# Introduction to Ecosystem Services Assessment
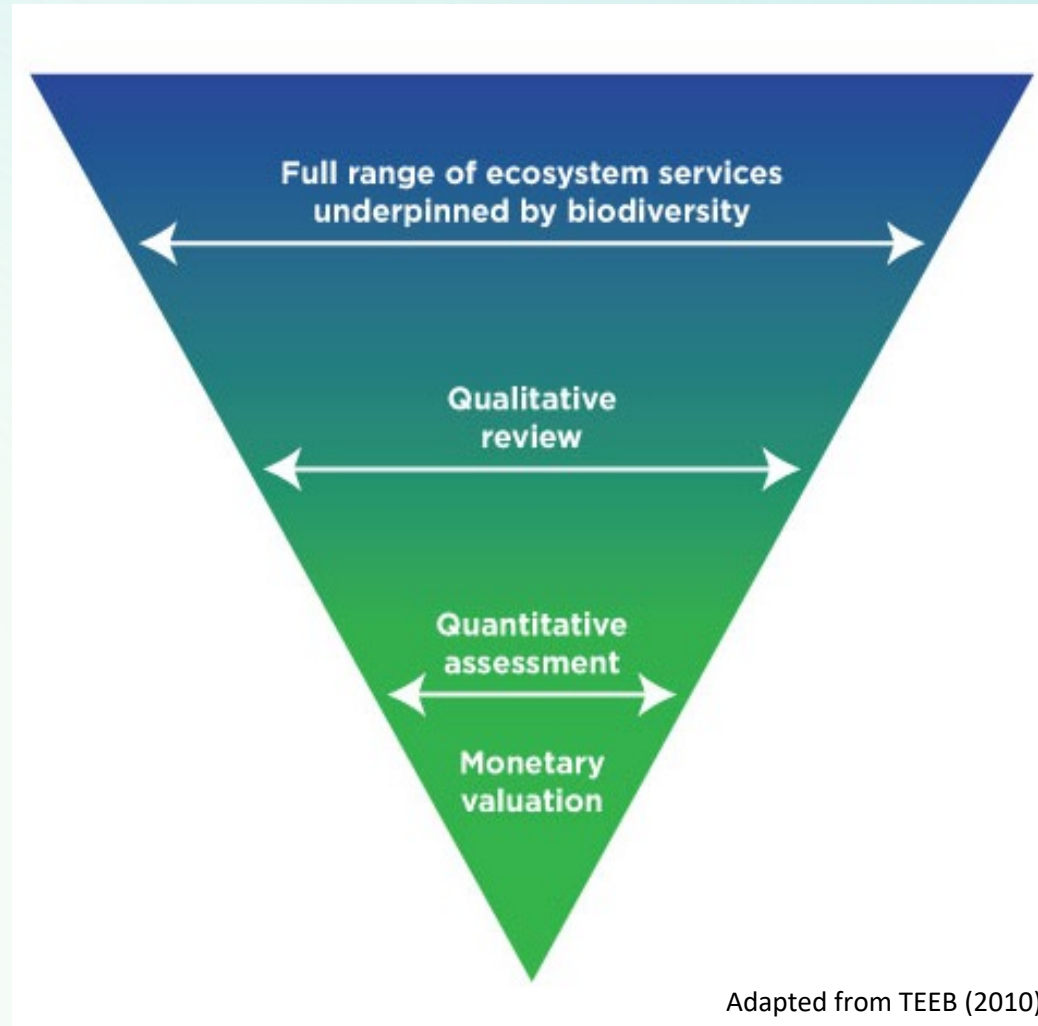
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