



TOOLKIT FOR ECOSYSTEM SERVICE SITE-BASED ASSESSMENT

An introduction

UNIVERSITY OF
Southampton

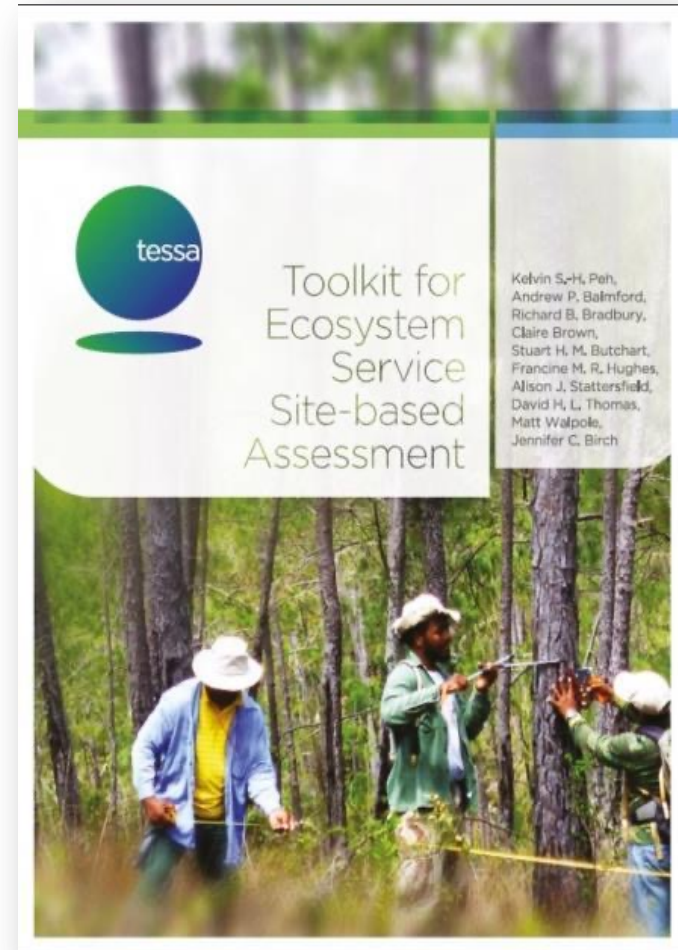


Anglia Ruskin
University



Overview

TESSA - Toolkit for Ecosystem Service Site-based Assessment - provides **accessible** guidance on **low-cost** methods for how to evaluate the benefits people receive from nature at protected areas (or other **sites**) in order to generate information that can be used to influence **decision making**.



Contributions to date

Wider development



Implementation



“To develop and deploy a rapid assessment tool to understand how far conserving sites for their biodiversity importance also helps to conserve different ecosystem services, relative to a converted state”.

Aims and principles:

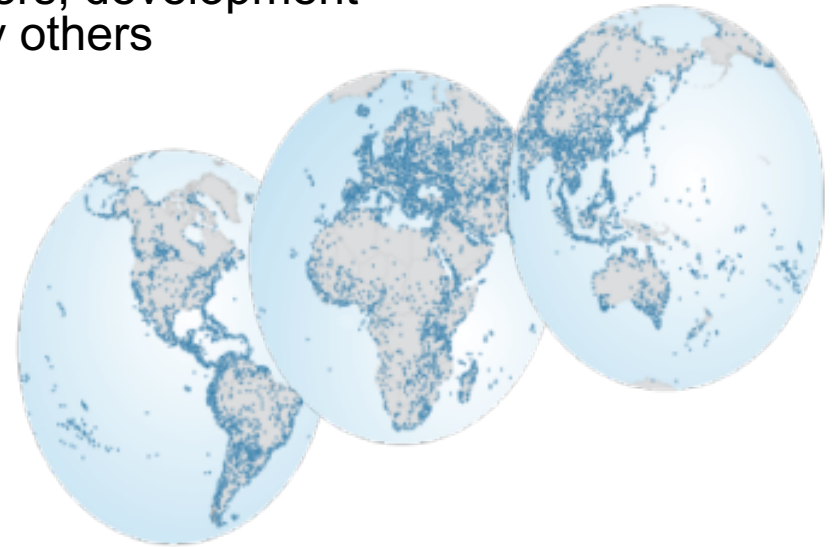
- 1.Help non-experts with limited capacity to measure several ecosystem services rapidly, cheaply but robustly
- 2.Estimate difference between current state and plausible alternative(s)
- 3.Involve stakeholders and beneficiaries
- 4.Provide scientifically robust data for decision-making and monitoring

Overall purpose is to support on-going conservation efforts, and should be used as one tool in a toolbox of approaches

Who this toolkit is for?

