REGIONAL FLYWAY INITIATIVE TRAINING SERIES:
From Wetland Ecosystem Services to Nature-based Solutions

ADB HQ on 27–30 June 2023

Introduction to the
Preliminary Scoping Appraisal of the
Toolkit for Ecosystem Service Site-based Assessment
(TESSA)

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Preliminary Scoping Appraisal
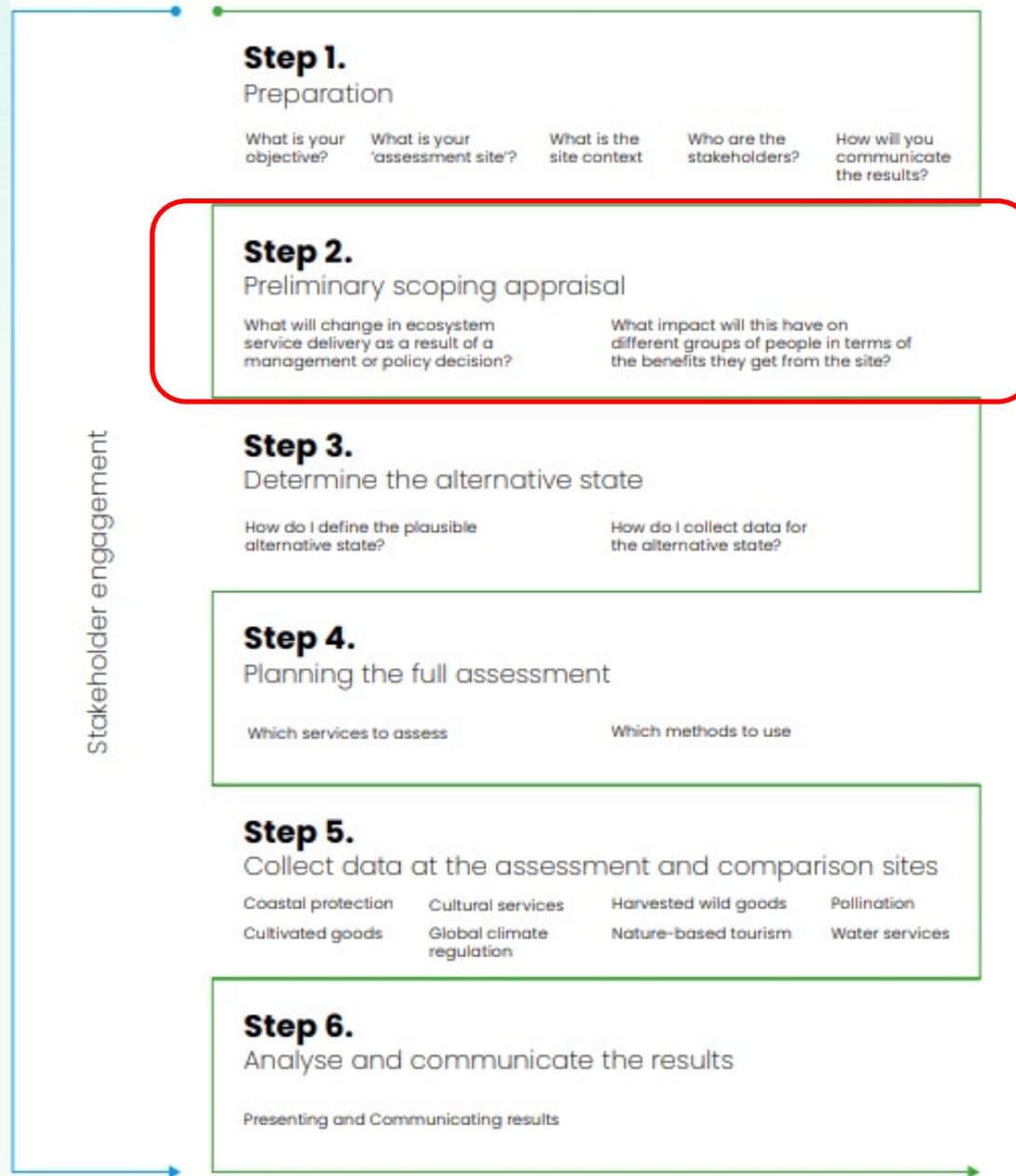
Preliminary Scoping Appraisal (PSA)

- Initial understanding of the dynamics of a site.

