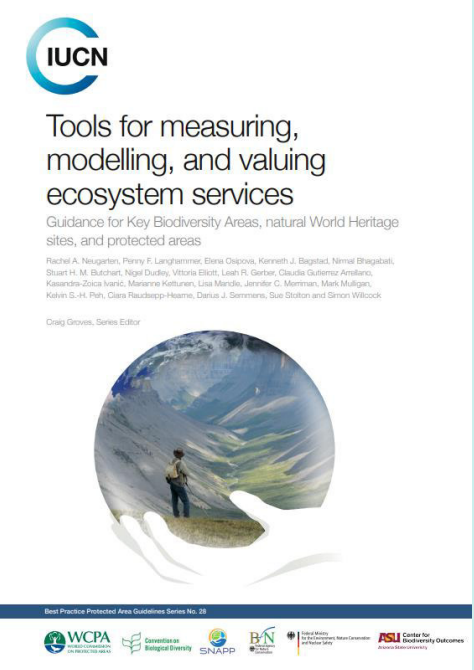
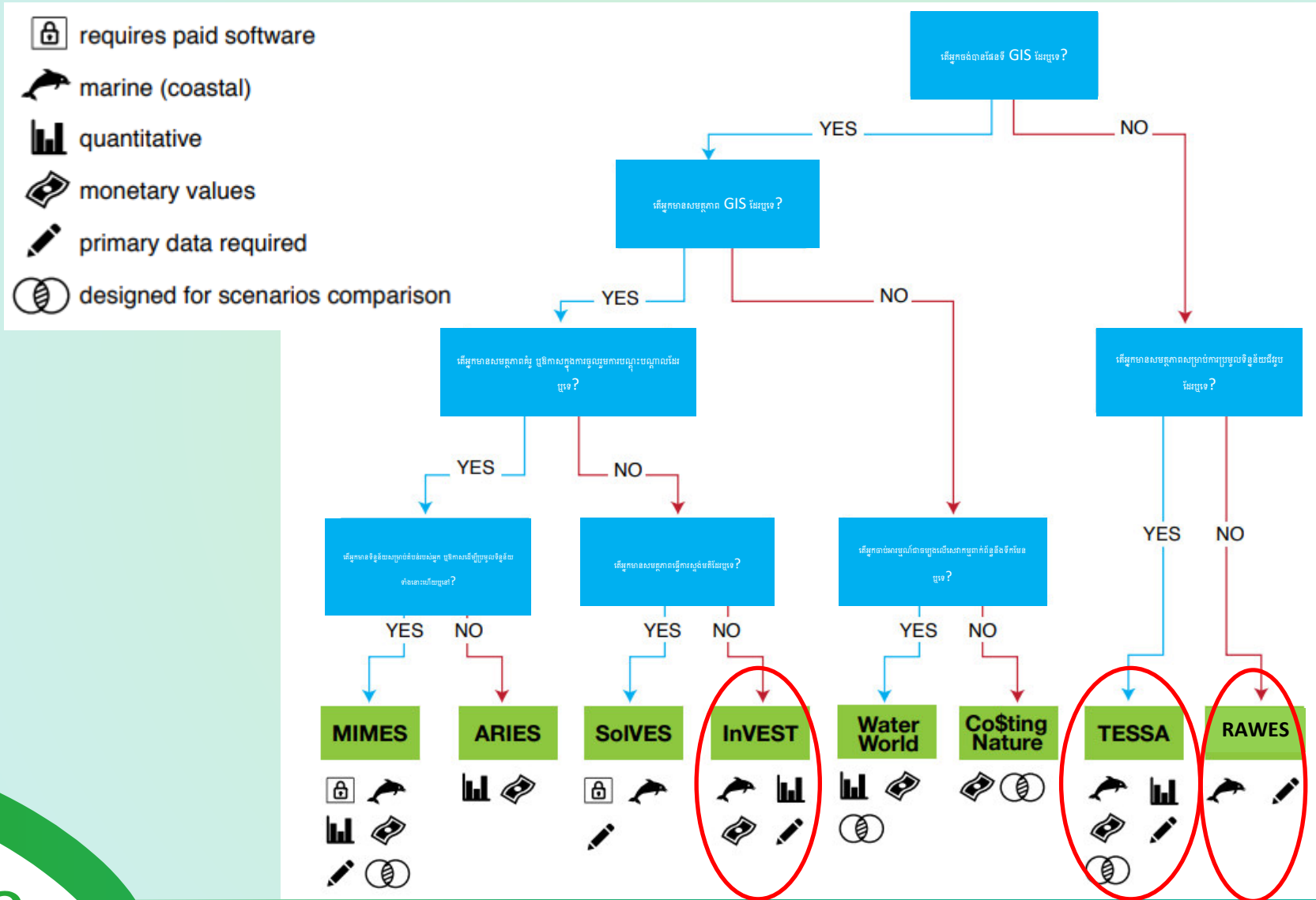


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ត្រូវបានប្រមូលពី Neugarten et al., 2018.
<https://portals.iucn.org/library/node/47778>

ការវាយតម្លៃហ៊ុសលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ីក្នុងតំបន់ដីសើម (RAWES)



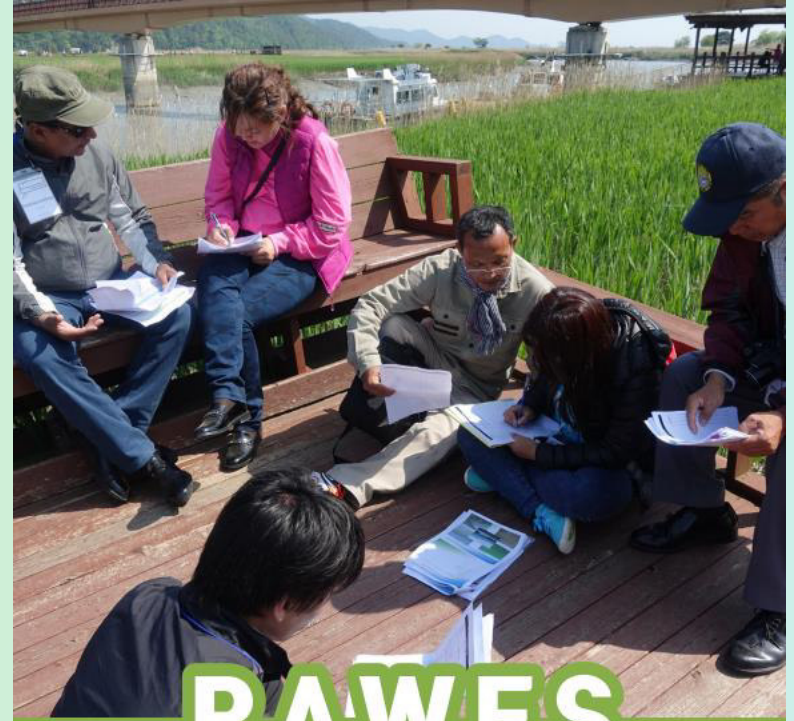
13th Meeting of the Conference of the Contracting Parties to the Ramsar Convention on Wetlands

“Wetlands for a Sustainable Urban Future”
Dubai, United Arab Emirates, 21-29 October 2018

Resolution XIII.17

Rapidly assessing wetland ecosystem services

1. RECOGNIZING that, to achieve the Mission of the Ramsar Convention as described in the Strategic Plan 2016-2024, it is essential that vital ecosystem functions and the ecosystem services that wetlands provide to people and nature are fully recognized, maintained, restored and wisely used and that the need to develop approaches for assessing both ecosystem functions and ecosystem services is recognized;
2. RECALLING that Annex A to Resolution IX.1 on *Additional scientific and technical guidance for implementing the Ramsar wise use concept* defines the ecological character of wetlands as “the combination of the ecosystem components, processes and benefits/services that characterize the wetland at a given point in time”; ALSO RECALLING that the *Guidance for valuing the benefits derived from wetland ecosystem services* (Ramsar Technical Report No.3 / Technical Series No.27 of the Convention on Biological Diversity) provides guidance for valuing wetlands and advice on when and why wetland valuation should be undertaken and sets out a framework for the integrated assessment and valuation of wetland services;
3. NOTING that a priority area of focus for the Convention under the Ramsar Strategic Plan 2016-2024 (Resolution XII.2) is to enhance the information about ecosystem functions and the ecosystem services that wetlands provide to people and nature; ALSO RECALLING Target 11 of the Ramsar Strategic Plan 2016-2024, “Wetland functions, services and benefits are widely demonstrated, documented and disseminated”, and that the assessment of ecosystem services of Wetlands of International Importance (Ramsar Sites) is a key indicator of progress against this target;
4. FURTHER recognizing that, under Resolution XII. 3¹, on *enhancing the languages of the Convention and its visibility and stature, and increasing synergies with other multilateral environmental agreements and other international institutions*, Contracting Parties and other stakeholders are encouraged “to increase their efforts to communicate on the values of ecosystem services of wetlands in other sectors’ strategies, plans and regulations, and integrate them into a basin approach to land-use plans and other relevant local, national and global decisions”;



RAWES

RAPID ASSESSMENT OF WETLAND ECOSYSTEM SERVICES

A practitioner’s guide



ការវាយតម្លៃរហ័សលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ីក្នុងតំបន់ដីសើម (RAWES)

- រាមសារ-ជាក់លាក់
- ជាប្រព័ន្ធ
- រហ័ស
- គុណភាព
- គ្រប់ជ្រុងជ្រោយ

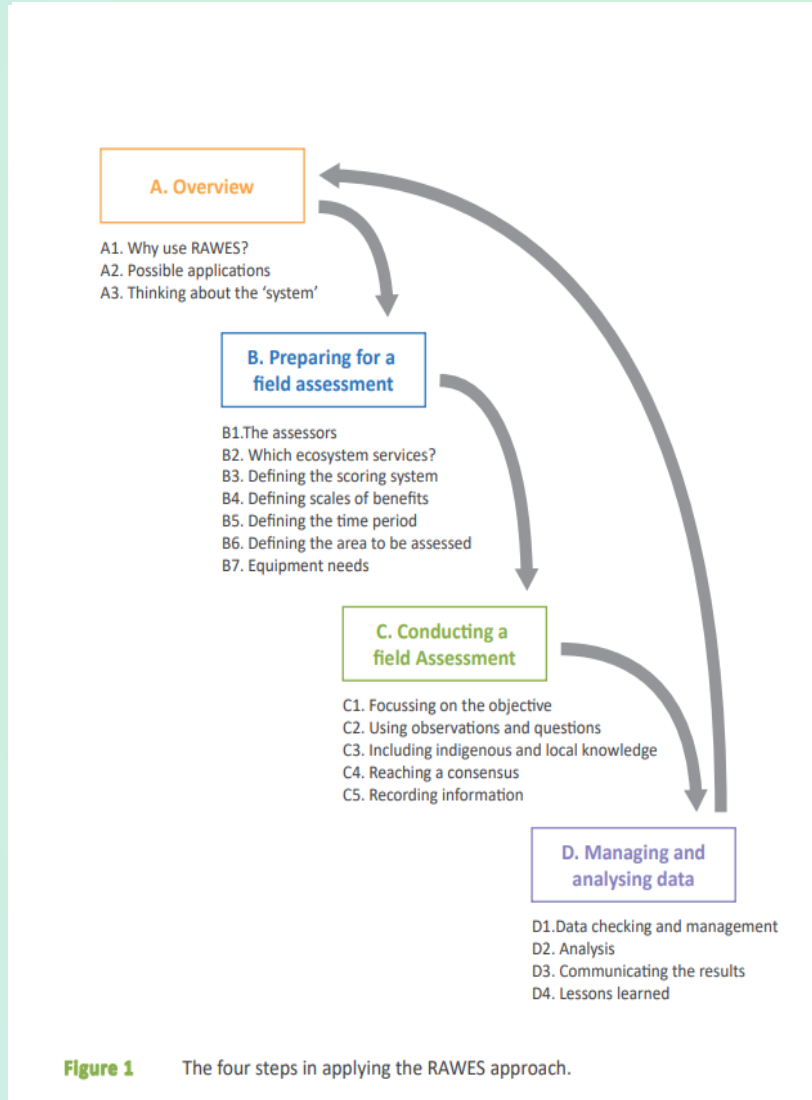
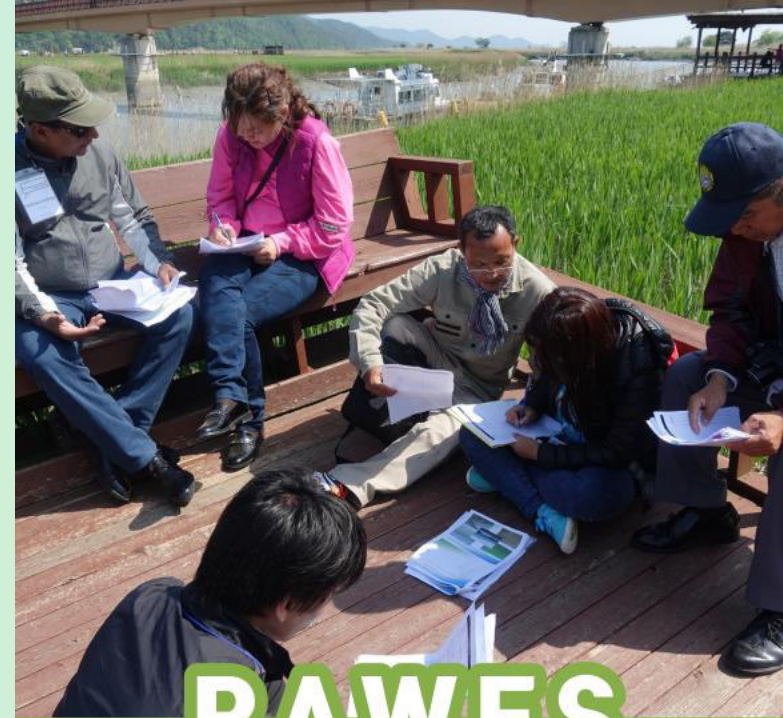


Figure 1 The four steps in applying the RAWES approach.