Conservation practitioners and those with an interest in supporting biodiversity conservation through ecosystem service arguments

Methodology is applicable to a wide range of users: forestry, fisheries, water managers, land use planners, development organisations, the private sector and many others





Requirements

SKILLS

- Some scientific training
- Some understanding of socio-economic methods
- Good computer and numeracy skills

RESOURCES

- Computer
- Internet connection*
- Field equipment *
- Team of staff/volunteers

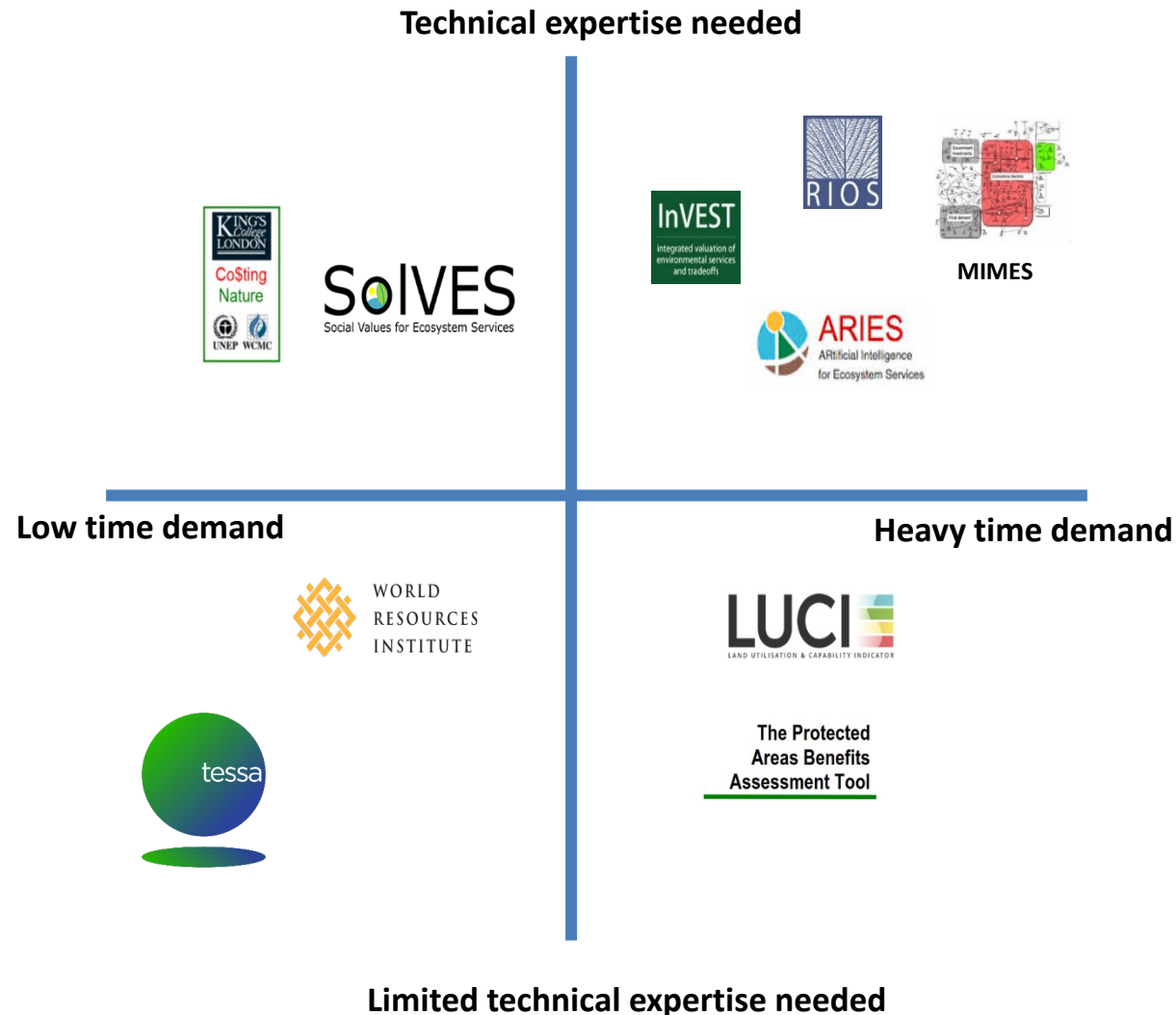
*depends on methods used

Characteristics

- Accessible (for practitioners)
- Low cost
- Participatory
- Rapid
- Robust (scientific methods, peer-review)
- Biophysical data (+ economic valuation)
- Site-scale (guide = 100 -100,000ha)
- Comparative valuation

Comparison with other tools

- ☐ Collects field data
- ☐ Can be done in less time
- ☐ Does not focus on spatial outputs
- ☐ Does not require use of online tools or complex models
- ☐ Requires less technical expertise



