, and their impact on nature. The issuance embeds social responsibility in business model frameworks and introduces environmental responsibility in same investments.

On the academe and research and development side, USAID is currently conducting its Philippine Sustainable Interventions for Biodiversity, Oceans, and Landscapes (SIBOL) Project which aims to conduct full valuation of four key protected areas and integrate this with environmental accounting. UP Los Baños plans to design a PES protocol for watershed ecosystem services as one of the knowledge products of their study.

A national PES success requires holistic perspective, not scattered initiatives and disconnected efforts, hence the importance of NEDA-PSA's Natural Capital Roadmap to tie everything up.

6.2. Frame sustainable PES templates

PES success is relatively seen in ecotourism cases and watershed agreement with water districts. The key rests in compliance payments lodged in policies like revenue code or resolutions. Local governments may jump off from this and explore replication. Private sector and external bodies' participation prove to be significant drivers in the examined cases; securing their buy-in would be essential.

6.3. Link PES to natural capital management and CCA/CCM efforts

An overall shift in conservation model from grants-based or user-based to exchange-based approach is encouraged. For instance, Netherlands government taps NGOs to set up watershed financing and provide water supply to depressed communities. The condition requires making water a market-based operating entity. Water companies will not solely finance watershed management, but the blended structure is able to catalyze investments to ensure provision of the commodity and ecosystems responsible for producing it (watershed, forest, biodiversity).

6.4. Augment accounting and auditing rules to reflect PES and natural capital accounts

Accounting and auditing rules and processes should be augmented to capture the nuances of natural capital accounts and add on estimated risks introduced by climate change. It should be similar to climate change and disaster risk management where all resources are accounted for

and reported to the bureaucracy. This also means establishing and maintaining data repositories to inform policy decisions and strategies.

6.5. *Institute PES transparency platform and data management, explore performance-based monitoring and evaluation*

Limited knowledge and awareness about the concept of PES derails its establishment in an area. Intermediaries are critical in communicating and establishing the (a) purpose of fees/levies/bills and the legal basis for such, (b) disbursement and collection vehicles of funds, and (c) auditing and accounting procedures.

This also calls for increased awareness, capacity building, and more groundwork with different offices. Successful messaging needs accurate accounting and better data management which requires accessible information and up-to-date data from various agencies.

Clear transaction and opportunity costs should be communicated with participating actors. Some cases pose high opportunity costs for other livelihood options. Government may want to explore marrying this with other socio-economic initiatives like tenurial agreements. Consider national government agencies, LGUs, academe, NGOs, CSOs, and peoples' organizations as intermediaries.

6.6. *Pursue legal platform for PES at NGA and subnational levels*

PES is better utilized as a tool and instrument among the arsenal of public financing tools, rather than a framework or a theoretical concept. Its capacity to address socio-ecological problems would depend on policy, institutions, and landscape. Key informants suggest institutionalizing at the provincial level to compel participation of all LGUs within the jurisdiction.

Integration of PES in Department of Interior and Local Government (DILG) directives and Department of Education (DepEd) curriculum may be vital in intensifying awareness around the concept. For subnational planning documents, PES is better streamlined in CDP for property rights rather than FLUP and CLUP which are more concerned with zoning. The marrying of the mechanism inside a planning document encourages clarity in fund management and would tackle choices between foundation or trust fund, accessibility, and other qualifiers.

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