RAWES

RAPID ASSESSMENT OF WETLAND ECOSYSTEM SERVICES

A practitioner's guide



ការវាយតម្លៃហ្វីសលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ីក្នុងតំបន់ដីសើម (RAWES)

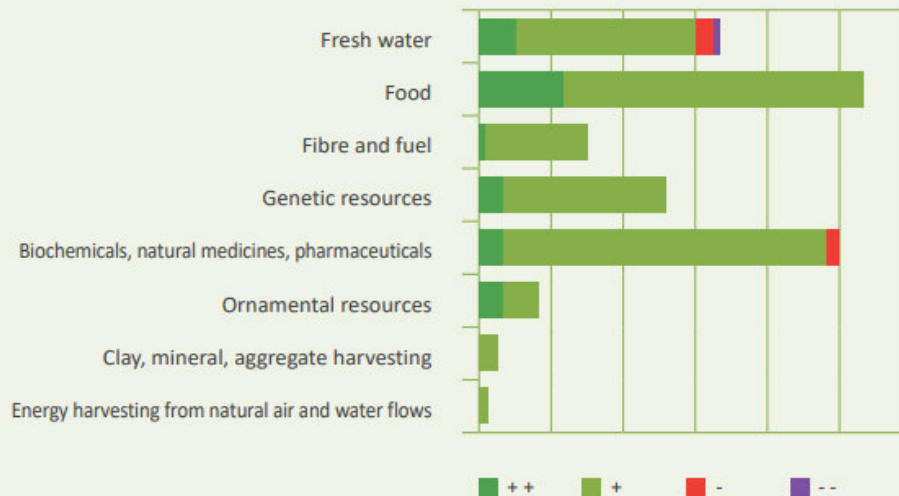
Box 10 UNDERSTANDING THE DIFFERENT ECOSYSTEM SERVICES FROM MULTIPLE WETLAND SITES WETLANDS OF METROPOLITAN COLOMBO, SRI LANKA

Assessments were conducted on 62 different wetland sites across Metropolitan Colombo. Upon completion of the field assessments, the total number of each of the different scores assigned to each ecosystem service was counted. From the count data it is possible to understand which ecosystem services are the most common and widespread across the city, and therefore the main benefits that are being derived from the wetlands.



The graph below shows the results for the provisioning services. The most frequently occurring and most important provisioning service is the production of food, closely followed by natural medicines. For some wetlands, the provision of fresh water was considered a 'disbenefit' due to high levels of pollution.

Rice production in the city of Colombo's wetlands



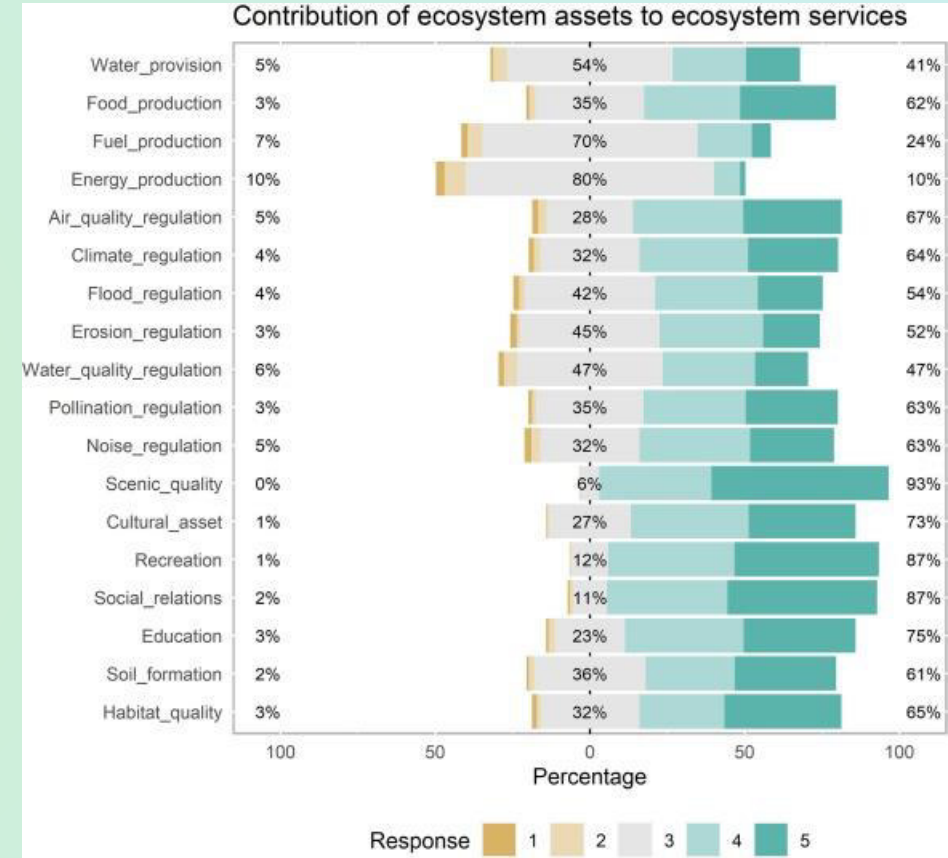
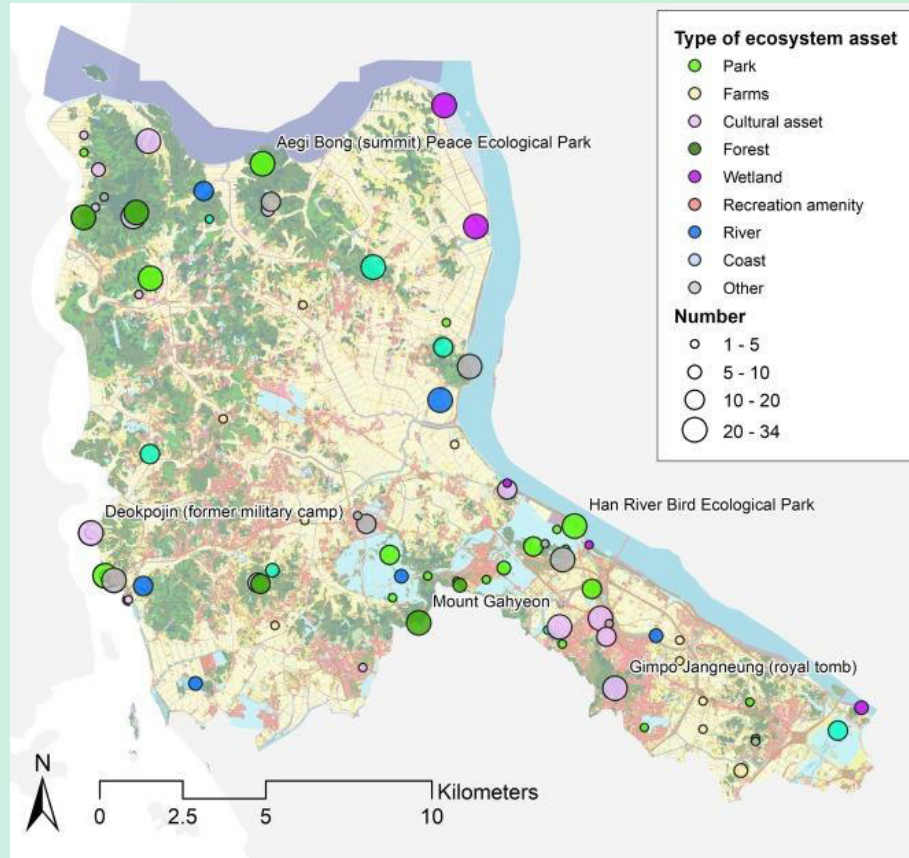
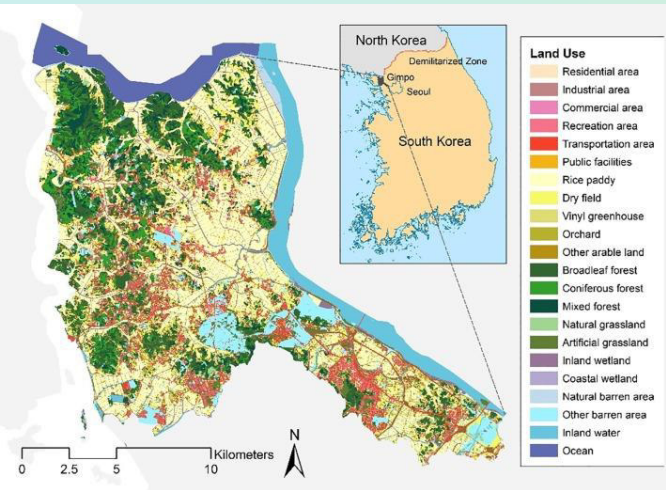
McInnes & Everard, 2017

<https://doi.org/10.1016/j.ecoser.2017.03.024>



ការវាយតម្លៃហ្វីសលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ីក្នុងតំបន់ដីសើម (RAWES)

Kim et al., 2021
<https://doi.org/10.1016/j.ecoser.2021.101337>








ភាពពាក់ព័ន្ធរបស់ **RAWES** នៅក្នុងបរិបទនៃអនុសញ្ញារាមសារ




Ramsar Sites Information Service
2,493 Sites covering 256,759,600 ha



© IUCN

	KOH KAPIK AND ASSOCIATED ISLETS	12,000 ha	Download RIS
	Country: Cambodia Designation date: 23-06-1999 Site number: 998 Published since: 11 year(s)		
	STUNG SEN	9,293 ha	Download RIS
	Country: Cambodia Designation date: 02-11-2018 Site number: 2365 Published since: 4 year(s)		
	BOENG CHHMAR AND ASSOCIATED RIVER SYSTEM AND FLOODPLAIN	28,000 ha	Download RIS
	Country: Cambodia Designation date: 23-06-1999 Site number: 997 Published since: 11 year(s)		
	MIDDLE STRETCHES OF MEKONG RIVER NORTH OF STOENG TRENG	14,600 ha	Download RIS
	Country: Cambodia Designation date: 23-06-1999 Site number: 999 Published since: 11 year(s)		
	PREK TOAL RAMSAR SITE	21,342 ha	Download RIS
	Country: Cambodia Designation date: 02-10-2015 Site number: 2245 Published since: 7 year(s)		

- កម្មវិធី **CEPA**
- ការចណ្តុះចណ្តាលក្រូចអង្គាស (**Mekong WET**)
- បណ្តាញ **IBRRI umbrella**



តើ TESSA គឺជាអ្វី?



ឧបករណ៍សម្រាប់ការវាយតម្លៃផ្នែកលើ

តំបន់ស្តីពីបណ្តាញសេវាអេកូឡូស៊ី



TOOLKIT FOR ECOSYSTEM SERVICE SITE-BASED ASSESSMENT

Version 3.0

Kelvin S.-H. Peh, Andrew P. Balmford, Richard B. Bradbury, Claire Brown, Stuart H. M. Butchart, Francine M. R. Hughes, Lisa Ingwall-King, Michael A. Macdonald, Anne-Sophie Peller, Ali J. Stattersfield, David H. L. Thomas, Rosie J. Trevelyan, Matt Walpole & Jenny C. Merriman.



Partnership for nature and people

តើ TESSA គឺជាអ្វី?

ឧបករណ៍អនុវត្តដោយភាពច្នៃប្រឌិត

វិធីសាស្ត្រចំណាយទាប — ស្វ័យប្រវត្តិបែបបរិទ្យាសាស្ត្រ

ការវាយតម្លៃសេវាកម្មប្រព័ន្ធអេកូឡូស៊ី

អាចឱ្យបុគ្គលមិនមែនអ្នកជំនាញចូលប្រើបាន

ទិន្នន័យជីវូបវិទ្យា និងការវាយតម្លៃសេដ្ឋកិច្ច

មាត្រដ្ឋានតំបន់ធៀបនឹងទេសភាព (100 – 100,000 ហិកតា)

ការវាយតម្លៃលើការផ្លាស់ប្តូរ — ការវាយតម្លៃបែបប្រៀបធៀប

ភាគីពាក់ព័ន្ធ និងអ្នកទទួលបានផល



Partnership for nature and people



TESSA — គោលការណ៍ណែនាំជាជំហាន ៗ

អនុញ្ញាតឱ្យអ្នកប្រើប្រាស់អភិវឌ្ឍការយល់ដឹងអំពីអត្ថប្រយោជន៍ដែលមនុស្សទទួលបានពីធម្មជាតិ និងវាយតម្លៃទៅលើគុណតម្លៃរបស់ពួកគេ ដើម្បីបង្កើតព័ត៌មានសម្រាប់ការសម្រេចចិត្តដោយប្រសិទ្ធភាព។