Building a global community of users

★ Work undertaken by TESSA steering committee



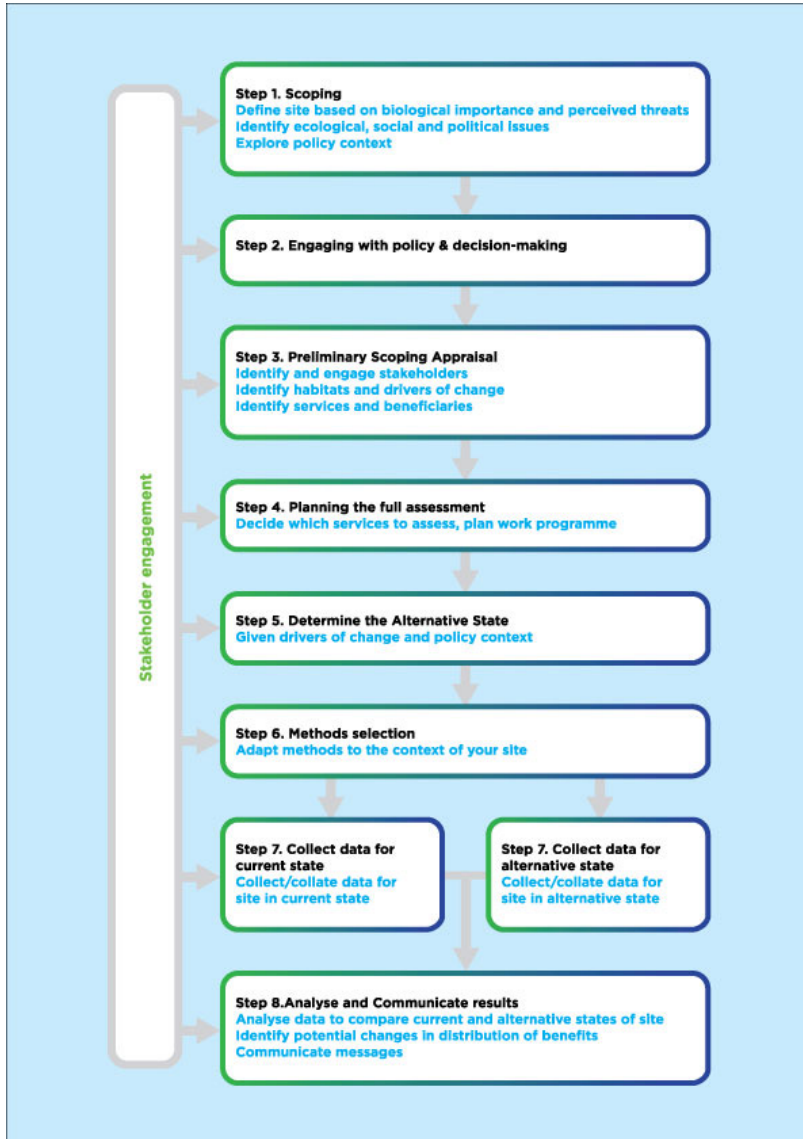
Format

The toolkit includes:

- ☐ Step by Step guidance
- ☐ Decision trees (flow charts)
- ☐ Detailed methods
- ☐ Additional guidance and tips
- ☐ Templates
- ☐ Worked examples
- ☐ Guidance on data synthesis



8-step process



TESSA has been designed to guide users through a step-by-step process.

It encourages stakeholder engagement throughout and provides guidance on how to identify and engage the appropriate people.

Engagement throughout the process improves information flow and fosters ownership

Scoping

- Define objectives
- Identify and engage with stakeholders
- Explore social, political and ecological context
- Identify social, political and ecological issues



Identify and engage with decision-makers



Identify local, national and international policies driving the decisions and processes leading to land or resource use change at the site

A meeting with the Department of Forestry, Nepal

Conduct a Preliminary Scoping Appraisal (PSA)

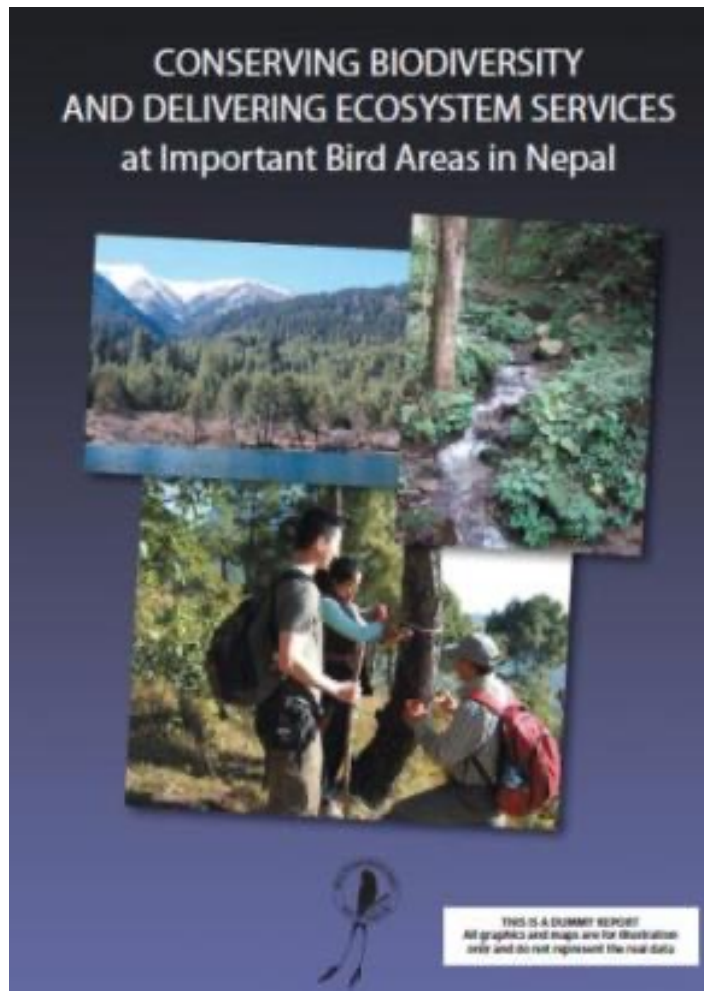
Designed to help understand the **important ecosystem services** that might be provided by a site and how they may change under plausible future changes.