- Scoping assessment.

- Helps us understand:

  - Ecosystem services provided by a site.

  - Changes on ecosystem services provision under plausible future changes.

- *This workshop*: we will use the PSA (with elements from other tools):

  1. Site boundaries.

  2. Habitat types.

  3. Provision of ecosystem services.

  4. Drivers of change.

PSA step 1. Site boundaries

- Key to documenting the ecosystem services provided by a site.

- Can define it manually, or by using available maps, reports, internet resources (e.g., Google Earth), etc.

- We compiled site boundaries from different sources.

- Decision rules for boundary selection:

1. Department of Environment and Natural Resources (DENR).

2. Local government.

3. World Database of Protected Areas

4. Ramsar* (not yet designated).

5. KBA database.

6. IBA database.

7. Estimated – straw man boundary.

PSA step 2. Habitat types

- We need to classify the habitat types within each site.
- Resources: recent land cover/vegetation maps, etc.
- TESSA habitat classification is based on the Ramsar Classification System for Wetland Type.

Marine/coastal	Inland	Human-made
- Permanent shallow marine waters - Marine subtidal aquatic beds - Coral reefs - Rocky marine shores - Sand, shingle or pebble shores - Estuarine waters - Intertidal mud, sand or salt flats - Intertidal marshes - Intertidal forested wetlands - Coastal brackish/saline lagoons	- Permanent inland deltas - Permanent rivers/streams/creeks - Seasonal/intermittent/irregular rivers/ streams/creeks - Permanent freshwater lakes - Seasonal/intermittent freshwater lakes - Permanent saline/brackish/alkaline lakes - Seasonal/intermittent saline/brackish/alkaline lakes and flats	- Aquaculture ponds - Ponds - Irrigated land - Seasonally flooded agricultural land - Salt exploitation sites - Water storage areas - Excavations - Wastewater treatment areas - Canals and drainage channels, ditches - Karst and other subterranean

PSA step 2. Habitat types – this workshop

- Total area and % of each land cover type.

- Percentage of the site covered by each land cover type.

- We will follow: wetland habitat classification and framework of TESSA.

Habitat type	Estimated cover (%)	Area (ha)
1 (W) - Shrub-dominated wetlands	25	62.5
2 (N) - Seasonal/intermittent/ irregular rivers/streams/ creeks	5	12.5
3 (Zk(a)) - Karst and other subterranean hydrological systems, marine/coastal	44	110.0
4 (Xf) - Freshwater, tree-dominated wetlands	26	65.0
TOTAL	100	250.0

Brief explanation of what the caveats or problems are (if any) with the map provided:

PSA step 3. Ecosystem services

- Need to document the ecosystem services provided by the site.
- TESSA framework: scoring of the top five services provided by the site.
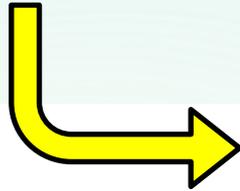
Service category	Specific services	Select the top five services provided by the site [tick box]	Reasons why site is particularly important for this ecosystem services			Additional detail on the service, beneficiaries and/or importance [text]
			Large number of beneficiaries [tick box]	High magnitude [tick box]	High irreplaceability [tick box]	
Carbon storage and greenhouse gas flux	Carbon storage in trees, soil and mud	✓		✓		Large amount of carbon stored in the soil and mature trees
Coastal protection	Storm protection in coastal area	✓	✓			Large coastal population living adjacent to the area
Harvested wild goods	Firewood	✓		✓		Local source of firewood that is not available elsewhere
Recreation / tourism						

PSA step 3. Ecosystem services – this workshop

- Stakeholder consultation survey – Section 1.

- We will use provision, regulating, and cultural services.

- We will follow:

  - World Database of KBAs for ecosystem services: recommended fields.

  - RAWES toolkit: ecosystem services classification.