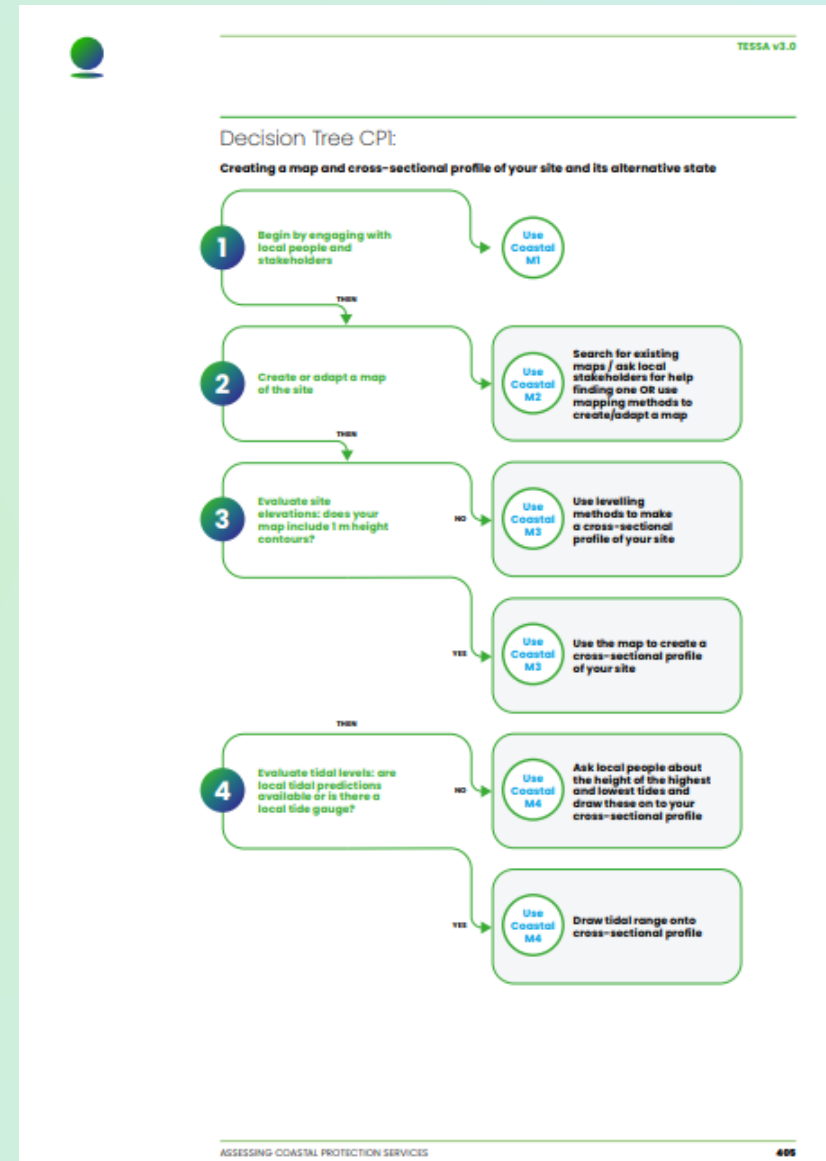
- កំណត់ពីគោលបំណងនៃការវាយតម្លៃ
- សម្រេចចិត្តថាតើសេវាកម្មណាដែលត្រូវផ្តោតទៅលើ
- វិធីសាស្ត្រវាស់វែងសេវាកម្មប្រព័ន្ធអេកូឡូស៊ី
- បង្ហាញ និងផ្សព្វផ្សាយពីលទ្ធផល



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ឧបករណ៍រួមមាន៖

- ✓ ម៉ែកធាងនៃការសម្រេចចិត្ត (តារាងលំហូរ)
- ✓ វិធីសាស្ត្រលម្អិត
- ✓ ឧទាហរណ៍ដែលត្រូវបានអនុវត្ត
- ✓ គោលការណ៍ណែនាំបន្ថែម (គំរូតារាង)
- ✓ ផ្នែកសំយោគទិន្នន័យ



TESSA – គោលការណ៍ណែនាំជាជំហាន ៗ [ត]

ឧបករណ៍រួមមាន៖

- ✓ ម៉ែកធាងនៃការសម្រេចចិត្ត (តារាងលំហូរ)
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- ✓ ឧទាហរណ៍ដែលត្រូវបានអនុវត្ត
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- ✓ ផ្នែកសំយោគទិន្នន័យ

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Recreation Method 3

Estimating consumer surplus of nature-based recreation and tourism at the site using travel cost method

If you want to estimate the economic value of nature-based recreation and tourism to a site but cannot get any secondary information, you can estimate this using the **Travel Cost Method (TCM)**.

ALERT

Travel Cost Method is more complex than other methods in this toolkit so using this method requires users to be confident with statistical analysis, especially regression analysis. If you are not confident with regression analysis, use instead **Recreation M2** to estimate the economic value based on visitor spend.

Important for first-time visitors, otherwise you will not be able to use their data to estimate visit frequency. This is especially important for the Individual Travel Cost Method (see below).

For sites where you do not have another site to collect data for the alternative state, you also need to ask:

How often they would visit the site if it changed to the alternative state.

In this case, you must explain the characteristics of the alternative state clearly (perhaps even show a photograph that represents the key characteristics of the alternative state). For guidance on estimating visit numbers under alternative state, see **Recreation M1**.

ALERT

The example questionnaire in **Recreation Appendix 1: Template questionnaire for nature-based recreation and tourism** is a **template** for guidance only. You will need to amend the questions according to the context of your site.

The questionnaire can be adapted to gather information about how benefits are distributed across different social groups (e.g., on gender, ethnicity, wealth status, age, marital status and education). Data of this sort can be helpful if you choose to apply the individual TCM rather than the zonal TCM.

It is also advisable to identify to whom any monetary value is being distributed i.e., package holidays benefit the holiday

Step 1: Gathering information from visitors

For this method, you need to ask visitors questions to give you data which you can use to estimate the economic value of visits to the assessment site (for the questions, see **Recreation Appendix 1: Template questionnaire for nature-based recreation and tourism**). The key pieces of information that you need to gather from respondents are:

The amount of money that they have spent to visit the site. This can include the cost of travel, entry fees, direct associated spend, and even the equivalent wage value for their time.

How often they visit the site, or how often they expect to visit the site. The latter is especially

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TESSA – គោលការណ៍ណែនាំជាជំហាន ៗ [ត]

ឧបករណ៍រួមមាន៖

- ✓ ម៉ែកធាងនៃការសម្រេចចិត្ត (តារាងលំហូរ)
- ✓ វិធីសាស្ត្រស្តង់ដារ
- ✓ ឧទាហរណ៍ដែលត្រូវបានអនុវត្ត
- ✓ គោលការណ៍ណែនាំបន្ថែម (គំរូតារាង)
- ✓ ផ្នែកសំយោគទិន្នន័យ


TESSA v3.0

Guidance 2. Stakeholder analysis

This section provides guidance on how to identify stakeholders.

Stakeholder analysis is an essential part of engaging with the most relevant people. The easiest way to do this is to complete a stakeholder analysis matrix, seeking input from people who are familiar with the site. This usually uses two axes to define 'importance' of the stakeholder against the 'influence' of the stakeholder.

In filling this in, consider their characteristics (the kind of organisation/person they are) such as:

- Their main interests in the site
- Their main rights in relation to the site (e.g., access)
- Their impact on the site and its services (current and future potential)
- Their dependence on the site and its services (current and future potential)

Example Stakeholder Analysis Matrix

Adapted from: Department for International Development. (1993). Guidance note on how to do stakeholder analysis of aid projects and programmes. London, UK: Department for International Development.

		Importance of Stakeholder			
		Unknown	Little / No importance	Some importance	Significant importance
Influential Stakeholder	Significant influence		C		A
	Somewhat influential				
	Little/no influence		D		B
	Unknown				

Boxes A, B and C are the key stakeholders of the project. The implications of each box are summarised below:

Box A

These are stakeholders with a high degree of influence on the project, who are also of high importance for its success. This implies that the implementing organisation will need to construct good working relationships with these stakeholders, to ensure an effective coalition of support for the project. Examples might be senior officials and politicians.

Box B

These are stakeholders of high importance to the success of the project, but with low influence. This implies that they will require special initiatives if their interests are to be protected. An example may be traditionally marginalised groups (e.g., indigenous people, youth, women), who might be dependent on a site, but who have little 'voice' in its management.

GUIDANCES 527



TESSA – គោលការណ៍ណែនាំជាជំហាន ៗ [ត]

ឧបករណ៍រួមមាន៖

- ✓ ម៉ែកធាងនៃការសម្រេចចិត្ត (តារាងលំហូរ)
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- ✓ ឧទាហរណ៍ដែលត្រូវបានអនុវត្ត
- ✓ គោលការណ៍ណែនាំបន្ថែម (គំរូតារាង)
- ✓ ផ្នែកសំយោគទិន្នន័យ





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



ការអនុវត្តសាកល្បង មតិក្រឡាប់ ការអភិវឌ្ឍ និងការកែលម្អ TESSA

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Short communication

TESSA: A toolkit for rapid assessment of ecosystem services at sites of biodiversity conservation importance

Kelvin S.-H. Peh^{a,*}, Andrew Balmford^a, Richard B. Bradbury^b, Claire Brown^c, Stuart H.M. Butchart^d, Francine M.R. Hughes^e, Alison Stattersfield^d, David H.L. Thomas^d, Matt Walpole^f, Julian Bayliss^{g,h}, David Gowing^g, Julia P.G. Jones^h, Simon L. Lewis^{i,j}, Mark Mulligan^k, Bhopal Pandeya^l, Charlie Stratford^h, Julian R. Thompson^l, Kerry Turner^m, Bhaskar Viraⁿ, Simon Willcock^o, Jennifer C. Birch^d

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ABSTRACT

Sites that are important for biodiversity conservation can also provide significant benefits (i.e. ecosystem services) to people. Decision-makers need to know how change to a site, whether development or restoration, would affect the delivery of services and the distribution of any benefits among stakeholders. However, there are relatively few empirical studies that present this information. One reason is the lack of appropriate methods and tools for ecosystem service assessment that do not require substantial resources or specialist technical knowledge, or rely heavily upon existing data. Here we address this gap by describing the Toolkit for Ecosystem Service Site-based Assessment (TESSA). It guides local non-specialists through a selection of relatively accessible methods for identifying which ecosystem services may be important at a site, and for evaluating the magnitude of benefits that people obtain from them currently, compared with those expected under alternative land-uses. The toolkit recommends use of existing data where appropriate and places emphasis on enabling users to collect new field data at relatively low cost and effort. By using TESSA, the users could also gain valuable information about the alternative land-uses; and data collected in the field could be incorporated into regular monitoring programmes.

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1. Introduction

There has been growing international recognition that the contribution that nature makes to human well-being is often not adequately valued or integrated in decision-making, and that ecosystem services are being eroded as a result (MEA (Millennium Ecosystem Assessment), 2005), with considerable cost to society

(Kumar, 2010). Increasingly, governments are being asked to initiate a range of policy processes aimed at integrating the environment and development, including environmental mainstreaming (UNEP-UNEP (United Nations Development Programme – United Nations Environment Programme), 2009), achieving the proposed Sustainable Development Goals (UNCSD (United Nations Conference on Sustainable Development) Secretariat, 2012) and delivering a Green Economy (ten Brink et al., 2010). In addition, countries have committed to assessing their contribution to the Convention on Biological Diversity's Strategic Plan 2011–2020 by tracking progress against the 20 Aichi Biodiversity Targets

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ARTICLES

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nature sustainability

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The economic consequences of conserving or restoring sites for nature

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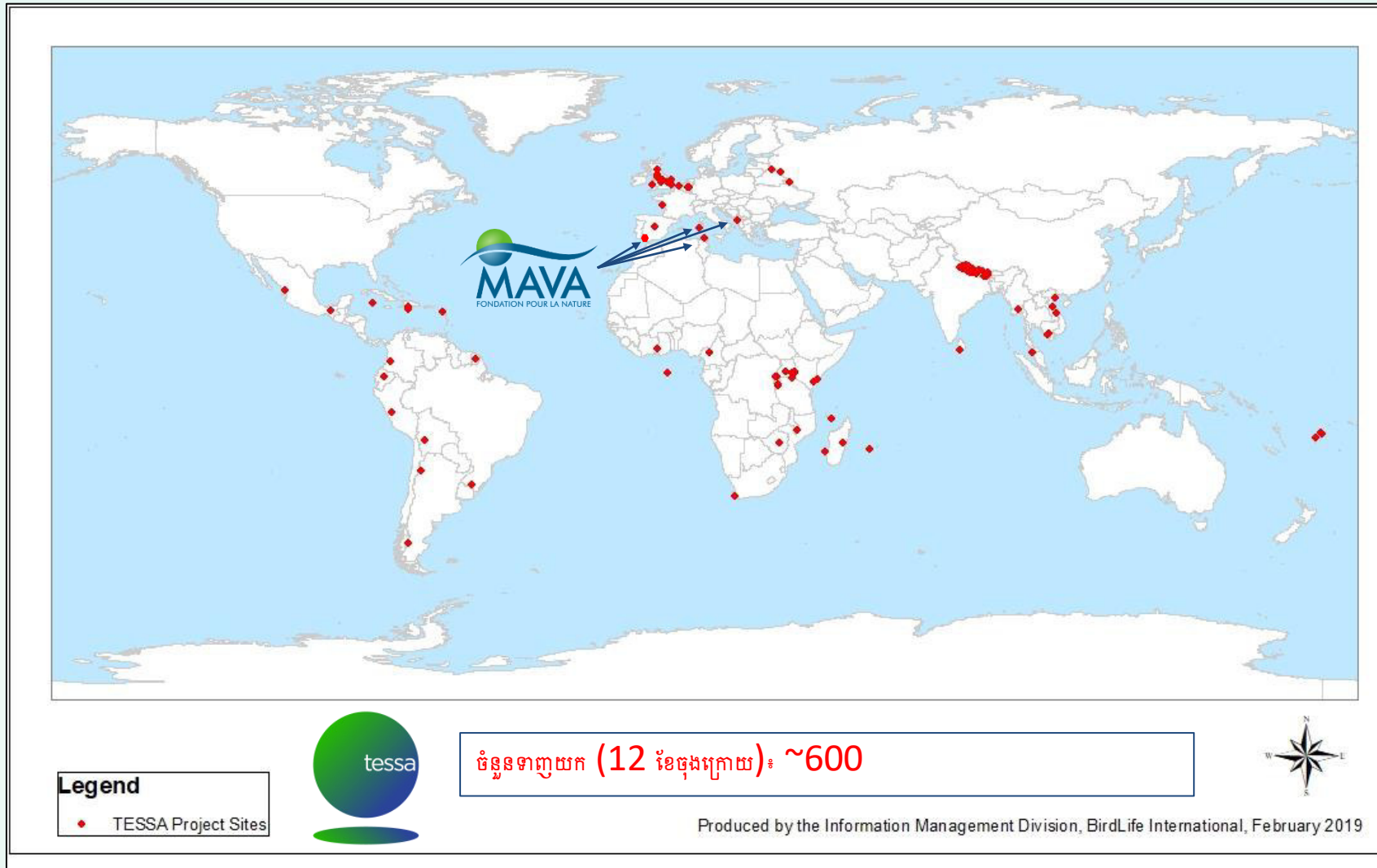
Nature provides many benefits for people, yet there are few data on how changes at individual sites impact the net value of ecosystem service provision. A 2002 review found only five analyses comparing the net economic benefits of conserving nature versus pursuing an alternative, more intensive human use. Here we revisit this crucial comparison, synthesizing recent data from 62 sites worldwide. In 24 cases with economic estimates of services, conservation or restoration benefits (for example, greenhouse gas regulation, flood protection) tend to outweigh those private benefits (for example, profits from agriculture or logging) driving change to the alternative state. Net benefits rise rapidly with increasing social cost of carbon. Qualitative data from all 62 sites suggest that monetization of additional services would further increase the difference. Although conservation and restoration did not universally provide greater net value than the alternative state, across a large, geographically and contextually diverse sample, our findings indicate that at current levels of habitat conversion, conserving and restoring sites typically benefits human prosperity.