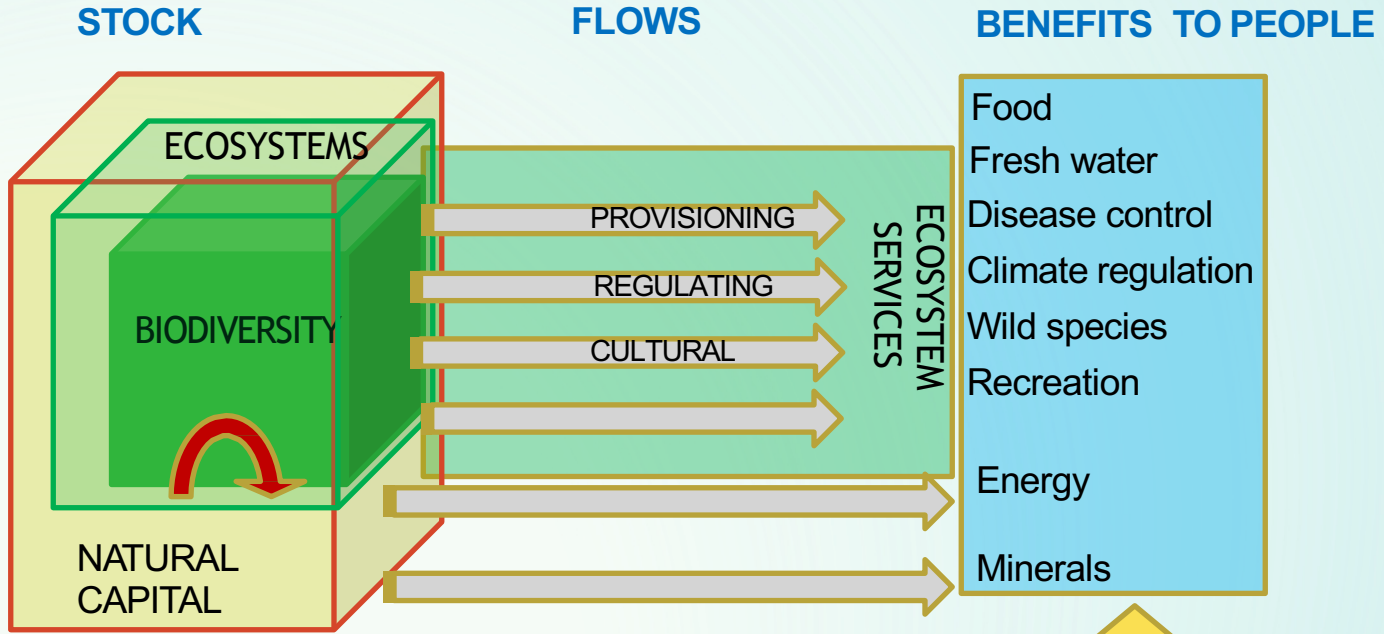
# Economic valuation of ecosystem services (ES)