KBAs

RAWES

Ecosystem services	Ecosystem service provided by the site	Service is essential or non-substitutable	Beneficiaries of this ES live (**tick all that apply**):			A high proportion of people in the surrounding area benefit from this ES	Additional detail on the ES, beneficiaries and/or importance
			Within the site	Adjacent to the site	Distant to the site		
Provisioning services: Comprise primarily materials that can be harvested or collected from wetlands and energy taken from ecosystems.							
1 **Provision of fresh water** E.g., Water used for domestic drinking supply, for irrigation, for livestock, etc.	☑	☑	☑	☑	☑	☑	
2 **Provision of food** E.g., Crops, fruit, livestock, capture fisheries, aquaculture, wild foods, etc.	☑	☑	☐	☑	☐	☑	
3 **Provision of wood products / fibre** E.g., Timber, and other wood products (for building, etc.) / fibres, resins, animal skins (for clothing, etc.)	☑	☑	☐	☑	☐	☐	
4 **Provision of fuel** E.g., Fuelwood, peat, etc.	☑	☑	☐	☑	☐	☐	
5 **Provision of genetic resources** E.g., Rare breeds used for crop/stock breeding, etc.	☐	☐	☐	☐	☐	☐	
6 **Provision of natural medicines and pharmaceuticals**	☐		☐	☐	☐	☐	

PSA step 4. Drivers of change

- How activities will impact the site's habitats and biodiversity?
- TESSA framework:

Timing	Scope (% of site affected)	Impact (degree of change in next 10 years)
1. Likely in long term (beyond 10 years)	0. Little of area (<10%)	1. Low (<10%)
2. Likely in short term (within 10 years)	1. Some of area (10- 49%)	2. Moderate (10- 30%)
3. Happening now	2. Most of area (50- 90%)	3. High (>30%)
	3. Whole area (>90%)	

Score = Timing + Scope + Severity

Table B. Activities impacting the site

Activities	Timing	Scope	Impact	Score
(Score all that apply)				
Residential and commercial development	1	3	2	6
Agriculture and aquaculture	3	1	1	5
Energy production and mining	1	3	2	6
Transportation and access corridors	3	1	3	7

PSA step 5. Drivers of change – this workshop

- Stakeholder consultation survey – Section 2.

- We will follow: Ramsar R-METT '*Data sheet 3: Ramsar site threats*'.

- Impact:
  - **High**: Serious impact.
  - **Medium**: Moderate impact.
  - **Low**: Driver is present, but with minimal impact.
  - **N/A**: Driver is not present.

Ramsar Site Management Effectiveness Tracking Tool

R-METT

A Guide for Managers and Stakeholders
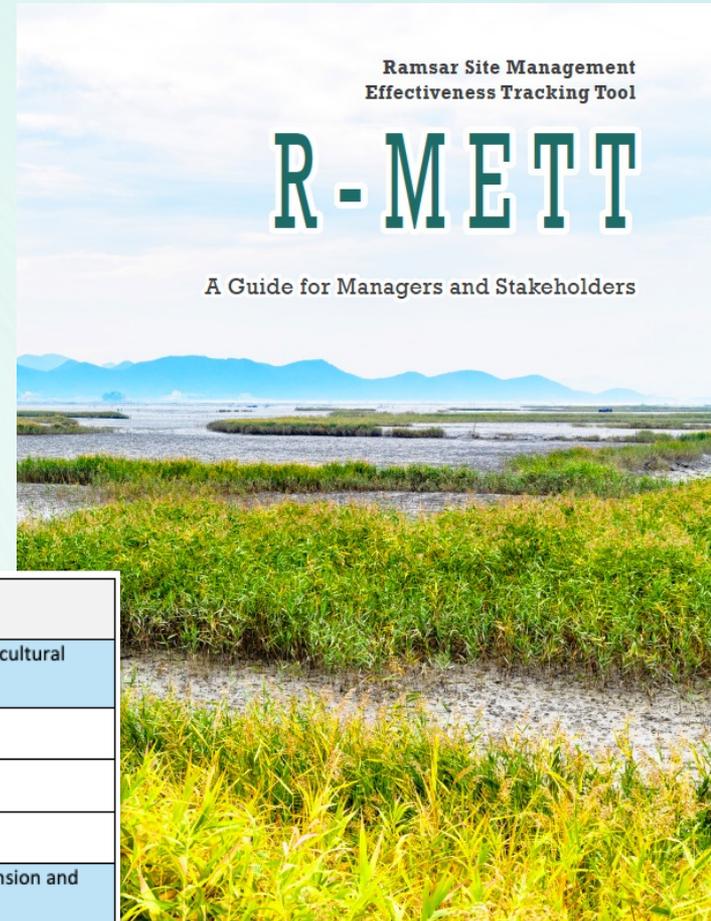
	Driver of change	High	Medium	Low	N/A	Notes
	Residential and commercial development within the wetland site: Drivers of change from human settlements or other non-agricultural land uses with a substantial footprint.					
1	Housing and settlement	☐	☑	☐	☐	
2	Commercial and industrial areas	☑	☐	☐	☐	
3	Tourism and recreation infrastructure	☐	☑	☐	☐	
	Agriculture and aquaculture within the wetland site: Drivers of change from farming and grazing as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture.					
4	Annual and perennial non-timber crop production	☐	☐	☑	☐	
5	Drug cultivation	☐	☐	☑	☐	
6	Wood pulp and plantations	☑	☐	☐	☐	
7	Livestock farming and grazing	☐	☑	☐	☐	