Recent decades have seen increasing recognition of the economic and human well-being consequences of degradation of nature^{1,2}. However, the degradation continues, perhaps in part because inadequate steps are taken to ensure that planning and management decisions are informed by estimates of their net consequences for benefits (ecosystem services) to different stakeholders³. Although criticisms of valuation are well rehearsed, from the ethical to the analytical⁴, cost-benefit and cost-effectiveness analyses are demanded in many regulatory contexts and provide a useful, if partial, lens on the impacts of decisions on human prosperity. An early review⁵ found only five site-level studies worldwide comparing the aggregate economic value of flows of ecosystem services delivered by the site when relatively intact with its potential economic value when converted to more human-dominated forms of use. Although tiny, this sample suggested retention of (or sustainably managing) areas of natural habitat typically delivered net economic benefits to people. While striking, this result was almost certainly conservative, given that assessments of service flows at one point in time tend to fail to consider whether those flows can be maintained sustainably into the future⁶. Despite growing understanding of the economic consequences of conserving or restoring nature^{1,2} and development of new tools for ecosystem service assessment^{7,8}, remarkably few additional studies^{9,10} have investigated this key question of the net economic value of conserving (or restoring) individual sites.

A new data synthesis on the net benefits of conservation
 We addressed this lack of evidence by synthesizing data from a relatively large sample of published and unpublished studies that

used the framework of the Toolkit for Ecosystem Service Site-Based Assessment (TESSA; <http://tessa.tools>)¹¹ to develop the earlier review⁵, evaluating the net consequences of plausible changes in habitat state on the benefits provided by particular sites. TESSA provides relatively simple methods, within a consistent framework, for evaluating the difference in ecosystem service flows, in biophysical and (where possible) economic terms, provided by a site under contrasting states. The resulting analyses do not claim to be full economic valuations but do aspire to cover as many of the main services provided by a site as possible, in either state, and always include the services driving state change. The toolkit emphasizes broad stakeholder participation—including those benefiting most from the change in state—to identify the main ecosystem services and plausible alternative land uses and to facilitate local data collection. Our literature review yielded information on 15 sites (13 in International Scientific Indexing (ISI) journal papers) that met our criteria (Methods) for analysis. Unpublished studies provided information from 47 additional sites (Supplementary Data). The combined set of 62 sites spanned six continents (Supplementary Table 1), contrasting (1) a nature conservation state with a more human-modified state (for example, protected area versus conversion to agriculture; 44 sites) or (2) an ecological restoration state with the pre-restoration (human-modified) state (for example, restoration to intertidal habitat versus coastal area claimed for agriculture; 18 sites). Henceforth, we refer to nature conservation and ecological restoration states as 'nature-focused' and the contrasting states as 'alternative'. These studies provided data on multiple services, including the most important private and toll (club) benefits

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[Hatch group page : TESSA Publications and Case Studies](#)



- NGOs អន្តរជាតិ / NGOs / GOs
- អ្នកអនុវត្តកិច្ចការអភិរក្ស (គោលដៅដំបូង)
- ព្រៃឈើ ជលផល អ្នកគ្រប់គ្រងទឹក អ្នករៀបចំផែនការប្រើប្រាស់ដីធ្លី អង្គការអភិវឌ្ឍន៍ អ្នកស្រាវជ្រាវ។ល។
- ការពង្រីកទៅដល់អ្នកប្រើប្រាស់ជាលក្ខណៈក្រុមហ៊ុន



TESSA ប្រៀបធៀបជាមួយឧបករណ៍ផ្សេងៗទៀត?

- គោលការណ៍ណែនាំសម្រាប់ការប្រើប្រាស់ទិន្នន័យបន្ទាប់បន្សំ និងការប្រមូលទិន្នន័យថ្មី។
- រួមបញ្ចូលគ្នានូវវិធីសាស្ត្របែបគុណភាព និងបែបបរិមាណ
- របៀប ការវាយតម្លៃតែមួយលើក
- មិនតម្រូវឱ្យបង្កើតផែនទី
- មិនមានគំរូ 'ប្រអប់ខ្នោះ' ដែលមានលក្ខណៈស្មុគស្មាញ
- ទាក់ទាញចំណាប់អារម្មណ៍ពីភាគីពាក់ព័ន្ធ
- វិធីសាស្ត្រមិនសូវមានលក្ខណៈបច្ចេកទេស



[Hatch group page : How TESSA is different from other tools](#)





វិធីប្រើប្រាស់ TESSA?

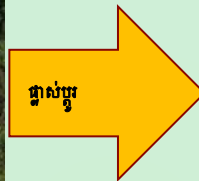




- ❖ ការវាយតម្លៃផលប៉ះពាល់នៃការផ្លាស់ប្តូរ — ស្ថានភាពជាជម្រើសផ្សេង
- ❖ ការវាយតម្លៃបែបប្រៀបធៀបលើពហុសេវាកម្មប្រព័ន្ធអេកូឡូស៊ី
- ❖ សារៈសំខាន់របស់អ្នកទទួលផល និងការផ្សព្វផ្សារ
- ❖ ក្រុមខ័ណ្ឌជាជំហានៗ



ការវាយតម្លៃផលប៉ះពាល់នៃការផ្លាស់ប្តូរ



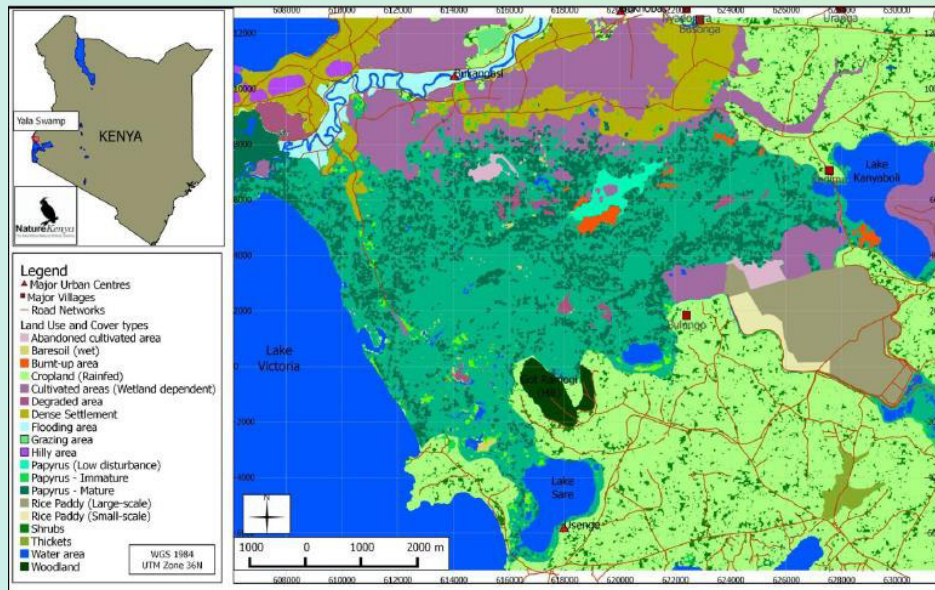
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(ស្ថានភាពបច្ចុប្បន្ន)
100% ព្រៃមានប្រភពដើម

ស្ថានភាពជាជម្រើសផ្សេង
95% កសិកម្មចិញ្ចឹមជីវិត
5% ព្រៃដុះឡើងវិញ

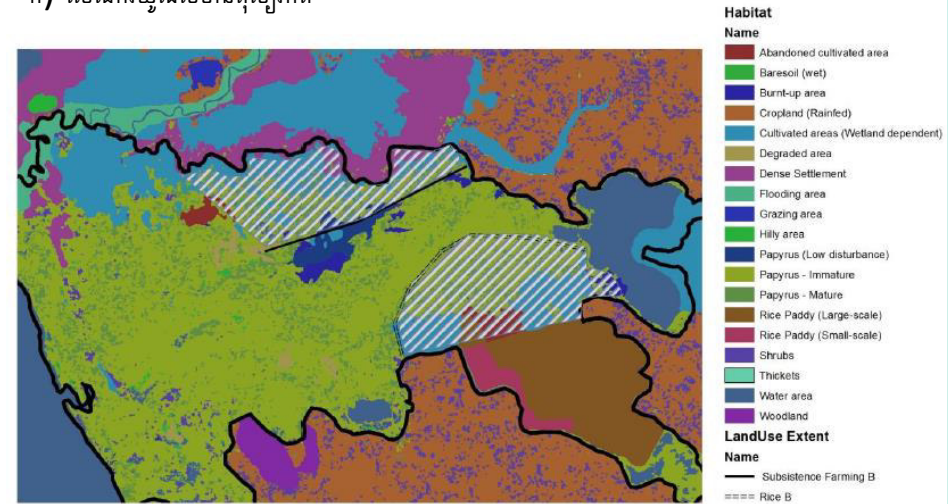


ស្ថានភាពដែលជាជម្រើសផ្សេង [ឧទាហរណ៍]

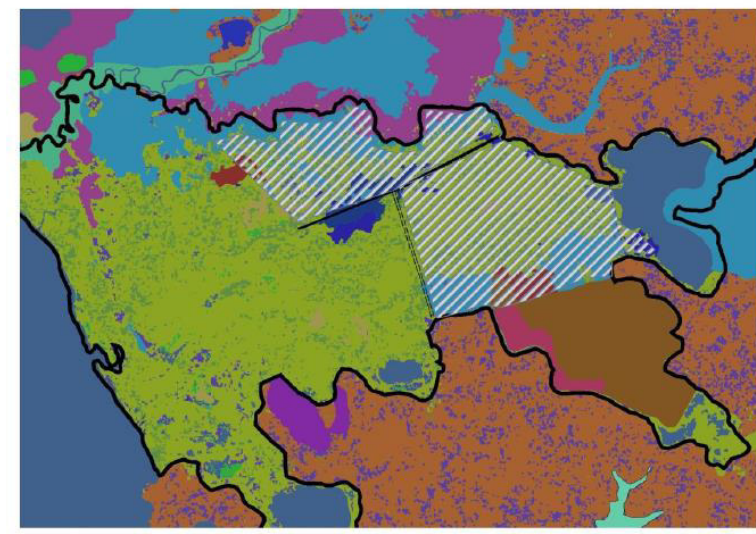
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ក) សេណារីយ៉ូដែលមានតុល្យភាព

