

Scoping Document for The Philippines NCAA Pilot Project

Enhancing integrated watershed management planning using ecosystem services assessment and valuation

Purpose of this document is to lay out a scope of work for this pilot project, to confirm that all partners are in agreement and help with internal tracking and documentation.

Background

Watersheds provide essential services to people in The Philippines including: clean water for drinking and domestic use, water for irrigation and energy production, and flood mitigation services. Approximately half of all terrestrial land in The Philippines lies within watersheds that are considered critical for supporting the country's irrigation needs ([Forest Management Bureau 2022](#)). In addition to downstream water consumers, according to the 2000 census, roughly one third of the population of the Philippines lives in upland areas, including 14-17 million Indigenous People living in these areas who depend on healthy watershed ecosystems for subsistence ([Espiritu et al. 2010](#), [Legal Rights and Natural Resources Center 2022](#)).

Although there is water stress in some watersheds, water supply has historically met the overall demands of the population, agriculture, and industry ([Philippines Statistical Authority 2022](#)). Unfortunately, water quality is not meeting expectations and has steadily decreased with both sediment and nutrient pollution issues ([Environmental Management Bureau, n.d.](#)). Watershed degradation is widespread throughout the country. It is driven by deforestation, unregulated land conversion, and unsustainable farming practices and is exacerbated by a natural predisposition for erosion from rugged, geologically unstable terrain, monsoonal rains and extreme weather events ([Ecosystems Research and Development Bureau 2022](#)). Furthermore, The Philippines is highly vulnerable to climate change and a future with more extreme weather events and slow-onset climate changes will compound existing challenges.

Watersheds in The Philippines are not granted any intrinsic protected status; at present only ~13% of the watershed area in The Philippines has any protected status ([Forest Management Bureau 2022](#)). Recent initiatives in the country have been undertaken to systematize governance of watersheds, including the 2023 creation of the Water Resources Management Office (WRMO) of the Department of Environmental and Natural Resources (DENR) ([Executive Order 22 2023](#)), which integrates all water-related departments at DENR and is mandated to create an Integrated Water Resources Master Plan. Governance at a local level has been advanced through the creation in 2021 of Watershed Management Councils (WMC). These are multi-agency and -sectoral groups who oversee planning and management activities in their local watersheds. Among the responsibilities of each WMC is crafting an Integrated Watershed Management Plan (IWMP) to guide and organize sustainable development and protection of ecosystems within a watershed ([Department of Environment and Natural Resources 2021](#)).

Guidance and methodological approaches for developing IWMPs is provided by the Ecosystems Research and Development Bureau (ERDB) of the DENR. For example, the manual for [Watershed Characterization and Vulnerability Assessment](#) (year?) outlines methods for the two primary current components of

IWMP planning in The Philippines: watershed profiling and vulnerability assessment. The watershed profiling component is a biophysical and socio-economic watershed characterization which maps and describes characteristics including topography, geology, land use, climate, hydrology, biological resources, and socio-economic information. The vulnerability assessment builds on stakeholder engagement to identify hazards within each watershed and maps these vulnerabilities across the watershed. Hazards may include those from extreme events such as flooding, landslides and coastal storm surges, as well as those from human activities including deforestation, poaching and pollution.

Recently, the DENR has identified information gaps in this current watershed management methodology that limit effective prioritization and targeting of investments (e.g., restoration efforts) and management interventions (e.g., protection) in watersheds. To fill this gap, partners in DENR have proposed an enhancement to the standard IWMP approach that incorporates an ecosystem services based approach that would model and map the critical ecosystem services provided by watersheds and calculate the net-present monetary value (NPV) of critical watershed services following the UN SEEA framework. This would provide spatially explicit information about critical natural capital in watersheds and value it in a system that is coherent with other national natural capital accounting frameworks.