The alternative state - TESSA

Stakeholder engagement

Step 1.
Preparation

What is your objective? | What is your 'assessment site'? | What is the site context | Who are the stakeholders? | How will you communicate the results?

Step 2.
Preliminary scoping appraisal

What will change in ecosystem service delivery as a result of a management or policy decision?

What impact will this have on different groups of people in terms of the benefits they get from the site?

Step 3.
Determine the alternative state

How do I define the plausible alternative state?

How do I collect data for the alternative state?

Step 4.
Planning the full assessment

Which services to assess

Which methods to use

Step 5.
Collect data at the assessment and comparison sites

Coastal protection | Cultural services | Harvested wild goods | Pollination
Cultivated goods | Global climate regulation | Nature-based tourism | Water services

Step 6.
Analyse and communicate the results

Presenting and Communicating results

The alternative state – TESSA rationale

- Most plausible change (e.g., management, land cover, habitat quality).

- Makes impacts on biodiversity and ecosystem services explicit.

- Difference from changes in land use useful to decision-makers.

- Need to consider who will be affected.

- TESSA compares the current state to an alternative state.
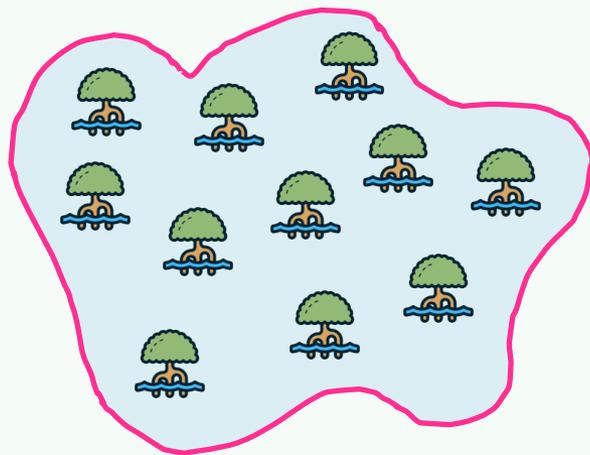
Mangrove

CHANGE

Changes in provision of ecosystem services?

Who will be affected?
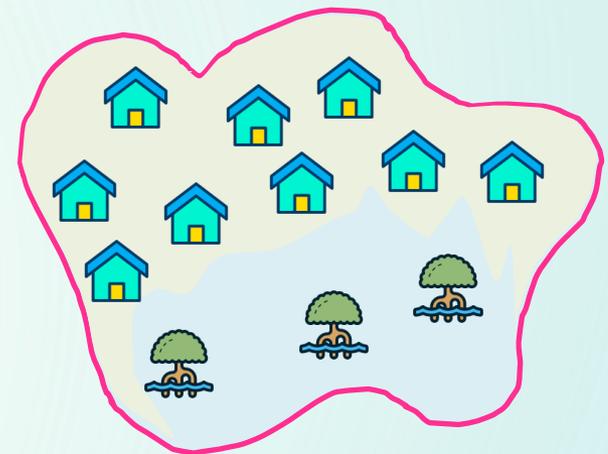
Urban/mangrove

The alternative state – selection of sites

- Measurements can be taken from a **real place.**

Assessment site

Forested mountain
Crop cultivation at the base

Comparison site
(e.g., adjacent to assessment site)

Cultivated mountain
Same soil, topography, climate, etc.