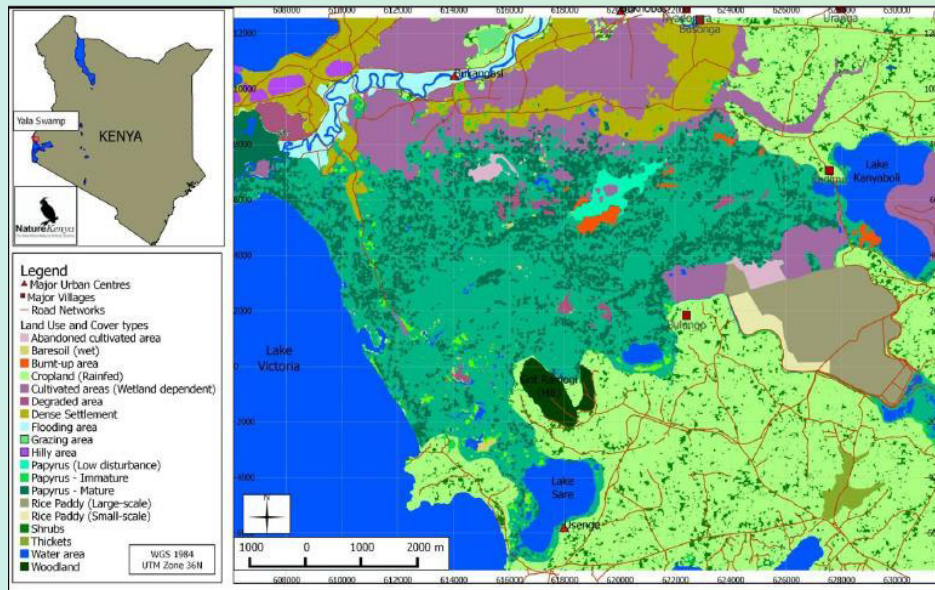


ខ) សេណារីយ៉ូអភិវឌ្ឍន៍ដែលត្រូវបានបន្ត

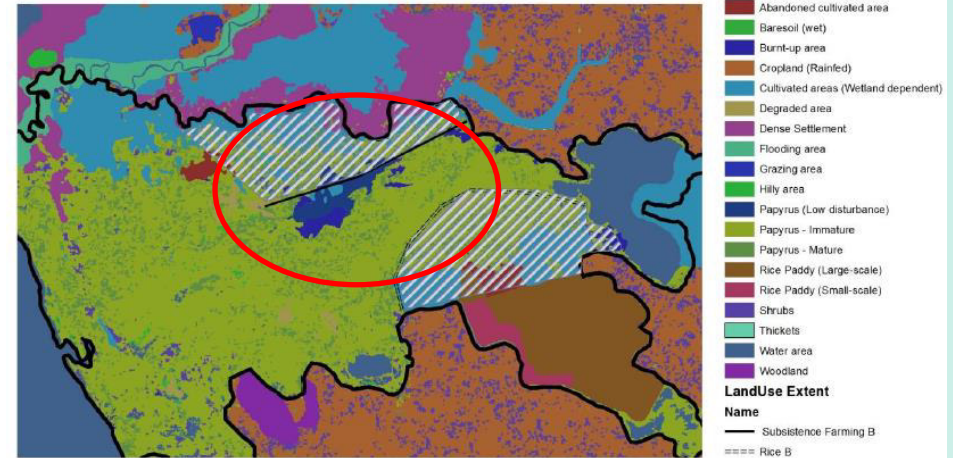


ស្ថានភាពដែលជាជម្រើសផ្សេង [ឧទាហរណ៍]

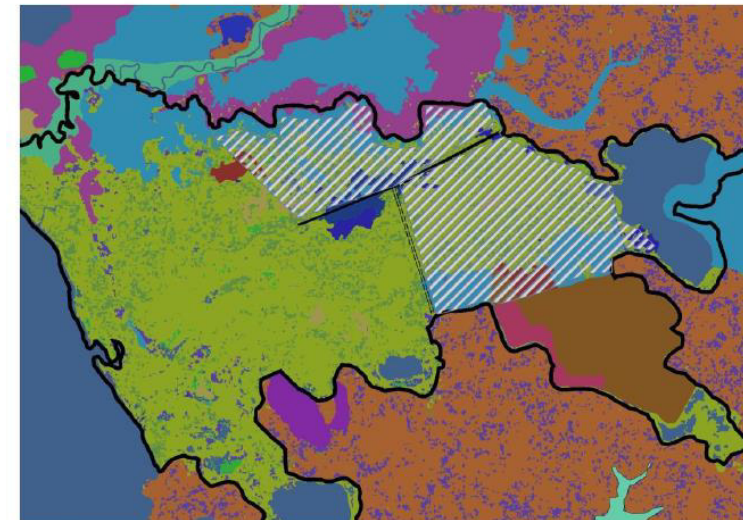
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ក) សេណារីយ៉ូដែលមានតុល្យភាព

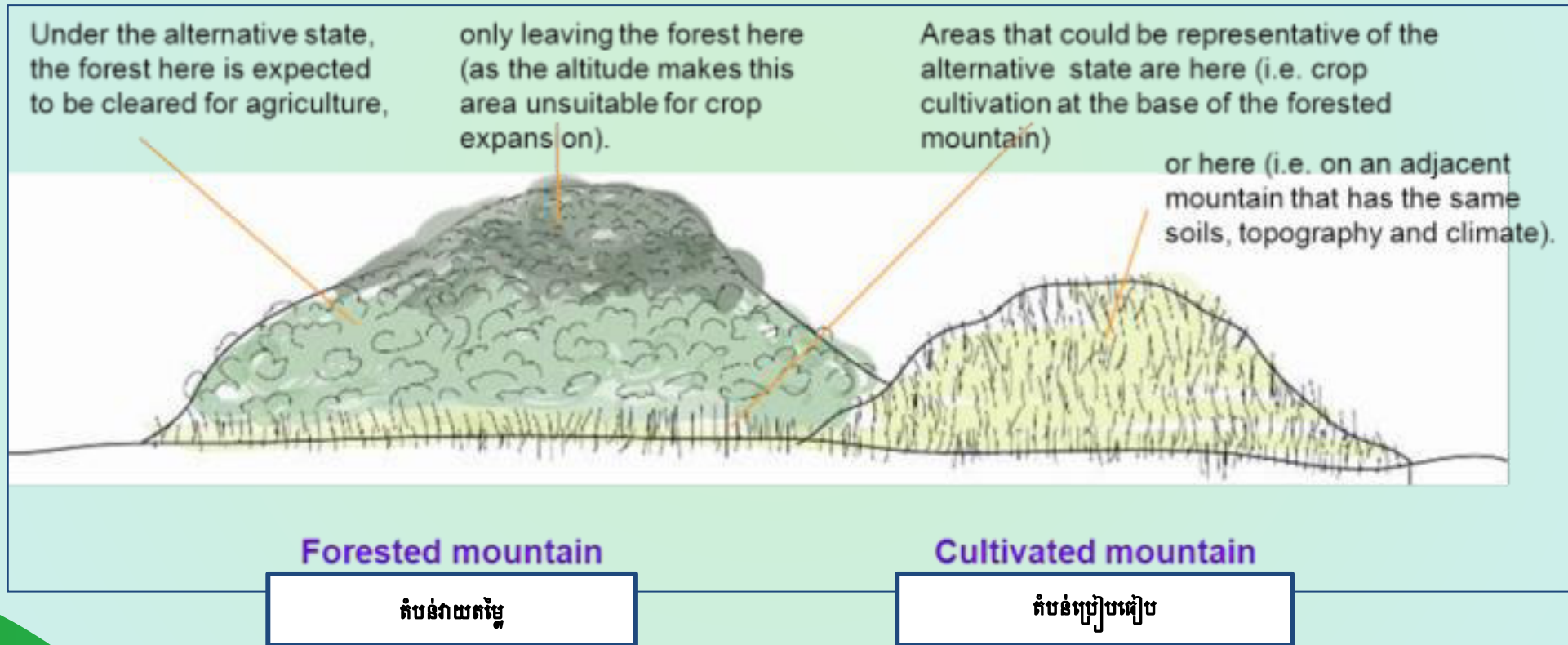


ខ) សេណារីយ៉ូអភិវឌ្ឍន៍ដែលត្រូវបានបន្ត



វិធីវាស់វែង ES នៅក្នុងលក្ខខណ្ឌស្ថានភាពដែលជាជម្រើសផ្សេង?

- ការវាស់វែងគួរធ្វើឡើងនៅកន្លែងពិតប្រាកដឱ្យច្រើនតាមដែលអាចធ្វើទៅបាន ដើម្បីបង្ហាញពីលក្ខខណ្ឌដែលជាជម្រើសនៃតំបន់វាយតម្លៃរបស់អ្នក = តំបន់ប្រៀបធៀប



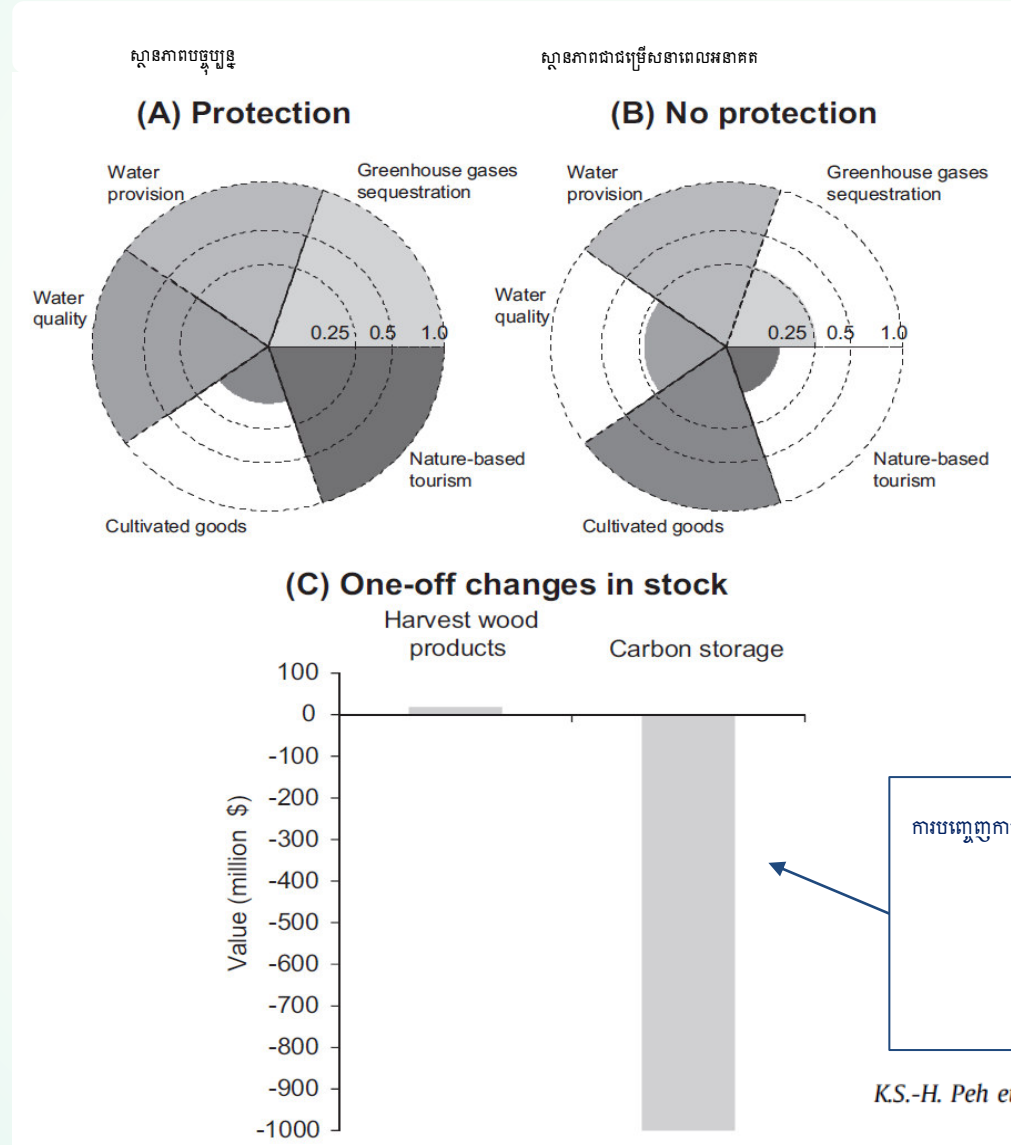
ហេតុអ្វីក៏ជាការវាយតម្លៃបែបប្រៀបធៀបនៃពហុ ES ?

- ✓ ការវាយតម្លៃបែបសាមញ្ញទៅលើតម្លៃសុទ្ធនៃសេវាកម្មជាក់លាក់គឺមិនសូវមានប្រយោជន៍ទេ - តម្លៃពាក់ព័ន្ធផ្តល់នូវគំនិតនៃផលវិបាកសុទ្ធពាក់ព័ន្ធនឹងការសម្រេចចិត្តដល់អ្នកដែលត្រូវធ្វើការសម្រេច
- ✓ យល់ដឹងពីផលប៉ះពាល់នៃការគ្រប់គ្រង ឬការផ្លាស់ប្តូរការប្រើប្រាស់ដីធ្លីមកលើការអនុវត្ត ES
- ✓ ជះឥទ្ធិពលលើការសម្រេចចិត្ត និងលើកកម្ពស់ការរៀបចំផែនការប្រកបដោយប្រសិទ្ធភាព
- ✓ ថែរក្សា ES និងអត្ថប្រយោជន៍ពាក់ព័ន្ធរបស់ពួកគេដែលមនុស្សពឹងផ្អែកទៅលើ
- ✓ ជូនដំណឹងអំពីសុខុមាលភាពមនុស្ស និងគោលបំណងនៃការអភិរក្សជីវចម្រុះ



ការវាយតម្លៃបែបប្រៀបធៀប [ឧទាហរណ៍]

ឧទ្យានជាតិ
ស៊ីវិល
ប្រទេសនេប៉ាល់



អត្ថប្រយោជន៍រូបិយវត្ថុសុទ្ធត្រូវបានប៉ាន់ស្មានក្នុង
ទំហំ **11** លានដុល្លារក្នុងមួយឆ្នាំ

ការបញ្ចេញកាបូន និងការប្រើប្រាស់ទំនិញប្រមូលផលពីធម្មជាតិអំឡុងពេលបំប្លែងពីតំបន់
មានការការពារទៅជាតំបន់មិនមានការការពារ