Get an overview of the site and its services

- Identify important ecosystem services
- Identify and map land use drivers
- Provide information about past trends



A national report on biodiversity and ecosystem services for Nepal



Determine the alternative state

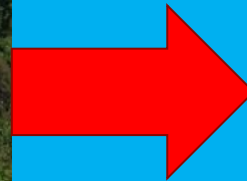
Phulchoki Forest, Nepal

Community Forest Users and Forestry staff in Nepal review maps of the site and explain what it would look like under the alternative state



Phulchoki Mountain Forest, Nepal

Habitat type	Current area (ha)
Mixed broadleaf forest	2029
Degraded forest	734
Pine forest	1106
Shrubland	412
Cropland	0
Grassland	0
Bareground	0
Built up	0
TOTAL	4281



Habitat type	Alternative state (ha)
Mixed broadleaf forest	0
Degraded forest	2456
Pine forest	0
Shrubland	0
Cropland	1082
Grassland	0
Bareground	111
Built up	631
TOTAL	4281

**Current state –
native forest**

**Alternative state –
subsistence agriculture**

Collecting data for the alternative state

Under the alternative state, the forest here is expected to be cleared for agriculture,

only leaving the forest here (as the altitude makes this area unsuitable for crop expansion).

Areas that could be representative of the alternative state are here (i.e. crop cultivation at the base of the forested mountain)

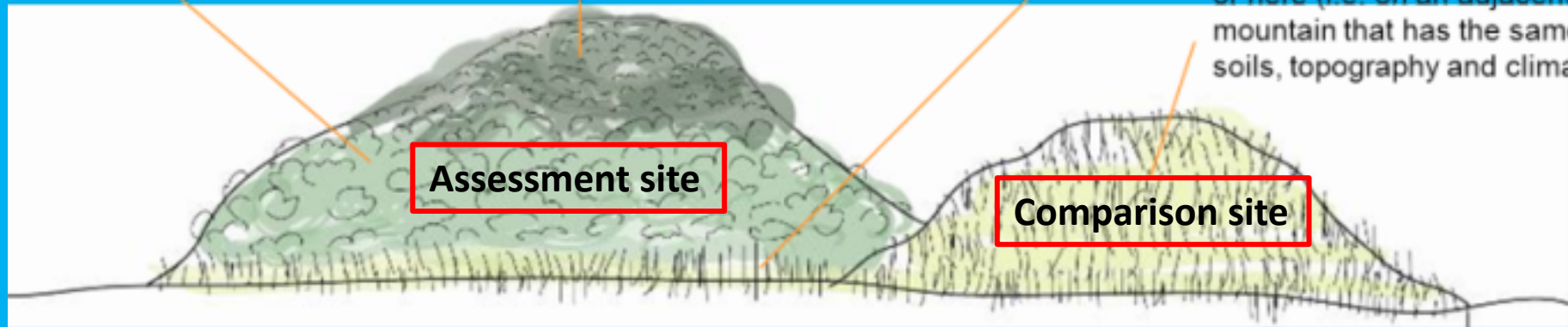
or here (i.e. on an adjacent mountain that has the same soils, topography and climate).