**PRO**: Frequently used to present ecosystem value in a policy-relevant and accessible way (leverage into decision-making)

**PRO**: Can use a range of methods to assess the value and relative importance of the full range of ES underpinned by biodiversity

**CON**: Can only capture some of the total value of ecosystems

Full range of ecosystem services underpinned by biodiversity

Qualitative review

Quantitative assessment

Monetary valuation

Adapted from TEEB (2010)

# Natural capital



STOCK      FLOWS      BENEFITS TO PEOPLE

ECOSYSTEMS

BIODIVERSITY

NATURAL CAPITAL

PROVISIONING
REGULATING
CULTURAL

ECOSYSTEM SERVICES

Food
Fresh water
Disease control
Climate regulation
Wild species
Recreation

Energy

Minerals

Natural capital is a stock, from which people derive benefits. One subset of the stock of natural capital is ecosystems, and the benefits are then called ecosystem services

Other capital inputs

# Natural capital framework
(Bateman and Mace, 2020)
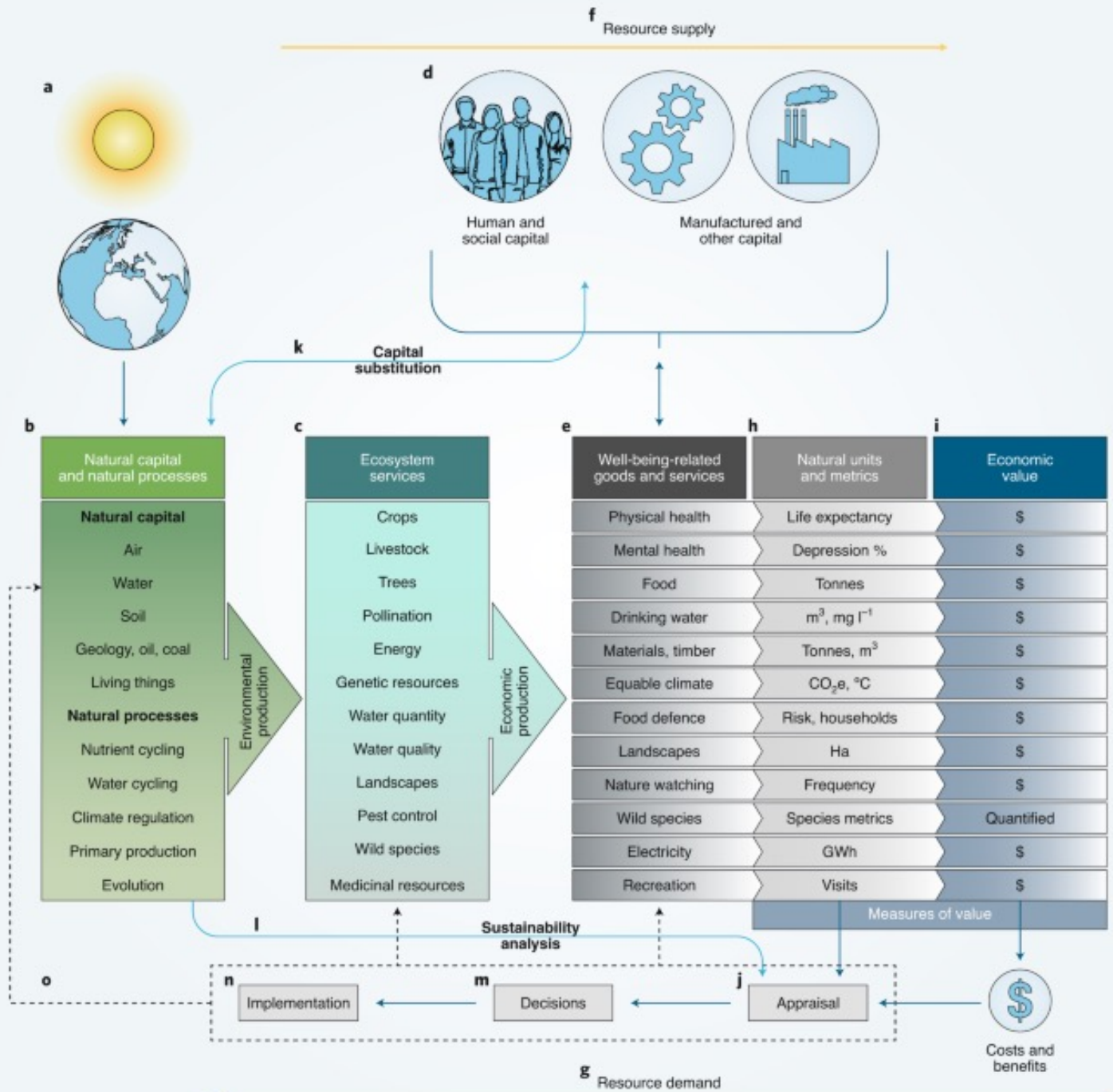
# Toolkits for ES assessment

Two types of tools:

1. Written step-by-step tools:
   - Written guidance documents with specific measurement protocols
   - ES assessment of one site
   - e.g. TESSA

2. Computer-based modelling tools:
   - Software or web-based tools
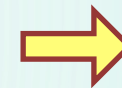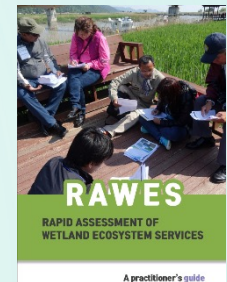   - ES assessment of one or more sites

# TESSA is a flexible framework

- Practical and yet provide robust local-relevant data

- Suitable for non-experts (limited capacity and knowledge)