Institutionalizing natural capital accounting in The Philippines is a current priority in the country. The recent [2023 PENCAS Bill](#) lays out a mandate to account for the country's natural capital and its effects on the economy through the establishment of a national system of natural capital accounting. The Philippines has been a leader in natural capital accounting and piloted several case study ecosystem accounts in the country through collaboration with the [WAVES project \(2014-2017\)](#). Details about previous efforts, as well as a path for scaling up natural capital accounting are detailed in the [2022 Roadmap to Institutionalize Natural Capital Accounting](#) (National Economic and Development Authority 2022).

What does the current work aim to address?

The subsequent sections lay out a proposed scope of work for the collaboration between the Natural Capital Project of Stanford University (hereafter Stanford), the Asian Development Bank (ADB) and The Philippines Department of Environment and Natural Resources (DENR). We lay out objectives, deliverables, timeline, and capacity development strategy.

The focal geographies for this work are two watersheds on Luzon Island, the Santo Tomas Watershed in Zambales Province and the Palawig Watershed in Cagayan Province (Fig 1). The Palawig River Watershed is critical for supporting local irrigation networks, including large tracts of rice fields as well as domestic supply for local populations, but forest loss and unregulated land use conversions have led to water quality degradation and variability in water supply. The Santo Tomas watershed was dramatically altered by the 1991 eruption of Mount Pinatubo and subsequent lahars and ashfall. Current concerns in the watershed are around unregulated land use including grazing, occupancy in forested areas, and lack of Ancestral Domain Management planning for the local Indigenous People, as well as continued unpredictable lahar flows and landslides.

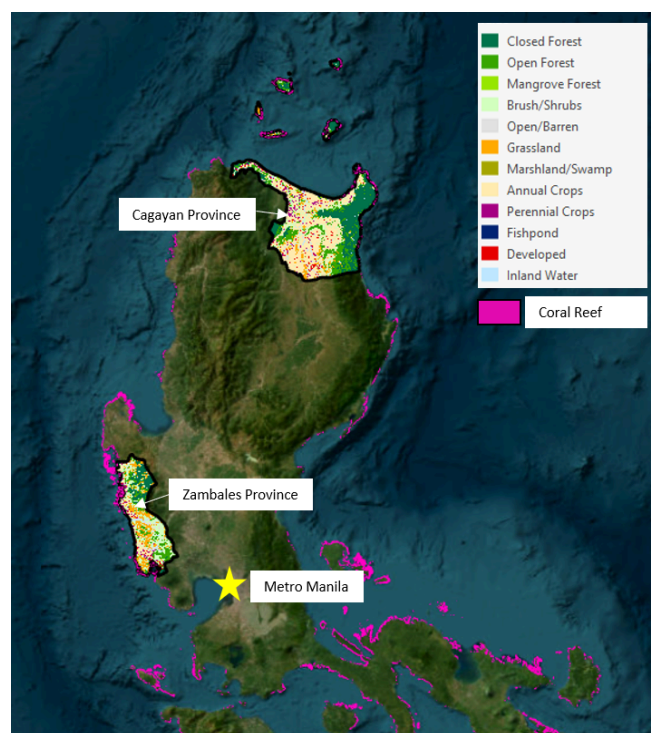


Fig 1. Focal areas for the pilot project, Zambales and Cagayan provinces on Luzon Island.

In this current pilot project the objectives of Stanford, along with the ADB, are to develop capacity within DENR staff to map and value key ecosystem services in watersheds throughout The Philippines, and to work with DENR to identify clear pathways and methodologies to use these approaches to enhance integrated watershed management planning. To this end the team’s work may include some or all of the following activities:

Activity	Team members
Mapping and modeling the baseline supply of 3 ecosystem services: water supply, water quality (sediment and nutrient) in two pilot watersheds using InVEST.	DENR will lead the analytical work which includes: data collection, preparing InVEST model inputs, running InVEST models, post-processing results. Stanford will provide technical training and guidance for DENR for all steps above using regular (biweekly) remote trainings and email.
Providing guidance and technical support to DENR to value watershed ecosystem services in the UN-SEEA framework.	To the extent that DENR would like to pursue this activity, this would be led by ADB senior economist staff, supported by Stanford and DENR.