Areas representative of the alternative state

Forest expected to be cleared for agriculture

Forest expected to be left (altitude makes crop expansion unsuitable)

Crop cultivation at the base of the forested mountain

Crop cultivation on the adjacent mountain
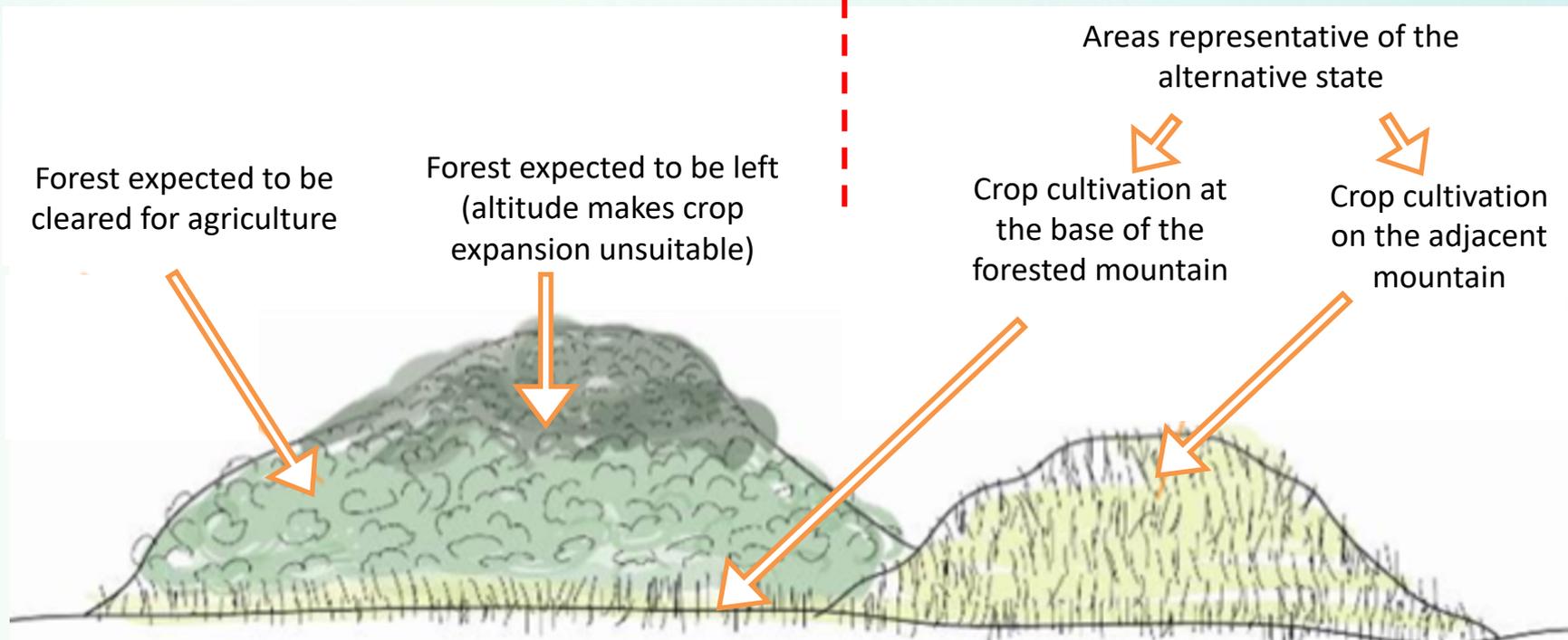
The alternative state – this workshop

- Area of each land use type that would occur in the alternative state.
- We will follow the TESSA framework:

Habitat type	Current state area (ha)	Alternative state area (ha)
1. Shrub-dominated wetlands	62.5	20.0
2. Seasonal/intermittent/ irregular rivers/streams/ creeks	12.5	6.5
3. Karst and other subterranean hydrological systems	110.0	50.0
4. Freshwater, tree-dominated wetlands	65.0	78.5
5. Urban areas	0.0	75.0
6. Bare ground	0.0	20.0
TOTAL	250.0	250.0

