TESSA: A toolkit for rapid assessment of ecosystem services

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30 years from now?
Background to the project

• Much ecosystem services work - either global or regional often producing sophisticated maps that may or may not relate well to the situation on the ground.

• This toolkit focuses on the site-scale to respond to the need to bring this type of work down to the operational scale (e.g. a mountain, a reserve) using information gathered locally.
Background to the project

“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:

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

• 3 workshops in Cambridge with 50+ experts engaged
• 30 external reviewers of first draft
• >10 pilot sites (globally distributed)
• Regular steering committee meetings
• Support to others (BirdLife Partners, training...)
TESSA: An Introduction

TESSA guides non-specialists through a selection of accessible, low-cost methods, to identify the ecosystem services that are important at a site, and evaluate the benefits that people get now, compared with those expected under alternative land-uses.

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A rapid assessment tool to understand how far conserving sites for their biodiversity importance also helps to conserve...rapidly and cheaply but also robustly. Used to estimate difference between current state and plausible alternative(s).

**Design**

**Step 1: Preliminary work**
- Define site
- Define objective
- Policy context

**Step 2: Rapid appraisal**
- Identify stakeholders
- Identify habitats and drivers of change
- Identify services and beneficiaries

**Step 3: Determine alternative state**
- What issue do you want to address?
- Matching sites
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**Design**

**Step 4: Methods selection**
- Select relevant services to assess
- How to assess alternative state
- Select method for each service

**Step 5: Collect data**
- Collect/collate data for current state
- Collect/collate data for alternative state

**Step 6: Analysis and communicate results**
- Compare current and alternative states
- Communicate messages
Design

• Designed as a decision key
• A series of steps or questions
• Specific guidance on methods for assessing services
• Methods range from
  – collecting new data from local field surveys or stakeholder workshops
  – to using existing datasets or published studies to extract site-relevant information
• In every case, the methods and guidance will be adapted to suit the local context
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Fisher et al. 2009

**Distribution of benefits**

1. \(S,B\)
2. \(S\)
3. \(S, B\)
4. \(S, B\)

\(S=Service\)
\(B=Benefits\)

Fisher et al. 2009
Scope

- Harvested wild goods
- Water-related services
- Nature-based recreation
- Cultivated goods
- Global climate regulation
Middleton lakes quarry

Wicken Fen / Ouse Fen wetlands

Belarus peatlands

4 Important Bird Areas in Nepal

Cambodia wetlands

Vietnam forest of hope

Coffee plantation Cameroon

Grasslands in Zimbabwe

Malawi

Coastal mangroves, Madagascar

Burundi

Kenya and Uganda

Ecuador paramo grasslands

Mastic forest, Grand Cayman

Fiji permanent forest estates

Various upland, freshwater wetland and coastal RSPB sites

Tropical forest and mining India
Water services
Water services

• Flood protection
• Water quality
• Water quantity provision
Flood protection

Does the site store water or flood at any time during the year?

- Use Water M1 & M3.A
- Ignore this section

Is there information on water levels for the site or for the rivers that flow into and out of the site?

- Yes
  - Use Water M1
  - Calculate flood protection using existing data
- No
  - Use Water M3.B
  - Estimate flood protection service Qualitatively
  - Or
  - Use Costing Nature for a mapped estimate of the flood protection service and beneficiaries
- Use Water M2
Approaches

• Obtain information on flooding, water use and water quality from stakeholder meetings

• Use hydrological data e.g. water level data, maps, reports, hydrographs

Reduced flows following dam construction on the Savannah River, US in 1954 (from Richter and Thomas, 2007)
Water quality

Are there obvious inflows and outflows from the site?

Yes → Does anyone use water from the site for domestic purposes?

No → Ignore this section

Yes → Use Water M1

Is your site a wetland or on sloping terrain?

Wetland → Use WaterWorld to estimate sediment retention (using sediment deposition output) or WaterWorld to assess site's contribution to removal of contaminants (using human footprint on water quality output)

Sloping terrain → Use Water M5.B

Is there an input of nutrients, other pollutants or sediment, as a result of human activities, into your site from upstream?

Yes → Calculate if the site is improving water quality

No → Use Water M1

Ignore this section
Approaches

• For wetlands: water testing (over time) or existing data

• For hillslopes: use ‘WaterWorld’ (more on this tool later)
Water quantity provision

Do people use water from the site for domestic or industrial purposes?

- **Use Water M1**
  - **No**
    - Ignore this section
  - **Yes**
    - Do data exist on the amount of water used by people from the site?
      - **Yes**
        - Use Water M1 & M4.A
          - Calculate water use using existing data
          - Use Water M4.A
      - **No**
        - Use Water M4.B
          - Estimate water use using household surveys
            - Or
            - Use Water World to estimate urban water use from the site where beneficiaries are in an urban area
          - Use Water M4.C
Approaches

• Use existing data (often available where water is piped)
• Interview water users (more rural locations)
• Modelling system ‘WaterWorld’

One of the key issues relating to water provision is not ‘how much’ but ‘when’ e.g. regulation. 

*Too much or Too little*
Global climate regulation
How are carbon stocks estimated?

1. Reference to IPCC standard tables
2. ‘Transfer’ of values from similar sites
3. Simple field surveys to quantify the volume of vegetation in different habitats
Some notes on the price of carbon

• There is no ‘right’ price for carbon
• Values range from $3 per tonne to over $200 per tonne
• Values depend on local context e.g. values used by the Government or published studies from the region
• We use a range of values to show sensitivity
How is TESSA different from other tools?
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Compared to other tools:
• Rapid (median = 39 person days)
• Low cost (median £4,200)
• Primary data collection in most cases not modelling per se
• Low specialist technical knowledge (e.g. no GIS but simple excel/maths needed)
• Relevant to site scale / local decision-making
Limitations

• Does not quantify/measure ‘all’ services but does ‘scoping’
• Other types of value
• Uncertainty
• Ecological tipping points, levels of sustainability, resilience
• How to bring in climate change?
Where next?

- Broadening of services covered
- Providing training
- Web-enabled tool
- Development of a community of users and support forum?
- Assessment of global case studies
- Analysis of the impact of case studies on real world decisions affecting biodiversity conservation
Broadening the coverage of services

- Global climate regulation
- Harvested wild goods
- Water-related services
- Cultivated goods
- Nature-based recreation (includes tourism)
- Coastal protection (forthcoming)
- Cultural services (forthcoming)
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Questions in the concept note

- Adaptability?
- Spatial scale?
- Classification system?
- Labour and infrastructure requirements?
- Linkage to beneficiaries?
Thank you...

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Further information
• TESSA is accessible here: http://www.birdlife.org/datazone/info/estoolkit
• Contact: Kelvin Peh (kelvin.peh@gmail.com) or Jenny Birch (jenny.birch@birdlife.org)
• Peh et al. (2013) TESSA: A toolkit for rapid assessment of ecosystem services at sites of biodiversity conservation importance. Ecosystem Services 5, 51-55