- Generic – applicable in all contexts

- Welcome "add-ons" and other complementary methods



**147 priority sites**

tessa

**RAWES**
RAPID ASSESSMENT OF
WETLAND ECOSYSTEM SERVICES

A practitioner's guide
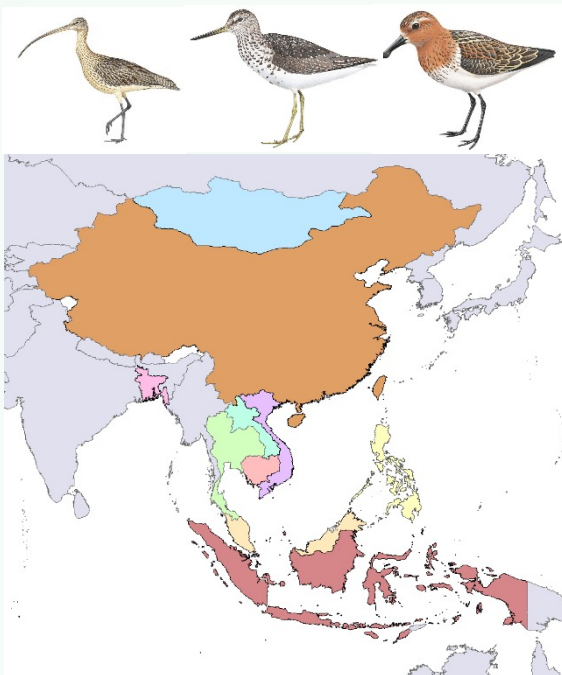
**InVEST**
integrated valuation of
environmental services
and tradeoffs

Recommended documentation for
ecosystem services delivered by Key
Biodiversity Areas

*Prepared by the SNAPP working group on Ecosystem Services and Key
Biodiversity Areas*

**T**oolkit for **E**cosystem **S**ervice **S**ite-based **A**ssessment

# A collaborative contribution:



The Toolkit for Ecosystem Service Site-based Assessment has been developed by

# Piloting, feedback, development, and improvement:

# TESSA applications worldwide



Number of downloads (2021): >4,900
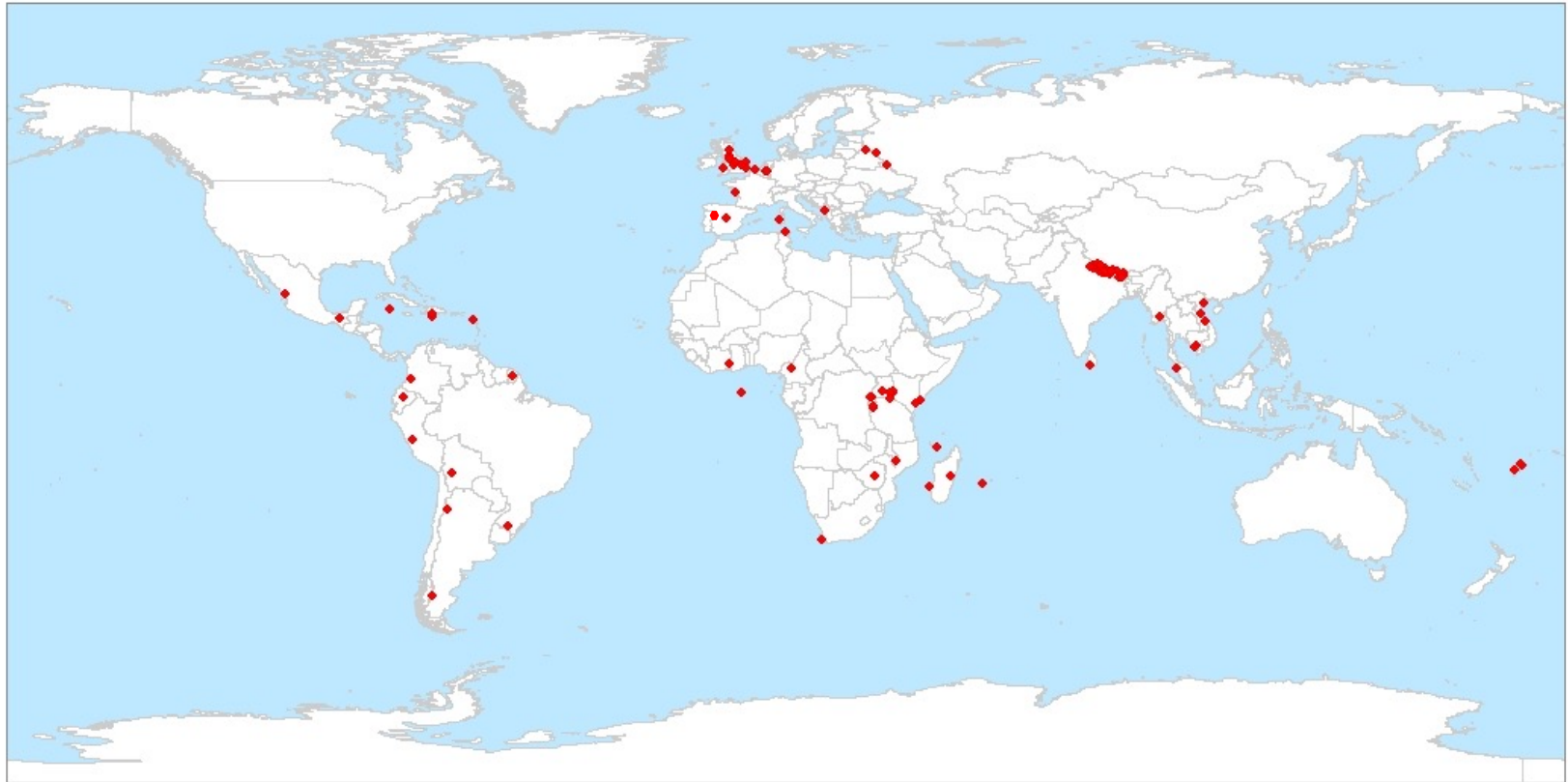
Legend
- TESSA Project Sites