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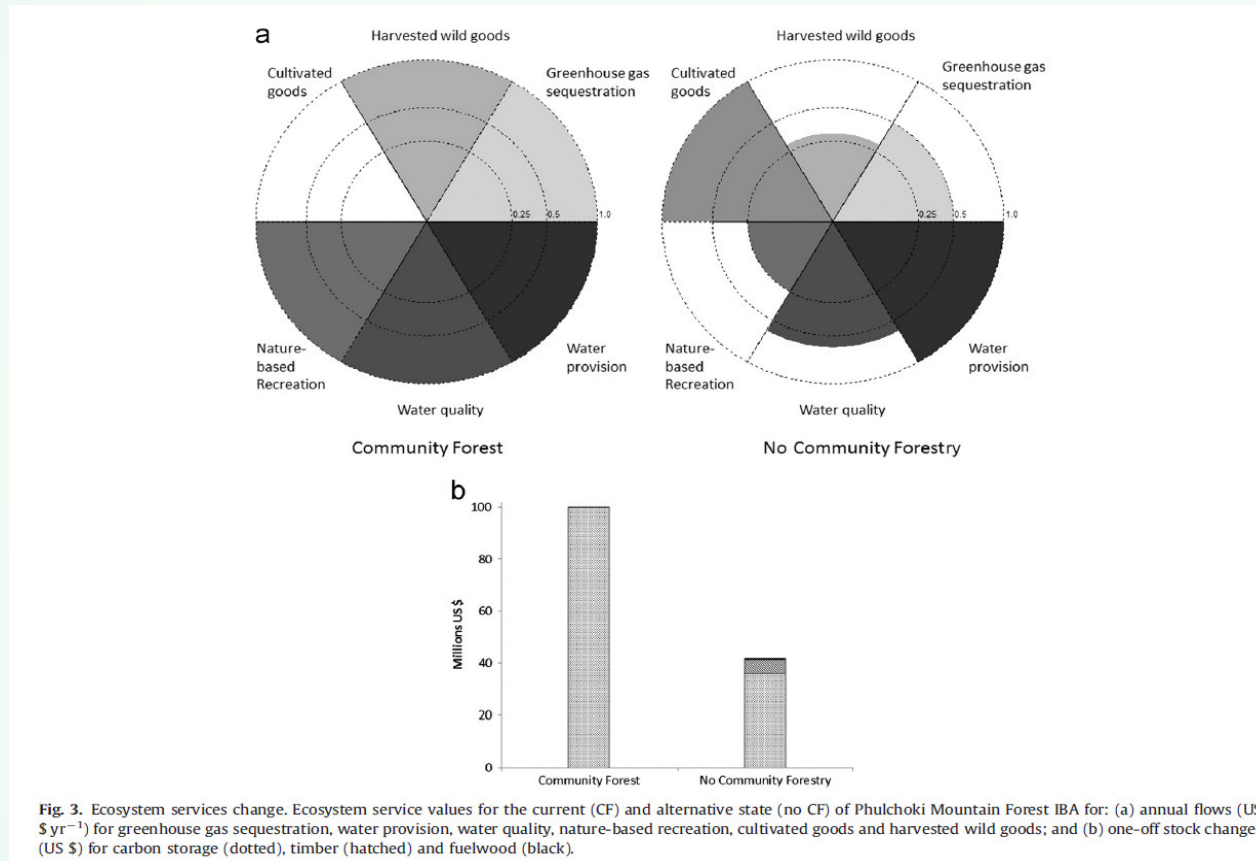
អ្នកទទួលបានផល

សេវាកម្មប្រព័ន្ធអេកូឡូស៊ីអាចមានវត្តមានបាន លុះត្រាតែមានបុគ្គលណាម្នាក់ទទួលបានអត្ថប្រយោជន៍ពីសេវាកម្មនោះ។ កត្តាសង្គម នយោបាយ សេដ្ឋកិច្ច និងអេកូឡូស៊ីដើរតួនាទីក្នុងកិច្ចការចែករំលែកនូវផលប្រយោជន៍ និង ផលចំណែកនៃការផ្លាស់ប្តូរ។ កិច្ចការទាំងនេះអាចមិនសមធម៌ទេ។ ការយល់ដឹងថាតើបុគ្គលរូបណាជាអ្នកទទួលបានផលនោះគឺជា រឿងដ៏សំខាន់ ដើម្បីអាចវាយតម្លៃផលវិបាកទាំងមូលនៃការផ្លាស់ប្តូរក្នុង ES បាន។



អ្នកទទួលបានផល — ការយល់ដឹងពីការផ្លាស់ប្តូរក្នុង ES

ផលប៉ះពាល់នៃការផ្លាស់ប្តូរក្នុងការផ្តល់សេវាកម្មដល់អ្នកទទួលបានផលតាមមាត្រដ្ឋានផ្សេងៗគ្នា



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សេចក្តីពន្យល់

+ : កើនឡើង

- : ថយចុះ

= : ពុំមានការផ្លាស់ប្តូរ

TESSA v3.0



<http://tessa.tools>



6 ជំហានរបស់ TESSA

Step-by-step framework

Figure 4. TESSA Step by Step Framework



ជ្រើសរើសវិធីសាស្ត្រសម្រាប់ការវាយតម្លៃ ES
 ការប្រមូលទិន្នន័យ / ទិន្នន័យបន្ទាប់បន្សំ

ការវិភាគតម្លៃជីវូប និង
 សេដ្ឋកិច្ច
 ការផ្សព្វផ្សាយលទ្ធផល



សារៈសំខាន់នៃការចូលរួមរបស់ភាគីពាក់ព័ន្ធ

- TESSA លើកទឹកចិត្តឱ្យមានការចូលរួមពីភាគីពាក់ព័ន្ធក្នុងដំណើរការទាំងមូល ចាប់ពីជំហានទី 1 ដល់ជំហានទី 6
- គោលការណ៍ណែនាំស្តីពីវិធីកំណត់ និងទាក់ទាញបុគ្គលដែលសាកសម។
- ការចូលរួមក្នុងដំណើរការទាំងមូលបង្កើតបានជាទំនាក់ទំនងដ៏រឹងមាំដែលមិនអាចកាត់ថ្លៃបានសម្រាប់គម្រោង ជួយកែលម្អលំហូរ ព័ត៌មាន និងជំរុញឱ្យមានភាពជាម្ចាស់។



វិធីសាស្ត្រជាក់ស្តែងដែលមានស្រាប់

សាមញ្ញ និង

ភាវូបនីយកម្ម

ជាជម្រើស

	Global climate	Water services	Harvested wild goods	Cultivated goods
Biophysical / quantitative methods	Forest transects	Hydrological modelling	Expert interviews	Expert interviews
	Soil sampling	Individual household surveys	Focus group discussions	Focus group discussions
	Dry mass	Water monitoring (quality/quantity)	Individual household surveys	Individual household surveys
Economic Valuation methods	Market values	Avoided damage cost	Market values	Market values
	Social cost	Mitigation cost	Substitute price	Substitute price
	<i>Benefits transfer</i>	<i>Benefits transfer</i>	<i>Benefits transfer</i>	<i>Benefits transfer</i>

វិធីសាស្ត្រជាក់ស្តែងដែលមានស្រាប់

សាមញ្ញ និង
ភាវូបនីយកម្ម

ជាជម្រើស

	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			
	<i>Benefits transfer</i>			

គោលការណ៍របស់ TESSA [សង្ខេប]

- ជួយបុគ្គលមិនមែនអ្នកជំនាញដែលសមត្ថភាពនៅមានកម្រិតក្នុងការវាស់ស្ទង់ **ES** មួយចំនួនដែលពាក់ព័ន្ធបានយ៉ាងឆាប់រហ័ស



គោលការណ៍របស់ TESSA [សង្ខេប]

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- ប៉ាន់ស្មានពីភាពខុសគ្នារវាងស្ថានភាពបច្ចុប្បន្ន និងស្ថានភាពដែលជាជម្រើសផ្សេងដែលអាចកើតមាន



គោលការណ៍របស់ TESSA [សង្ខេប]

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- រៀបចំឱ្យមានការចូលរួមពីសំណាក់ភាគីពាក់ព័ន្ធ និងអ្នកទទួលផល

គោលការណ៍របស់ TESSA [សង្ខេប]

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- ភ្ជាប់ទំនាក់ទំនងជាមួយភាគីពាក់ព័ន្ធ និងអ្នកទទួលបានផល
- ផ្តល់ទិន្នន័យដ៏រឹងមាំបែបវិទ្យាសាស្ត្រ ដើម្បីមានឥទ្ធិពលលើការគ្រប់គ្រង គោលនយោបាយ ឬការសម្រេចចិត្ត (និងសម្រាប់ការពិនិត្យតាមដានផងដែរ)



TESSA គឺជាក្របខ័ណ្ឌដែលមានភាពបត់បែន

- ✓ ឱ្យសាមញ្ញបំផុតតាមដែលអាចធ្វើទៅបានដោយពុំឱ្យបាត់បង់លក្ខណៈវិទ្យាសាស្ត្រ
- ✓ ប្រើទៅតាមកម្រិតសមត្ថភាព និងចំណេះដឹងផ្ទាល់ខ្លួន
- ✓ បង្កើតឡើងដើម្បីឱ្យមានការកែសម្រួលឱ្យសាកសមទៅនឹងបរិបទ
- ✓ ស្វាគមន៍ "កម្មវិធីបន្ថែម" និងវិធីសាស្ត្របំពេញបន្ថែមផ្សេងៗទៀត
- ✓ លើកទឹកចិត្តឱ្យមានមតិព្រឺងប្រាប់ និងការកែលម្អបន្ថែមទៀតតាមរយៈគម្រោងថ្មីៗ


បទពិសោធន៍របស់មីយ៉ាន់ម៉ា និងវៀតណាមជាមួយ TESSA



Measuring ECOSYSTEM SERVICES provided by MOEYUNGYI WETLAND in Myanmar

 Ministry of the Environment, Japan

 BirdLife International Tokyo

 Biodiversity and Nature Conservation Association (BANCA)
Contact information:
Email: banca@myanmar@gmail.com
Phone: 95-9-42008979



Benefits of Ecosystem Services provided by Thai Thuy Wetland in Vietnam

 Ministry of the Environment, Japan

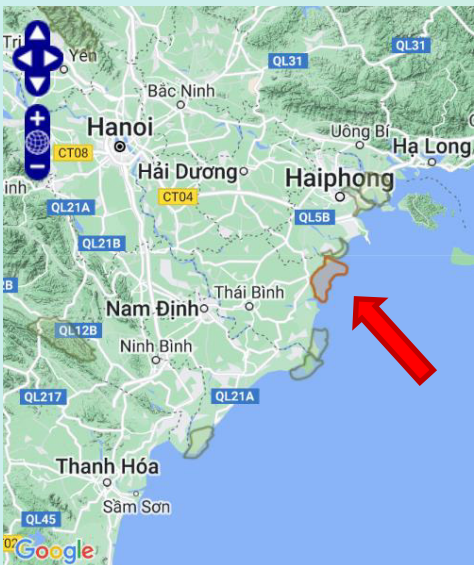
 BirdLife International Tokyo

 Viet Nature Conservation Centre
Office: Room No. 202, 1812, Le Van Luong Street, Thanh Xuan district, Hanoi, Vietnam
Email: admin@thienhienviet.org.vn
Phone: +84-4-62781380 www.thienhienviet.org.vn




Photos provided by BirdLife International and Viet Nature

បទពិសោធន៍នៅ Thai Thuy ប្រទេសវៀតណាម




The area of the IBA (Important Bird and Biodiversity Area) was selected as the site for this measurement. Background information and previous research was collected for scoping and identifying the beneficiaries.



All data collected during the survey were analyzed with the existing data and literature. For the climate regulation and disaster prevention, desk top analyses were conducted.

Preliminary work & Rapid appraisal

- Define site, based on biological importance and perceived threats
- Explore policy context
- Identify the stakeholders
- Identify habitat, services and beneficiaries

Methods selection

- Select relevant services to assess
- Select appropriate methods for each service

Data acquisition

- Collect/collate data for site

Analysis and communication

- Analyse data
- Communicate messages



In this survey, four ecosystem services were identified and methods for each service were selected

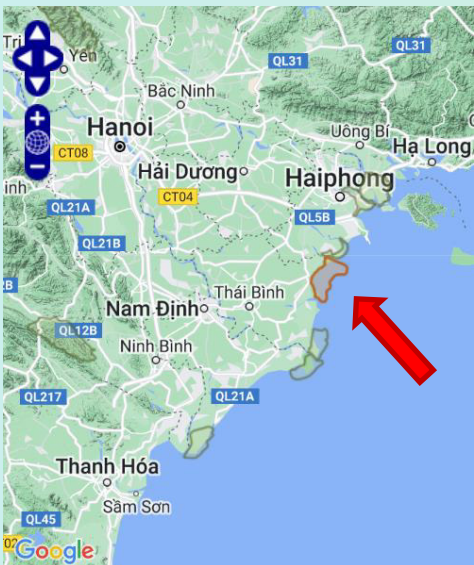
- Harvested wild goods
- Cultivated goods
- Disaster risk reduction
- Global climate regulation



Data was collected from existing data and simple interviews. In order to identify missing services and collect information, a stakeholder meeting was conducted with the representatives of the area.