	Note: \$50,000 USD funds can be allocated towards additional capacity if a project partners agree that a consultant would be useful to assist with this step.
Developing capacity in core DENR staff so that ecosystem service assessment and valuation can be replicated in other watersheds.	Capacity development will involve all team members. Stanford will lead ecosystem services assessment capacity development with DENR, and economists at the ADB will provide capacity development around valuation.
Assisting DENR in drafting a roadmap for how the UN SEEA accounting framework and the IWM planning process will work together to (a) characterize watersheds and their values; (b) set quantitative targets for ES enhancement; (c) prioritize watersheds for IWM implementation; (d) track progress of the IWM program towards achieving quantitative targets; and (d) adaptively manage the IWM program.	This will be co-led by DENR and Stanford, with support from the ADB.
Participating in reporting and workshops as outlined by the DENR. DENR specifically calls out one report, stakeholder consultation and a workshop with Stanford as part of their schedule of activities for this project.	This will be led by DENR with support from Stanford and the ADB.

Proposed scope of work

- Explanation of activities: The key activities are outlined above and will center around providing analytical and capacity development support to DENR staff to parameterize, run, calibrate and interpret InVEST model inputs and outputs, assigning monetary values to ecosystem services (data permitting) in accordance with the UN SEEA framework selected by DENR, and to providing guidance and documentation to help establish an approach by which ecosystem services information and natural capital accounting can help to inform IWMP in meaningful ways. Stanford’s work with DENR is part of a larger 2 year project at the DENR.
- Role of ADB and/or consultant(s) in this project: This project includes several components, of which the valuation component, described in **Deliverable 3** below, is beyond the expertise of Stanford’s team and is best completed in collaboration with either experts at the DENR, economists at the ADB, or additional consultants. Proposed activities and deliverables associated with this component are described below, but this will need to be further scoped with the DENR and potential consultants (ADB or other).

Proposed Deliverables

Modeling and mapping ecosystem services:

- **Deliverable 1 (co-led by DENR and Stanford):** Baseline maps of the supply of 3-4

watershed ecosystems services in 1-2 pilot watersheds.

- **Deliverable 2 (co-led by Stanford and DENR):** Technical training in the form of virtual workshops, regular calls, and training materials to develop capacity in DENR staff to replicate analyses in additional watersheds.

Valuation of ecosystem services:

- **Deliverable 3 (led by ADB and/or consultant, support from DENR and Stanford):**
Proposed approach to monetary valuation of the 2-3 services mapped in the focal watershed, using DENR valuation methods, with discussion of how this work supports the development of economic accounts in the SEEA framework, and how it could be applied in other watersheds in the country.
 - The scope of this deliverable will be co-developed with DENR and ADB with support from Stanford . From past experience, Stanford suggests that the following activities will need to be conducted in association with this deliverable:
 - Map beneficiaries of ES in the watershed, and prioritize for which services can be reliably valued
 - Develop a methodology to value the selected services for key beneficiaries using spatially-explicit results from the InVEST models
 - Compile relevant socio-economic data (and potentially gather new data, i.e. surveys of WTP, etc.)
 - Evaluate the values of the selected ecosystem services
 - Reporting (likely as contributions/chapters in Deliverables 4 and 5).
- **Deliverable 4 (led by ADB and/or consultant, support from DENR and Stanford):**
Capacity development workshop focused on valuation, to be scoped by ADB, DENR and Stanford.

Linking ecosystems service valuation and NCA to policy and IWMP:

- **Deliverable 5 (led by Stanford):** A Final Report prepared for DENR including the results of baseline ES assessment and valuation in the focal watershed, along with recommendations for how the approach could be replicated/scaled up.
- **Deliverable 6: (co-led by DENR & Stanford, with support from ADB and/or consultant)**
A co-developed vision and plan for enhancing the IWMP process in the Philippines using natural capital assessments and valuation. Included in this deliverable are contributions made to reports that DENR will be producing.