Documentation of ES in RFI wetland sites of the Philippines

1. Site boundaries.
2. Habitat types.
3. Ecosystem services.
4. Drivers of change.
5. Alternative state.
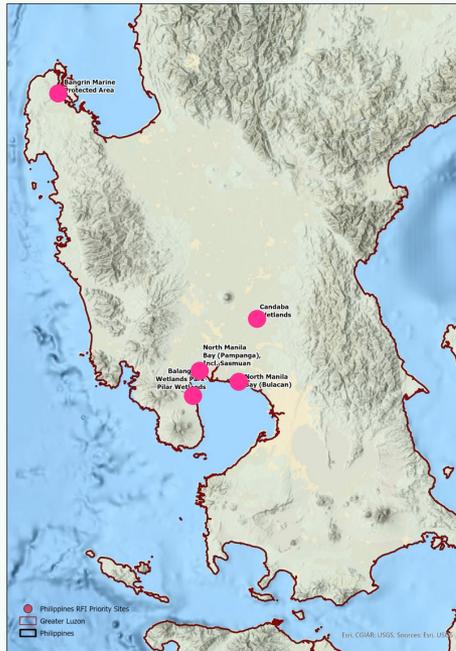
Luzon
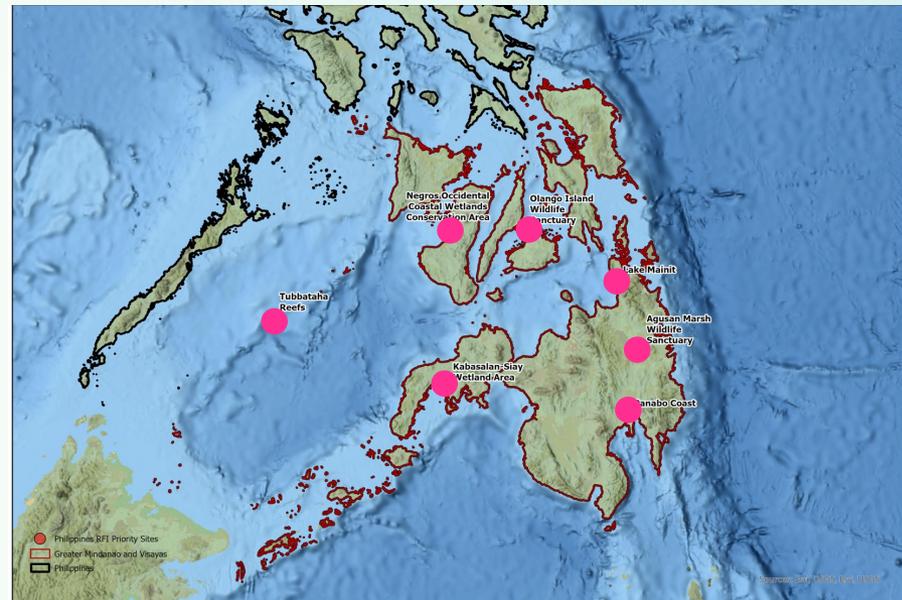
Visayas, Palawan & Mindanao

Documentation of ES in RFI wetland sites of the Philippines

→ Combination of toolkits and resources:

- **TESSA** ⇒ The framework we will follow.

  - Site-tailored – vs. InVEST, Co$tingNature, etc.

  - Valuations of ecosystem services (alternative state) – vs. RAWES, PA-BAT +

- **RAWES** ⇒ Ecosystem services classification (tailored for wetlands).

- **World Database of KBAs for ecosystem services** ⇒ Recommended fields.

- **Ramsar R-METT tool** ⇒ Classification of drivers of change (tailored for wetlands).

→ We will facilitate:

  - Site maps with boundaries for current and alternative states.

  - Tables of habitat types for current and alternative states.

  - Ecosystem services and drivers of change (stakeholder consultation surveys per site).

  - Additional supporting material.