Produced by the Information Management Division, BirdLife International, February 2019

Hatch group page : TESSA Publications and Case Studies

# TESSA users

- Conservation practitioners (first target)
- International NGOs, local NGOs, government officials
- Natural resource managers: forestry, fisheries, water managers, land use planners, development organizations, researchers, etc.
- The private sector

# Key concepts and principles of TESSA

- Relatively rapid framework

- Practical step-by-step guidance on how to understand, assess, and monitor ES

- Scientifically robust data to influence management, policy- or decision-making (and for monitoring)

- Helps non-experts with limited capacity to value and compare multiple ES

- Involves stakeholders and beneficiaries

# Key concepts and principles of TESSA (cont.)

- For all terrestrial and wetland ecosystems

- For use in developed and developing countries

- Impacts of change: estimates difference between current state and plausible alternative state(s)

- Identifies:

  - **ES** (and stocks of natural capital) significant at a site

  - **Data** needed to measure them

  - **Methods** or sources that can be used to obtain the data

  - How to **communicate** the results

# ES included in TESSA v3.0



Global climate regulation

Water (provision, quality)

Harvested wild goods

Cultivated goods

Cultural

Coastal protection

Pollination

Nature-based recreation
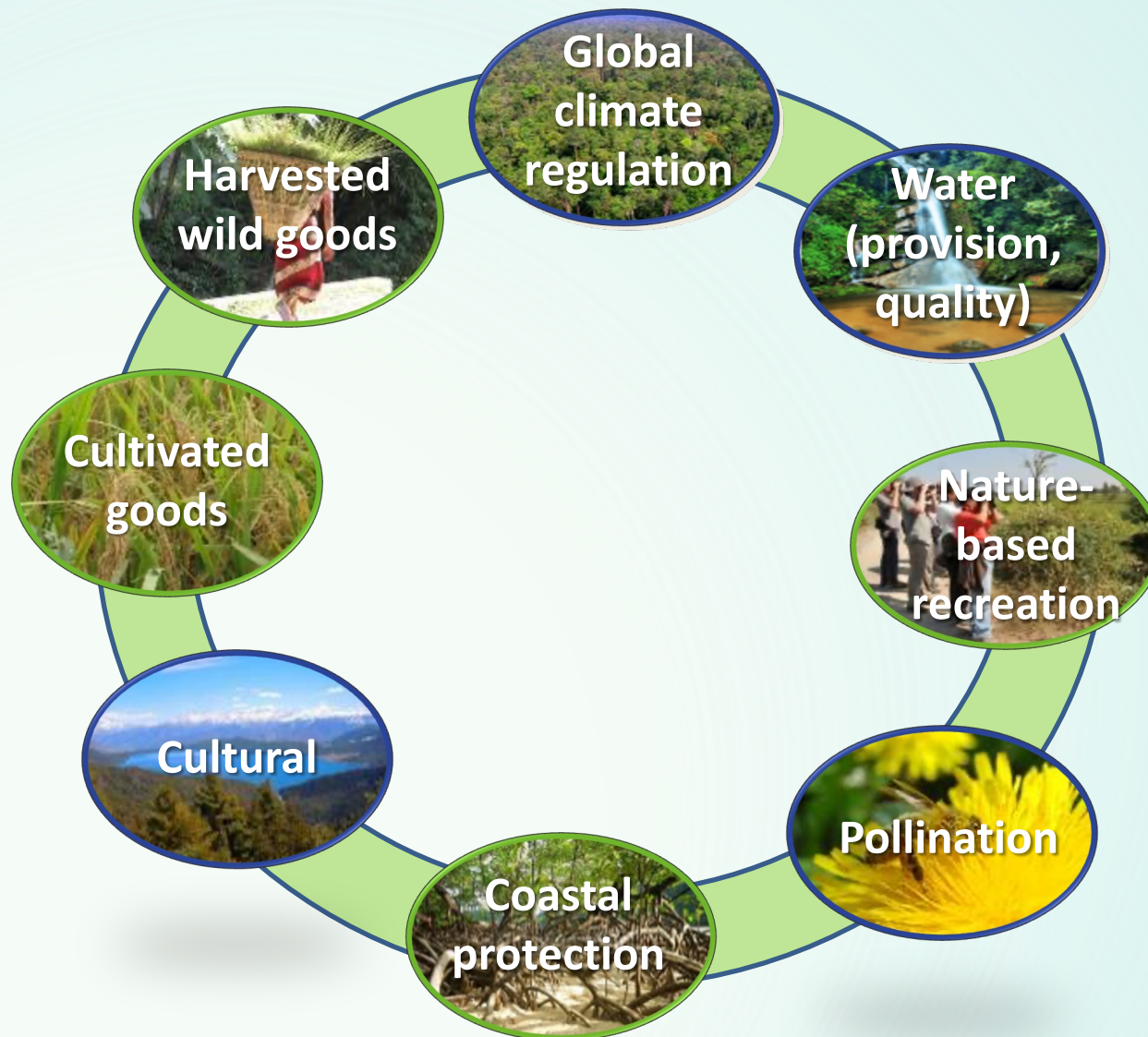
# Practical methods available

**Simple & rapid**

**Optional**

|  | Nature-based recreation | Pollination | Coastal protection | Cultural |
|---|---|---|---|---|
| **Biophysical / quantitative methods** | Expert interviews | Dependency ratios | Mapping / visual inspection / GPS | Questionnaires / surveys |
|  | Published data | Desk-based methods | Literature / databases / numerical models | Interpretative drawings |
|  | Visitor surveys / census | Visitation rates | Sediment traps / marker horizons | Photo voice / Storytelling |
| **Economic Valuation methods** | Visitor spend | Exclusion experiments | Damage reduction | |
|  | Travel cost | | | |
|  | *Benefits transfer* | | | |

# Assessing the impact of change

**Current state**

**Alternative state**



CHANGE

100% Native forest

95% Subsistence agriculture
5% Secondary Forest

# Why comparative valuation of multiple ES?

- Simple assessment of the gross values of a particular service is less useful:
    - Relative values give decision-makers an idea of the <u>net consequences</u> of decisions