Proposed Timeline

Task	Lead	Support	2024							
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Finalize Scoping										
Finalize institutional partnerships	Stanford	DENR, ADB								
Identify geographic and analytical scope of pilot project	DENR	Stanford								
Scope role for ADB and/or consultant to assist with valuation and Deliverable 3.	DENR, Stanford	ADB								
Draft Scoping Report (present document)	Stanford	DENR, ADB								
Finalize Scoping Report	Stanford	DENR, ADB								
Conduct baseline ES assessment in pilot watersheds										
Data collection for ES models	DENR	Stanford								
Baseline runs of ES models in pilot watersheds	DENR	Stanford								
Calibration and/or validation of water models (where data allow)	DENR	Stanford								
Review baseline ES models	DENR	Stanford								
Final runs of ES models in pilot watersheds	DENR	Stanford								
Develop capacity with core DENR staff on data collection, and running InVEST models	Stanford	DENR								
Deliverable 1: Baseline maps and data for 3 ecosystem services in 1-2 pilot watersheds	DENR	Stanford								
Deliverable 2: Guidance document for DENR to replicate workflow in additional watersheds	Stanford, DENR, ADB									
Valuation of watershed ES and linking to UN SEEA framework (case study)										
Further scope Deliverable 3 with DENR, ADB and Stanford	DENR & ADB	Stanford								

Partners/Stakeholders involved in activities

- **Internal to country** (Ministries, universities, local private sector, etc) (institutions/groups listed here, not individuals)
 - The primary in-country partners are staff in the Department of Environment and Natural Resources Ecosystems Research and Development Bureau (DENR-ERDB). Core staff include:
 - Timothy John Dizon: timothy.dizon@erdb.denr.gov.ph
 - Karen Rae Fortus: karenrae.fortus@erdb.denr.gov.ph
 - Roy Joven Amatus: email
 - Kim Aaron Tolentino: email
 - Additional partners that will be engaging with DENR, and possibly Stanford, in this project include collaborators involved in IWMP in the pilot watersheds including regional and field VA focal/technical staff involved in WCVA, ERDB VA Team, Forest Management Bureau technical staff (from the Watershed Section handling the WCVA/IWMP).
 - This project will likely also interface with the Natural Capital Accounting Technical Working Group in The Philippines which has representation from across many government ministries.
- **External to country** (Stanford, MDBs, etc)
 - Stanford will provide key analytical and capacity development support for all elements of the project
 - ADB has proposed to provide support around valuation and policy mapping. The explicit role for ADB in this project should be scoped with DENR staff and the ADB.
 - Consultant role (TBD) if it is deemed beneficial, a consultant may be hired to provide additional support for the pilot project.

Capacity Development plan

Capacity development is a core component of this engagement and will center around the following outcomes:

- At least four core staff members can use at least one InVEST model and know where to go to learn more.
- 10-20 staff members in DENR are familiar with InVEST outputs and how they can be used in watershed management planning.
- A diverse set of staff will be included in capacity development activities, which may include a focus on diversity as it relates to gender, seniority (e.g. a diverse mix of senior and junior staff), and historically marginalized groups.
- Capacity development activities will extend to other agencies, local watershed management staff, and stakeholders as identified by DENR in stakeholder activities.

A capacity development strategy will be co-developed with DENR staff. DENR has outlined 'capacity building with Stanford' in their schedule of activities for February and May 2024, as well as August and November 2024 for guidance and consultation as needed. They have also identified a workshop to be conducted in collaboration with Stanford (date TBD) as part of their schedule of activities. We suggest

that in addition to workshops and other capacity development events that Stanford and core staff at the DENR establish **regular virtual meetings**, either weekly or bi-weekly. These meetings may also involve ADB participation as well.

The key topics that we will focus on capacity development include:

- Ecosystem services assessment using InVEST*: including data gathering and preparation, parameterizing InVEST models, calibrating InVEST models, running InVEST models, and interpreting results. (*: to the extent DENR is using and proficient with models other than InVEST, we can focus on working with results from those models).
- Valuation of watershed ES: including identifying and mapping beneficiaries, establishing NPV for ES, and linking to the SEEA framework.
- Using ES valuation to improve watershed management planning including mapping to policy and finance mechanisms, identifying locations for watershed management and/or protection activities, monitoring and evaluation of watershed management programs using ecosystem services metrics.

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