Assessment of Cultivated Goods, Harvested Wild Goods, and Nature-based Recreation and Tourism

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Cultivated goods

- Quantifies amounts, and economic value of cultivated goods:

  - *Include*: e.g., aquaculture or plantation products, food and biofuel crops, livestock.

  - *Do not include*: e.g., timber from non-cultivated species.

- Identifies groups that would gain / lose benefits resulting from changes.

- Data collection: workshop / existing data / questionnaires for cultivators.

- Current and alternative states.

Cultivated goods - methods

Cultivated M1	Cultivated M2	Cultivated M3

- Workshop
- Used at first, to establish:
  • Total <u>area</u> under cultivation
  • <u>Who</u> is involved?
  • <u>Existing data</u>? ⇒ no = M2 / yes = M3
  • For each selected good:
    1. How many <u>households</u> cultivate it?
    2. Which <u>social groups</u> cultivate it?
    3. How is it <u>cultivated/used</u>?
    4. Temporal <u>changes</u> in patterns of cultivation
    5. Contribution of the <u>ecosystem</u> to production of each selected good
	- Individual questionnaires with cultivators
	- Can be adapted to local circumstances
	- For less developed contexts (rural areas)
		- Existing data
		- Developed countries

Harvested wild goods

- Volume, economic net value, and relative importance to people.

- From uncultivated areas:

  - *Include*: e.g., plants for food and medicine, animals hunted for food (fish) or decoration (feathers), fibres (timber, bamboo, rattan), livestock feed.

  - *Do not include*: e.g., crops, products from aquaculture or plantations.

- Data collection: workshop / existing data / questionnaires for harvesters.

- Current and alternative states.

Harvested wild goods - methods

Harvested wild goods M1	Harvested wild goods M2	Harvested wild goods M3	Harvested wild goods M4

- Workshop
- First step: collect general information on wild goods harvesting (assessment site)
- Focus on the most important <u>3-5 products</u>
- Importance for stakeholder groups
- Then ⇒ M2 / M3 / M4
- For each selected good:
  1. <u>Households</u> that harvest it
  2. Which particular <u>groups</u>?
  3. <u>When/from where</u> it is harvested?
  4. <u>How</u> it is used?
  5. Are the <u>harvest patterns</u> changing?
	- Questionnaire survey
	- Valuation of <u>harvested</u> wild goods
	- To individual harvesters
	- Needs to be adapted to local settings
		- Participatory approach
		- Valuation of <u>non-marketed</u> goods (subsistence)
		- Uses numeraires to estimate values (e.g., livestock)
			- Field surveys / secondary data
			- For estimating the value of harvested wild timber
			- <u>One-off benefit</u> of timber

Nature-based recreation and tourism

- Annual number of visits for tourism/recreation purposes.

- Annual total income from tourism/recreation.

- Data collection: existing data, expert interviews, field surveys/questionnaires.

- Current and alternative states.

Nature-based recreation and tourism - methods

- Annual economic value of nature-based recreation and tourism:

  a) Existing secondary data.

  b) Recreation methods:

Recreation M1	Recreation M2	Recreation M3

- Census
- First step
- Number of annual visits to a site
- Not recommended for <100 visits per year / <$1,000 USD gross annual revenue
- Knowledge of statistics?
  ⇒ no = M2 / yes = M3
	- Questionnaire
	- Indirect estimates
	- Needs to be adapted to local context
		- Questionnaire
		- Travel Costs Method (TCM):
		  • Zonal TCM (origin of visitors, 1 visit)
		  • Individual TCM (many visits)
		- More complex: statistical analysis

Example (Aung *et al. 2021*)

- *The site*: Moeyungyi Wetland Wildlife Sanctuary, Myanmar.

- *Its value*: Important reservoir for resident and migratory birds

- *The issue*: Water used for rice cultivation, and risk of increase.

- *The context*: Surrounded by 17 villages (12,000 households; 65,000 people).

- *The tool*: TESSA.

  - Assessment of ecosystem services.

  - Current state, and future plausible alternative state…
    - If water level of its permanent lake drops significantly.
    - Alternative state: nearby site with plausible land use change.

  - PSA identified six important ecosystem services.