Assessment site

Comparison site

Forested mountain

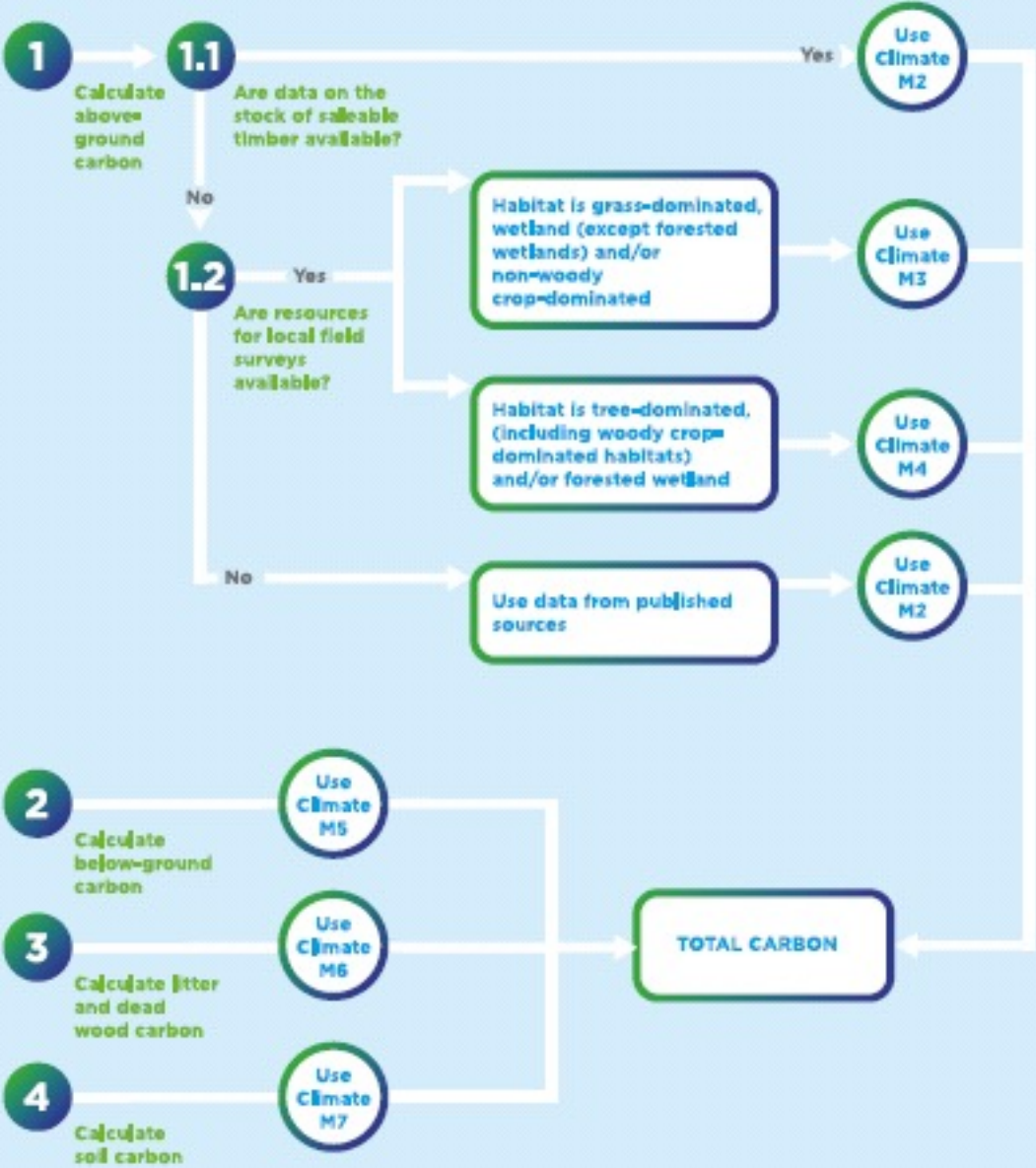
Cultivated mountain



Methods selection

Specify the policy change or management issue being addressed	Select appropriate survey methods (refer to Methods)						
	Published / Secondary data	Stakeholder workshop	Household questionnaire	Focus group interviews	Key informant interviews	Field work / interviews on site	Modelling tool
Ecosystem services to measure							
Global climate regulation							
Water quality							
Water use							
Fish							
Rice paddy cultivation							