- Understand the impacts of management or land-use change on ES delivery

- Influence decision-making and promote efficient planning

- Preserve ES & their associated benefits people rely on

- Inform on human well-being & biodiversity conservation objectives

# Comparative valuation of ES

**Shivapuri-Nagarjun National Park, Nepal**



Current state

(A) Protection

Alternative state

(B) No protection

(C) One-off changes in stock
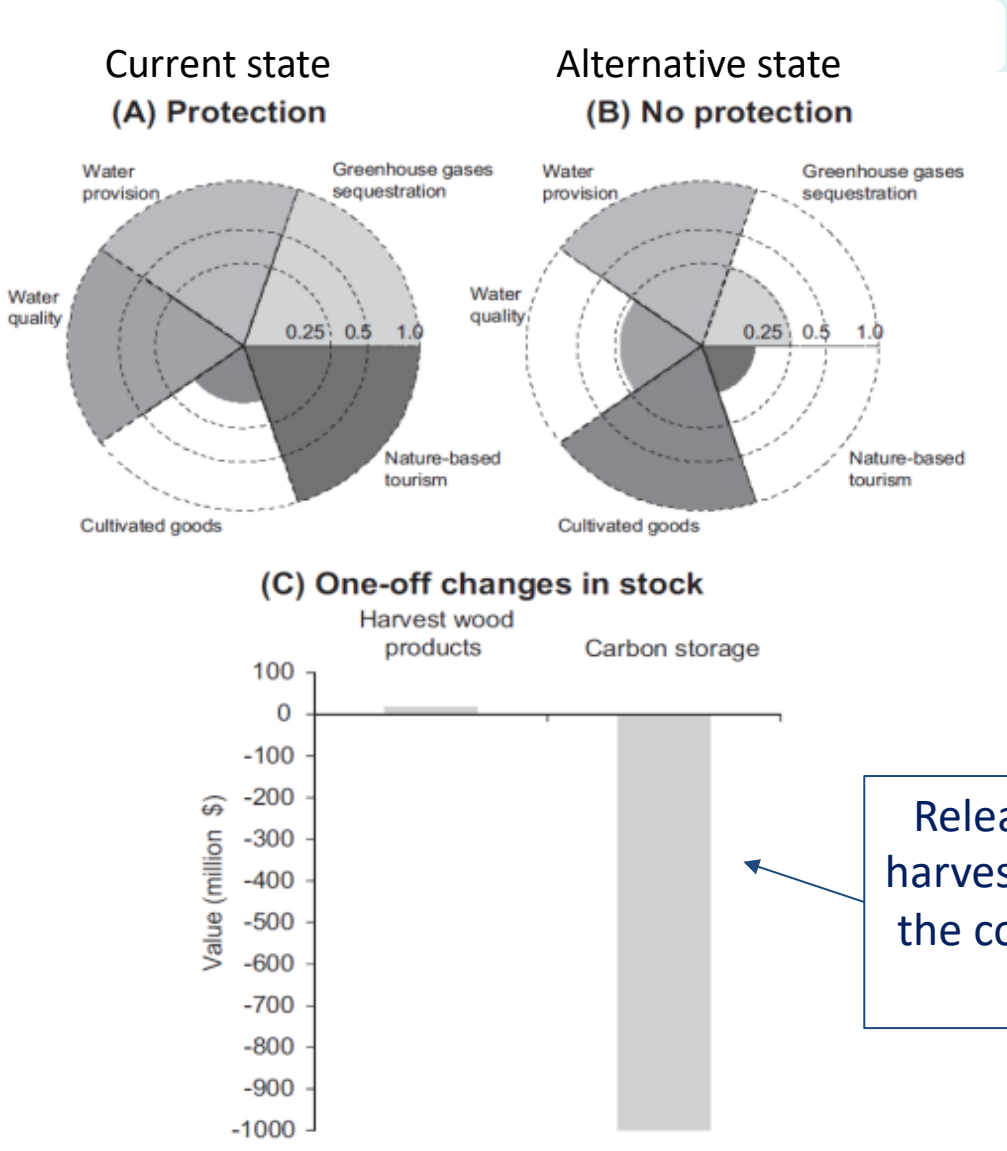
**Net monetary benefit was estimated at $11million/year**

Release of carbon and use of harvest of wood product during the conversion from Protected to NON-protected

Peh *et al.* (2016) / Ecosystem Services 22: 359-369

# Steps of TESSA

Qualitative assessment
Create/gather LULC of the site
Identify Key Stakeholders

Workshops/Meetings: Preliminary Scoping appraisal

Identify the foreseeable change of the site

Select methods for the ES assessment

Field collection / Secondary data

Analysis of biophysical and economic values
Communication of results

**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
Cultivated goods

Cultural services
Global climate regulation

Harvested wild goods
Nature-based tourism

Pollination
Water services

**Step 6.**
Analyse and communicate the results

Presenting and Communicating results

Stakeholder engagement

Qualitative +++
Quantitative +

Qualitative +
Quantitative +++

Quantitative +++

# TESSA also includes:

- Decision trees (flow charts)