  - Will focus on…
    - ✓ Harvested wild goods: fish, molluscs, plants.
    - ✓ Cultivated goods: rice.
    - ✓ Nature-based recreation: bird watching.

Example - results

1. <u>Harvested wild goods</u>

  - Mean annual net value of fish/household = $3,360.
  - 4,577 households.
  - Total annual net economic benefit from fishing = $15.4 million.

2. <u>Cultivated goods</u>

  - Total annual net value of rice cultivation = $438,000.
  - Alternative state = $603,000.

3. <u>Nature-based recreation</u>

  - Total annual recreation revenue = $73,500.
    - International tourists = $54,200 (>70% of all revenue).
    - National tourists = $19,300.

Nature-based recreation and tourism – example

- Middleton Lakes, UK
- Zonal TCM to estimate consumer surplus
- Visitors/yr = 31,167
- 73 survey questionnaires
- Round-trip travel cost per visitor (TC):

$$TC = \frac{(2D \times F) + P}{n} + A$$

- Total consumer surplus:
- Current state (nature conservation site) = £104,655
- Alternative state (public amenity park) = £53,374

Ecosystem Services Provided by a Former Gravel Extraction Site in the UK Under Two Contrasting Restoration States

Phillip J. Blaen[a,b,#], Michael A. MacDonald[a], and Richard B. Bradbury[a]

[a]RSPB Centre for Conservation Science, RSPB, The Lodge, Sandy, Bedfordshire, UK

[b]School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, UK
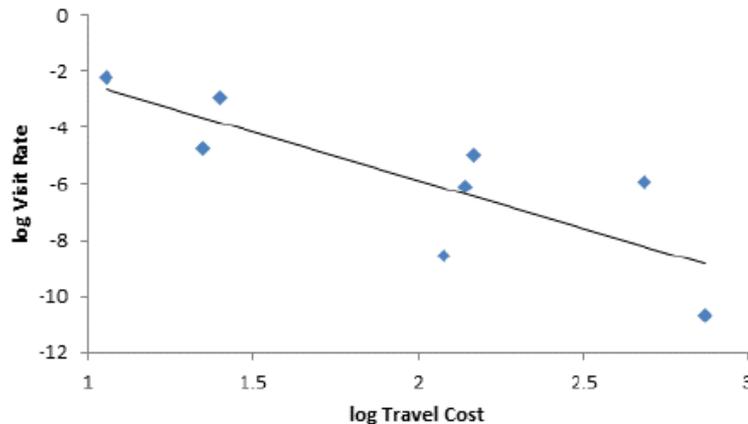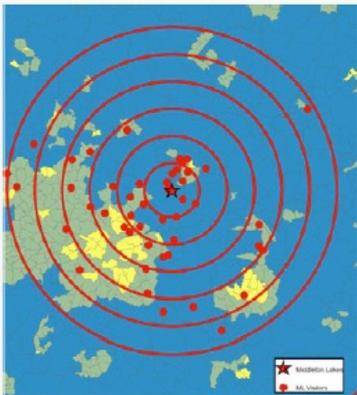
Annual visitation rates per capita as a function of travel cost
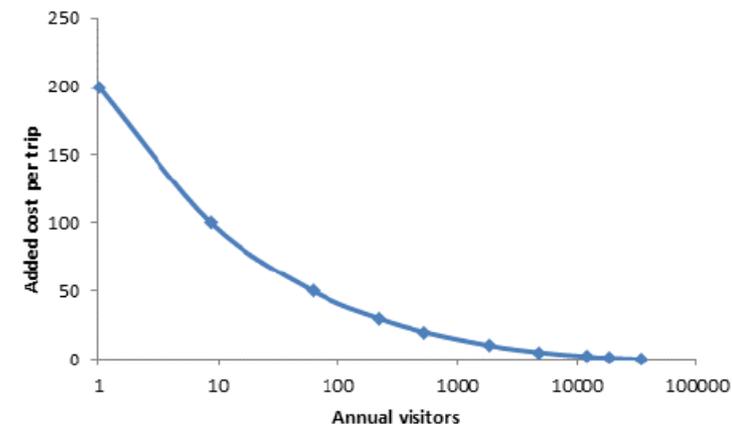
Predicted number of visits under different additional costs

ANY QUESTIONS?

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