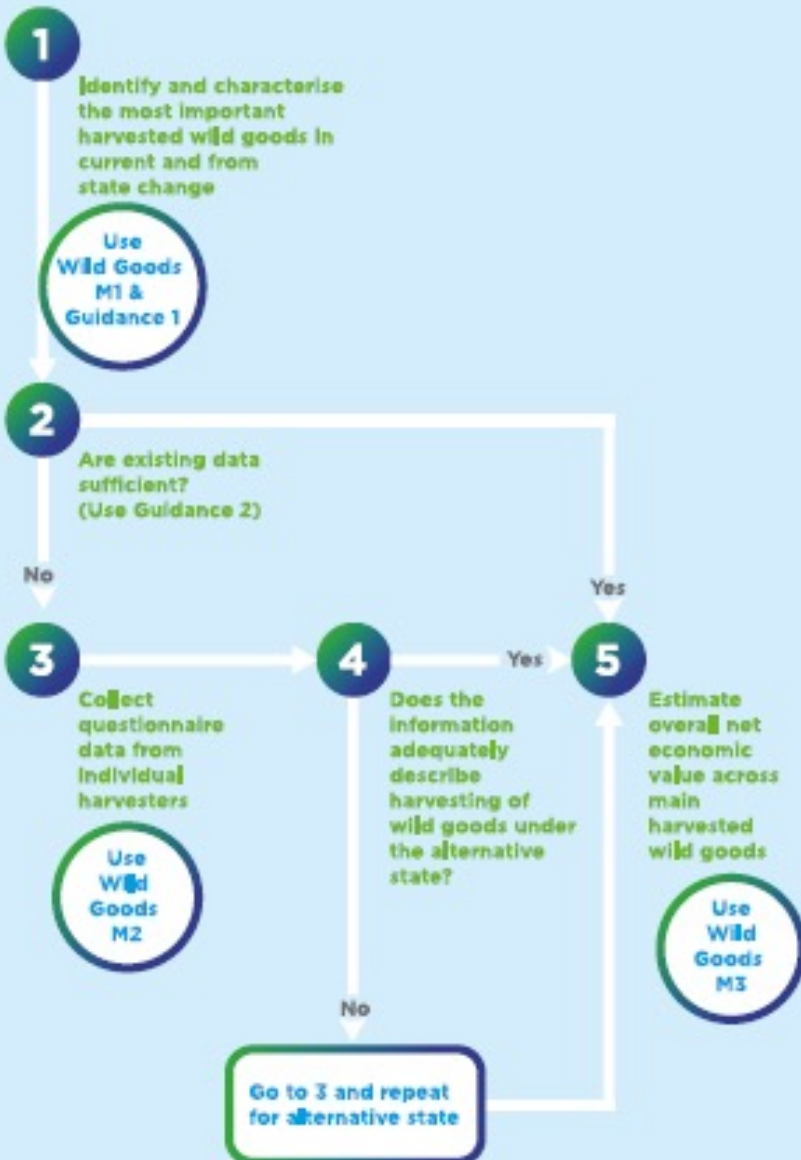
Example - Estimating total carbon stocks



Credit: Jenny Merriman

Example – Value of harvested wild goods

Credit: Lalao Aigrette Ravaoarinorotsihoarana



Carrying out methods

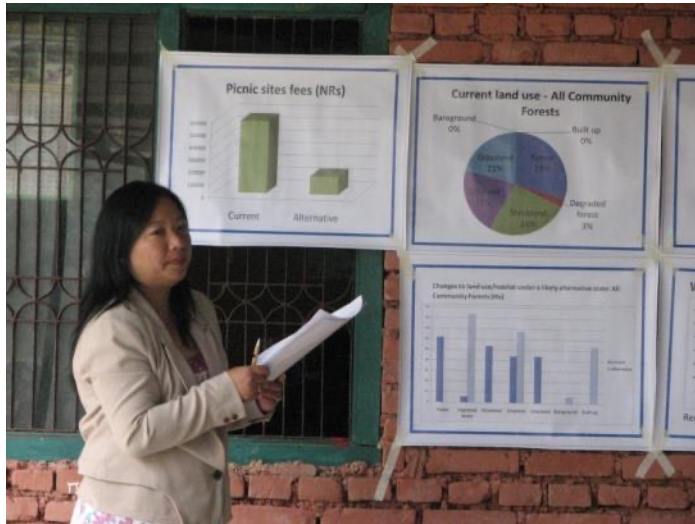


Community members and NGO staff help to collect data on above-ground biomass in Dominican Republic for estimating carbon stock in the forest



Local NGO staff interview visitors to a National Park to estimate the annual value of nature-based recreation