បទពិសោធន៍នៅ Thai Thuy ប្រទេសវៀតណាម



Exchange rate: 22,300VND/USD

Benefit

- Harvested Wild Goods \$2.2 million/year**
 Fish harvested in Thai Thuy district \$1.37 million/year¹
 Shellfish collected in the mudflat \$0.87 million/year
- Cultivated Goods \$ 11.7 million/year**
 Fish and Shrimp harvested from semi natural aquaculture \$0.58 million/year (\$2,524/ha/year)²
 Fish harvested from intensive aquaculture \$8.93 million/year (\$7,558/ha/year)²
 Clam harvested from clam culture in mudflat \$ 1.93 m/year
 Salt production in the salt farm \$0.22 million/year³
- Disaster Risk Reduction \$ 1.1 million/year**
 Protective benefits of mangrove forest \$1.05 million/year⁴
- Climate Regulation \$60.3 million**
 The benefit of global climate regulation from the carbon stored in the wetland is \$ 60.26 million. This is an one-off stored value, i.e. not an annual value.⁵

**Net Benefit : \$ 15.0 million / year
Plus \$ 60.3 million of carbon storage function**

Water Purification

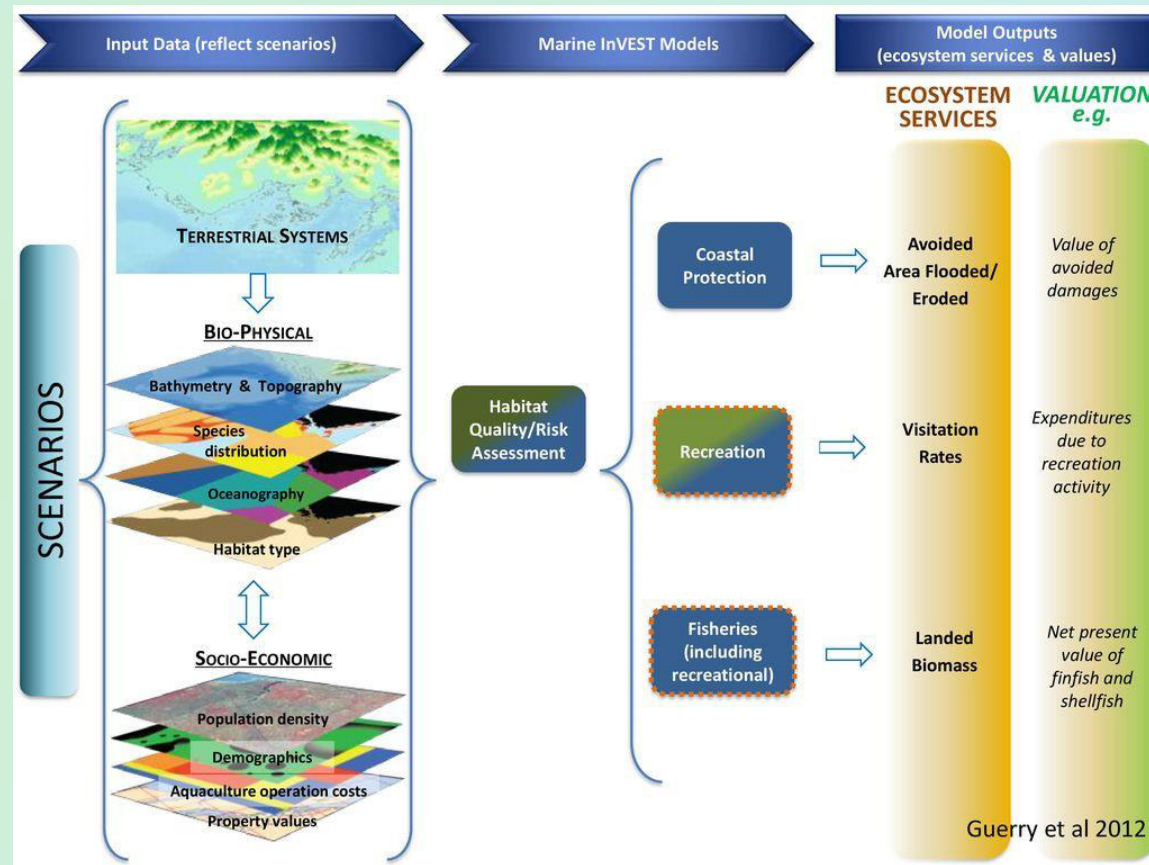
The mudflat conducts water purification through the activities of living organisms such as clams, microalgae and bacteria in the mud. Mangroves also have a waste treatment function and these functions are vital to maintain seawater quality.

Eco-tourism

Eco-tourism such as bird watching and walking in the mudflat has not been developed at Thai Thuy but there is potential to attract tourists. Well managed eco-tourism can provide benefits not only for tourists, but also for local people as an income source.

ការវាយតម្លៃរមលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ី និងការជួញដូរ (InVEST)

- លក្ខណៈម៉ូឌុល
 - ផ្អែកលើសមីការស្ថិតស្ថាពរ
 - ផែនទីក្នុង ផែនទីក្រៅ
 - កម្មវិធីឯករាជ្យ
- ប៉ុន្តែកម្មវិធី GIS នៅតែមានតម្រូវការ



Guerry et al 2012



<https://naturalcapitalproject.stanford.edu/software/invest>



ការវាយតម្លៃរមលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ី និងការជួញដូរ (InVEST)

InVEST models

Carbon | [Read more »](#)

Crop Pollination | [Read more »](#)

Habitat Risk Assessment | [Read more »](#)

Reservoir Hydropower Production (Water Yield) | [Read more »](#)

[Sediment Retention | Read more »](#)



Urban Stormwater Retention | [Read more »](#)

Coastal Blue Carbon | [Read more »](#)

Crop Production | [Read more »](#)

Offshore Wind Energy | [Read more »](#)

Scenic Quality | [Read more »](#)

Urban Cooling | [Read more »](#)

Water Purification | [Read more »](#)



[Coastal Vulnerability | Read more »](#)

Habitat Quality | [Read more »](#)

Recreation | [Read more »](#)



[Seasonal Water Yield | Read more »](#)



[Urban Flood Risk Mitigation | Read more »](#)

Wave Energy | [Read more »](#)

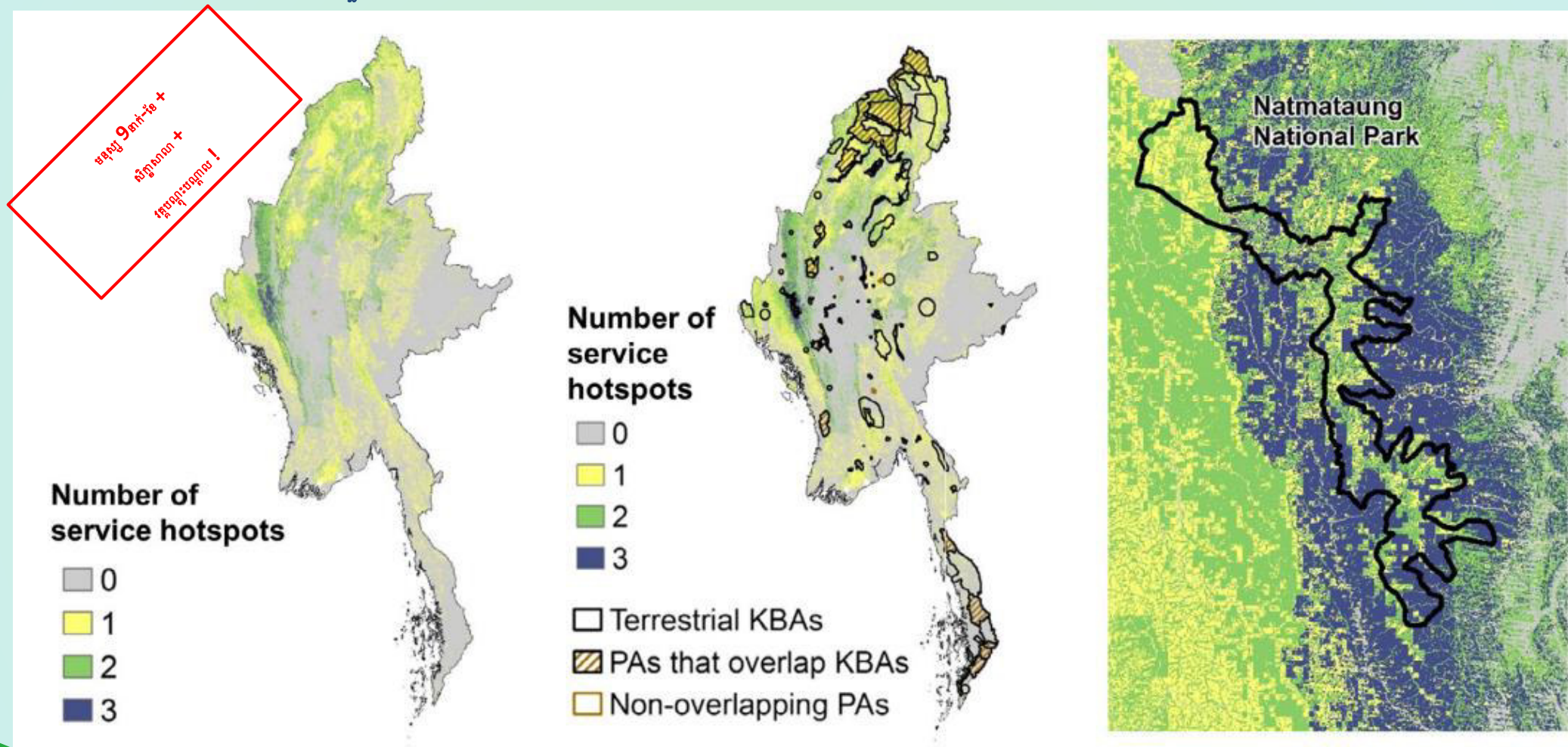


<https://naturalcapitalproject.stanford.edu/software/invest>



Partnership for nature and people

កម្មវិធី InVEST ៖ ភាពត្រួតស៊ីគ្នានៃហតស្តត ES និង KBAs/PAs



Mandle et al., 2017 in Neugarten et al., 2018.
<https://portals.iucn.org/library/node/47778>

ការវាយតម្លៃរមលើសេវាកម្មប្រព័ន្ធអេកូឡូស៊ី និងការជួញដូរ (InVEST)

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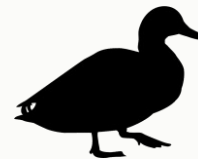
Crop Production | [Read more »](#)

Offshore Wind Energy | [Read more »](#)

Scenic Quality | [Read more »](#)

Urban Cooling | [Read more »](#)

Water Purification | [Read more »](#)



Coastal Vulnerability | [Read more »](#)

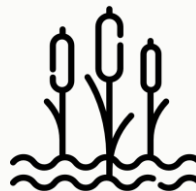
Habitat Quality | [Read more »](#)

Recreation | [Read more »](#)

Seasonal Water Yield | [Read more »](#)

Urban Flood Risk Mitigation | [Read more »](#)

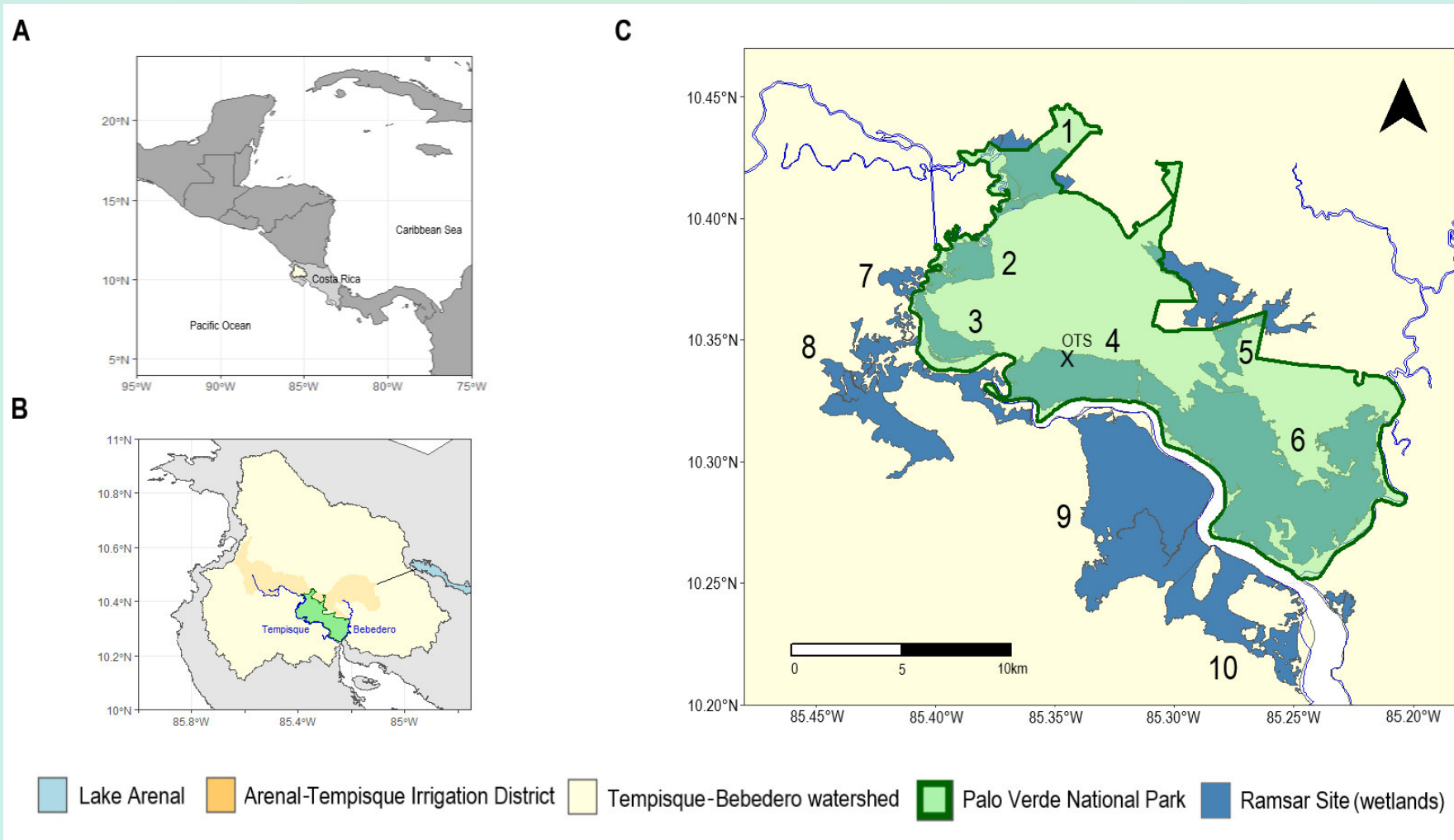
Wave Energy | [Read more »](#)