- Detailed methods

- Worked examples

- Additional Guidance (templates)

- Section on data synthesis

# Importance of stakeholder engagement

- TESSA encourages stakeholder engagement throughout the process from Step 1 through 6

- Guidance on how to identify and engage the appropriate people

- Engagement throughout the process built strong relationships invaluable for the project(s), improves information flow, and fosters ownership

# Importance of beneficiaries

- An ES only exists if someone derives benefits from it

- Social, political, economic, and ecological factors play a role in the **distribution of benefits**, and the **impacts of change.** These may not be equitable

- Essential to **understand who the beneficiaries are** so that the full consequences of changes in ES can be assessed

# Case study: Moeyungyi Wetland Wildlife Sanctuary, Myanmar



Location Map of Moeyungyi Wetland Wildlife Senctuary
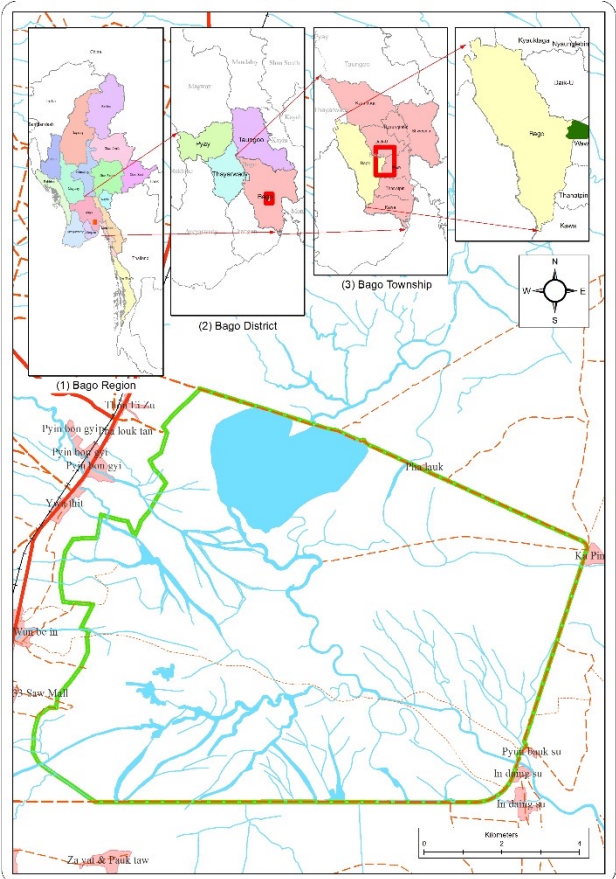


## Benefit

**Water : $ 8.5 million/year**
Irrigation water is worth $83,400/year
Domestic use of water is worth $7,987,000/year ($1,280/household/year)
Flood protection function to the downstream region is worth $458,000/year

**Harvested Wild Goods : $ 16.2 million/year**
Fish production of the wetland is worth $15,360,000/year ($3,360/household/year)
Buffalo grazing and molluscs for duck food in the wetland is worth $774,000/year and $75,000/year, respectively. Lotus stalk harvest for waving textile is worth $19,000/year

**Cultivated Goods : $ 0.4 million/year**
Rice production inside the sanctuary is worth $438,000/year ($548/ha/year)

**Nature-based Recreation : $ 0.07 million/year**
Foreign and domestic tourists and visitors pay a travel cost equal to $74,000/year

**Carbon Storage : $ 91.6 million**
The benefit of global climate regulation from the carbon stored in the wetland is $91,595,000. This is an one-off stored value, i.e. not an annual value.

## Cost

**GHG Emission : - $ 3.1 million/year**
Paddy fields release CO2, Methane and Nitrous which accelerates climate change. The cost of these are $3,136,000/year.

**Management Cost : - $ 0.02 million/year**
The management cost of the sanctuary is about $22,000/year and this is used for various activities such as monitoring and controlling the use of the resources, awareness raising for conservation etc.

**Net Benefit $ 22.1 million/year**
**Plus $ 91.6 million of carbon storage function**

# THANK YOU

More information: https://birdlife-hatch.org/topics/30877/feed

Enquiries: tessa@birdlife.org

Version 3.0 available to download: http://tessa.tools

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

ADB HQ on 27–30 June 2023