Analyse & Communicate results



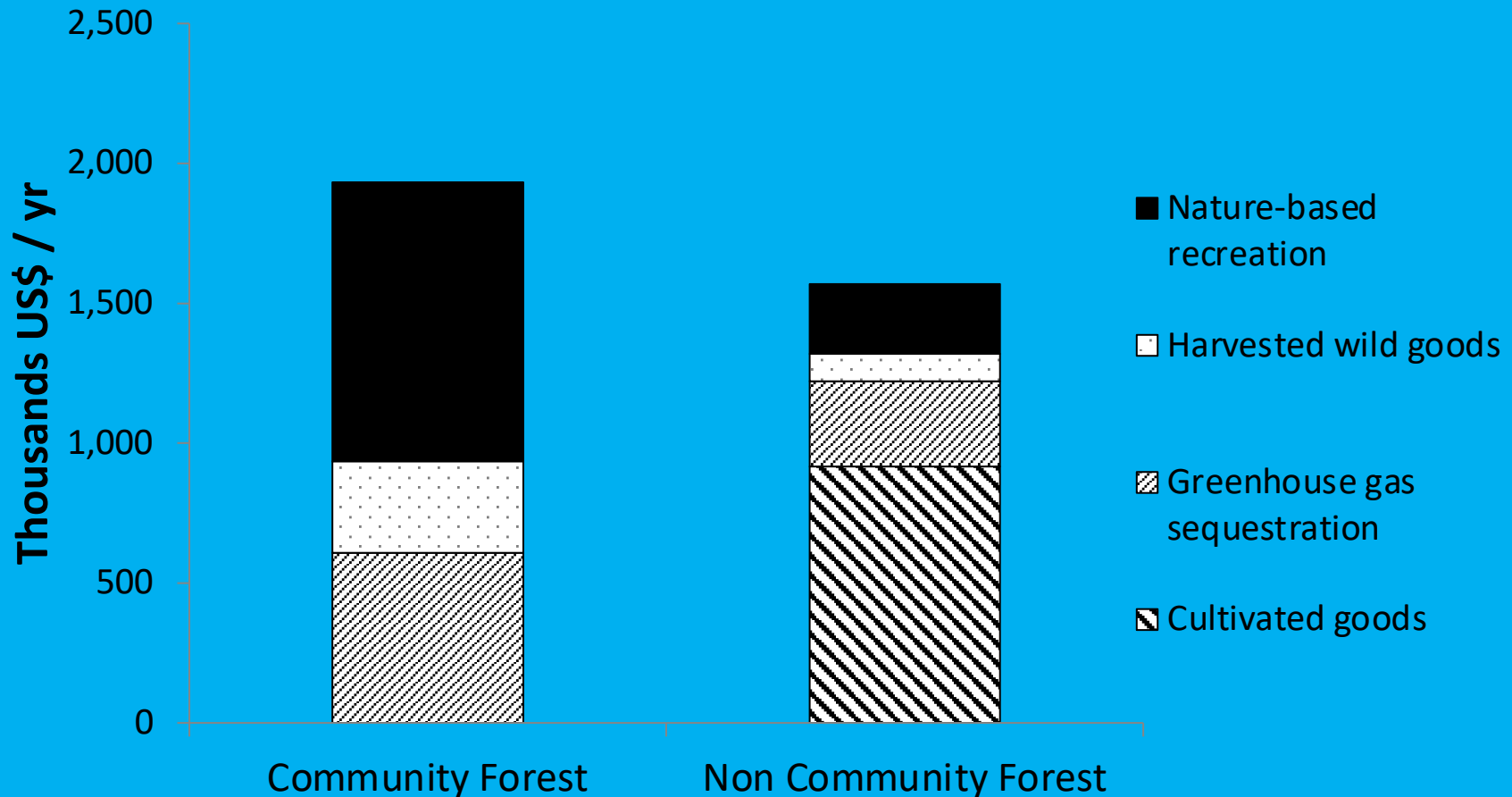
An important step is to continue stakeholder engagement through to the end of the project (and beyond e.g. monitoring).

Invite stakeholders to provide feedback on preliminary results

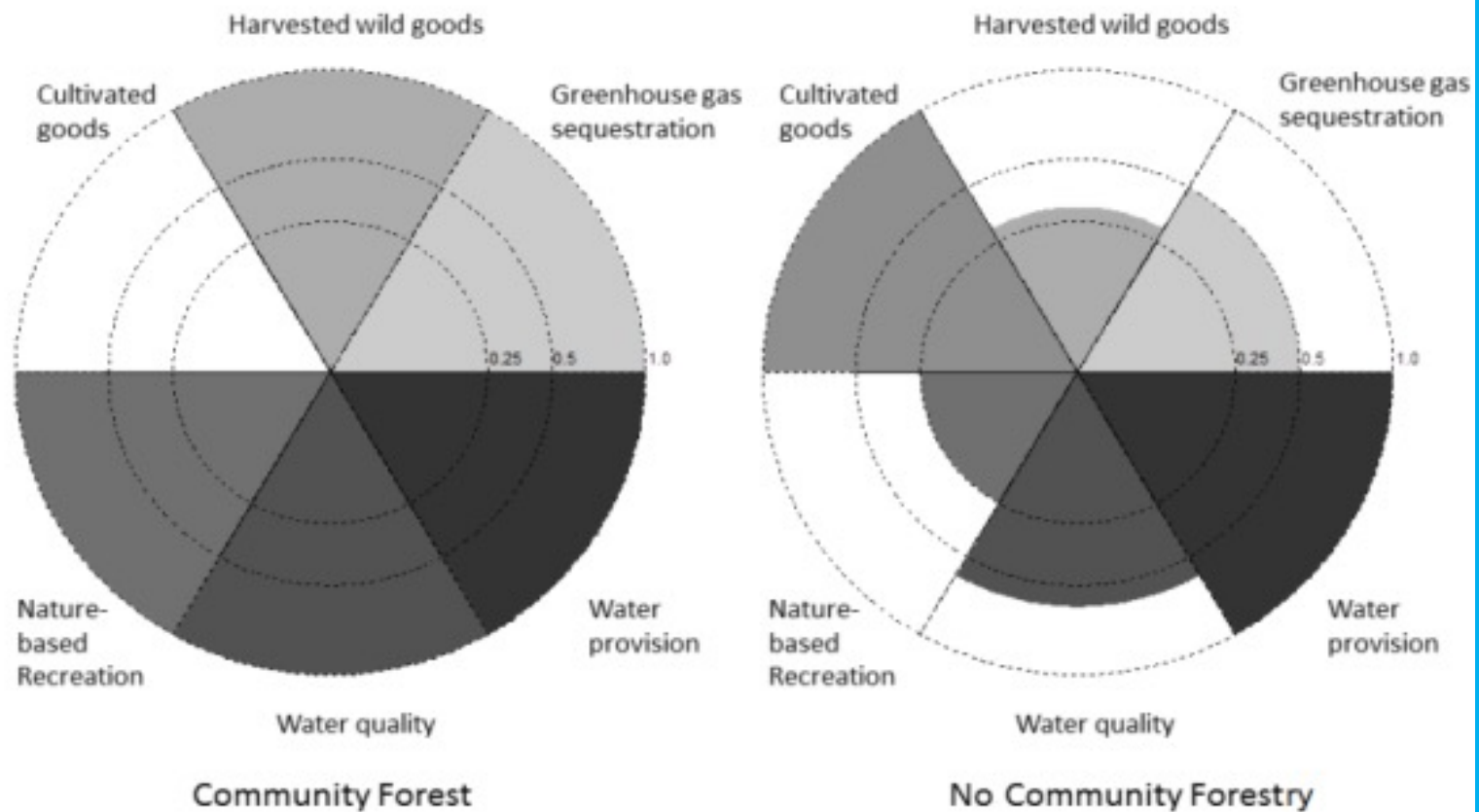
Present results in a suitable format for the target audience