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Barchiesi et al., 2022៖ ទម្រង់ជលសាស្ត្រនៃតំបន់ដីសើម និងភាពបែកខ្ញែកនៃដំណាំព្យាករណ៍ចំនួនសត្វបក្សីនៅតំបន់ Palo Verde ប្រទេសកូស្តារីកា

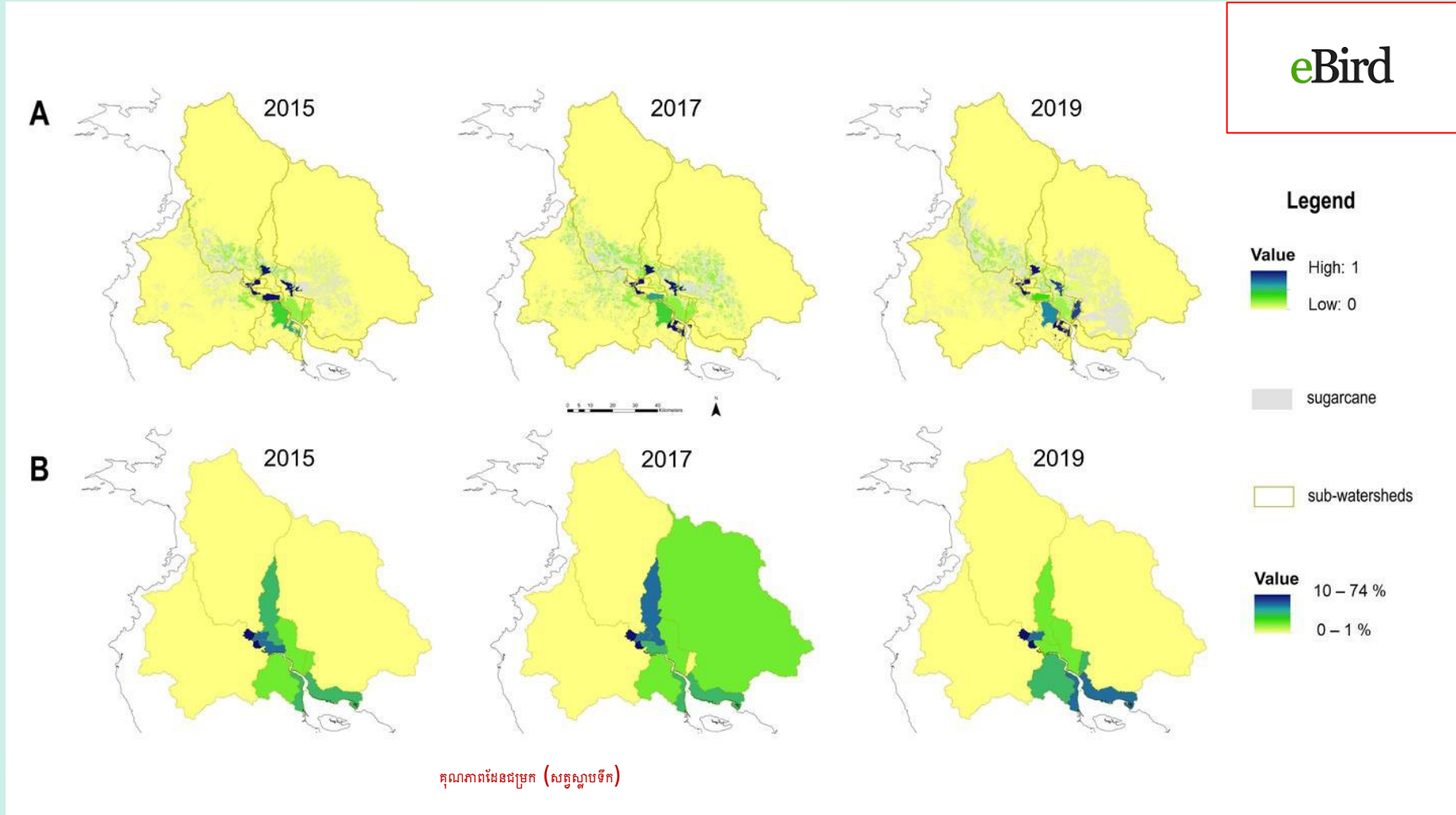
កម្មវិធី InVEST ៖ ភាពត្រួតស៊ីគ្នានៃហតស្តុត ES និងតំបន់ជលសាស្ត្រ



តំបន់ Palo Verde ប្រទេសកូឡុំប៊ី © S. Barchiesi



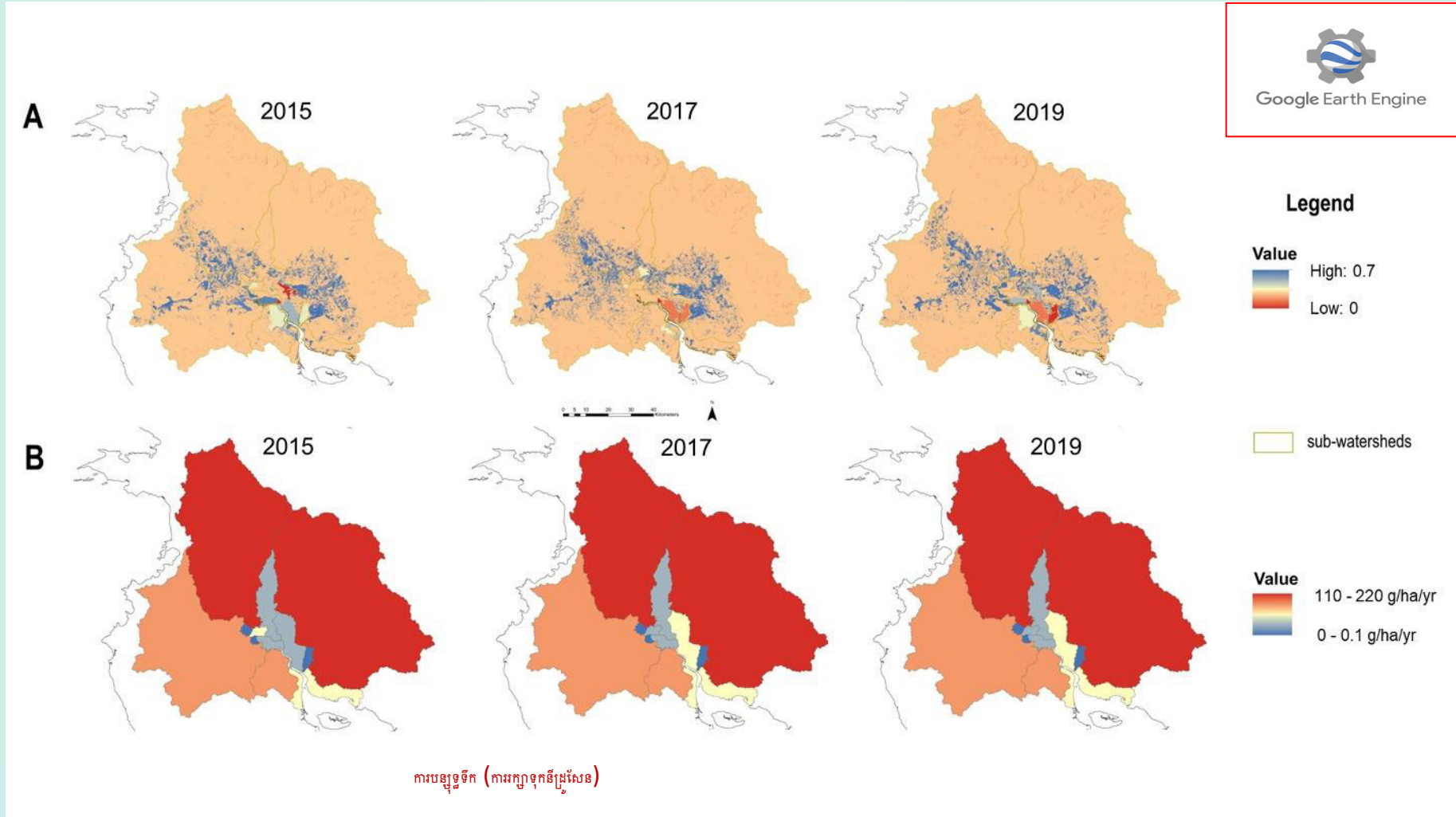
កម្មវិធី InVEST ៖ ភាពត្រួតស៊ីគ្នានៃហតស្តត ES និងតំបន់ជលសាស្ត្រ



Barchiesi et al., 2022៖ ទម្រង់ជលសាស្ត្រនៃតំបន់ដីសើម និងភាពបែកខ្ញែកនៃដំណាំព្យាករណ៍ចំនួនសត្វបក្សីនៅតំបន់ Palo Verde ប្រទេសកូស្តារីកា

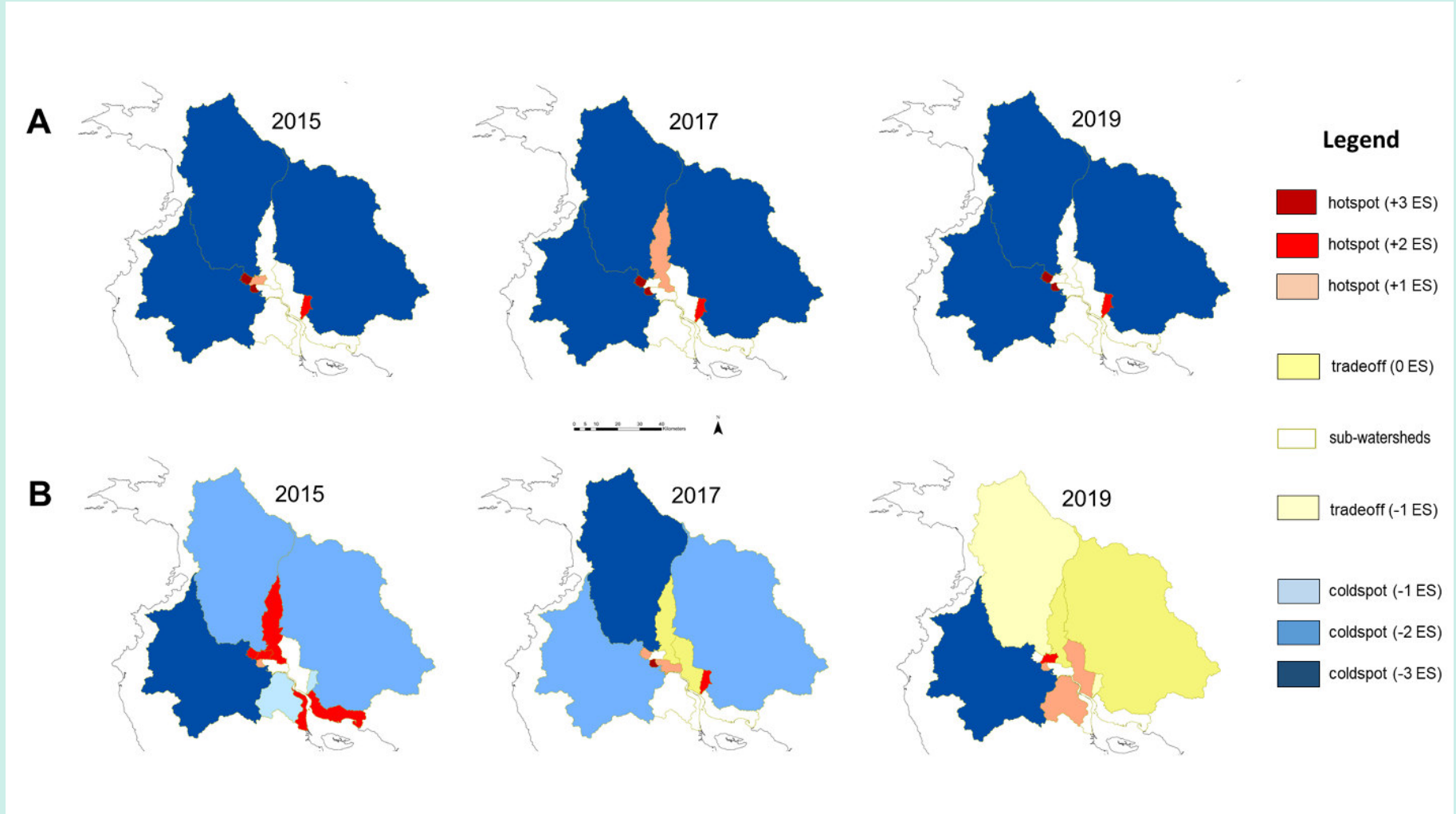


កម្មវិធី InVEST : ភាពត្រួតស៊ីគ្នានៃហតស្តត ES និងតំបន់ជលសាស្ត្រ



Barchiesi et al., (forthcoming)

កម្មវិធី InVEST ៖ ភាពត្រួតស៊ីគ្នានៃហតស្តុត ES និងតំបន់ជលសាស្ត្រ



Barchiesi et al., (forthcoming)



តើមានសំណួរដែរឬទេ?

បណ្ឌិត ស្ទីហ្វានូ បារឆីស៊ី

បុគ្គលិកផ្នែកសេវាកម្មប្រព័ន្ធអេកូឡូស៊ីនៃអង្គការជីវិតសត្វស្នាបអន្តរជាតិ stefano.barchiesi@birdlife.org