Example 1

Bar chart showing the net difference between two 'states' of the site (using monetary units)



Example 2



Results in context of balance of services

Example 3

	Location of beneficiaries		
Ecosystem service	Local	National	Global
Change in flows if converted			
Greenhouse gas sequestration	--	--	--
Water provision	=		
Water quality (treatment cost)	-		
Harvested wild goods	--		
Cultivated crops		+++	
Fodder for livestock		+++	
Nature-based recreation	---		
Change in stock if converted			
Carbon storage	--	--	--
Wood products		+++	

The impact of the change in state on different beneficiaries is presented.



TESSA limitations to bear in mind

- Limited services included
- Does not include values relating to health
- Trade off between cost (time, resources), simplicity, utility vs. in-depth analysis and inclusion of complex factors
- May not provide the answers or the right kind of output you need to aid advocacy for conserving your site

Rapid ecosystem service assessment at **Moeyungyi Wetland Wildlife Sanctuary**, Myanmar (Thiri et al. 2021)



Values of ecosystem services:

1. Stored carbon - \$91.6 million
2. Water provisioning for domestic use - \$7.99 million y⁻¹
3. Irrigation - \$83,400 y⁻¹
4. Flood mitigation - \$458,000 y⁻¹
5. Nature-based recreation - \$73,500 y⁻¹
6. Rice cultivation - \$438,000 y⁻¹
7. Fish - \$15.4 million y⁻¹
8. Lotus stalk - \$19,400 y⁻¹
9. Molluscs (duck feeding) - \$74,900
10. Grass (buffalo grazing) - \$774,000

*Harvested
wild
goods*

*Annual benefits: >\$22 million y⁻¹
(excluding stored carbon)*



Ministry of the Environment



Toolkit for Ecosystem Service Site-based Assessments (TESSA)

For measuring and monitoring ecosystem services at the site-scale
(1-10,000km², 5-25y)



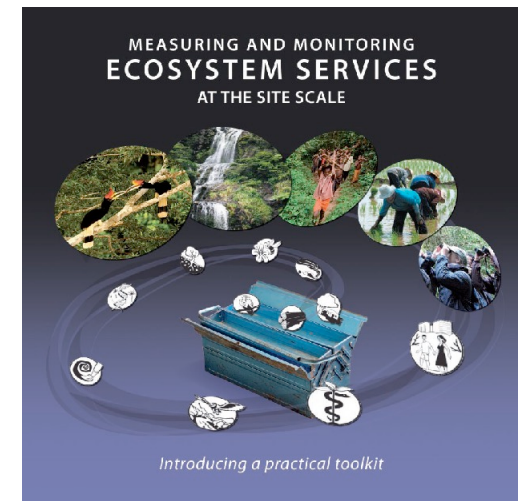
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Types of services covered so far:

1. Global climate regulating services
2. Water services
3. Harvested wild goods
4. Cultivated goods
5. Nature-based tourism + recreation

*Lookup
tables,
models,
direct data*



Tested at >30 sites across the world
£4,000 and 1-3 person-months/site
Mix of biophysical and monetary units

Cambridge**Conservation**Initiative



AXA
Research Fund
Through research protection

Acknowledgements

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Further information

- TESSA is accessible here: <http://tessa.tools/>
- Contact: Kelvin Peh (kelvin.peh@gmail.com)
- Peh et al. (2013) TESSA: A toolkit for rapid assessment of ecosystem services at sites of biodiversity conservation importance. *Ecosystem Services* 5, 51-55 <http://dx.doi.org/10.1016/j.ecoser.2013.06.003>