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LEAFLET

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Sustainability

A POWERFUL NEW TOOL FOR DECISION-MAKERS TO VALUE ECOSYSTEM SERVICES

InVEST - Intergrated Valuation of Ecosystem Services and Tradofs

This leaflet aims at bringing general information on the importance of assessing Natural Capital and Ecosystem Services in order to improve decision making processes and enable a Sustainable Development. It presents the tool InVEST, that supports the mapping and valuation of such Ecosystem Services. InVEST is one of many existing and complementary tolls, methods or models to assess Natural Capital and all of them may also be appropriate and useful for mapping and valuing ecosystem services.

1. What are Ecosystem Services?

An Ecosystem includes all of the living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, atmosphere).

Ecosystem services are the benefits that people obtain from these ecosystems that contribute to human well-being. They are often categorized under goods, services and cultural services.

Natural capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things.

Life on earth-Biodiversity

2. Why Do We Need to Map and Value Ecosystem Services?

Nature supports human health, livelihoods and economies in countless ways: ecosystems store carbon to regulate the climate, purify and regulate water supplies, and provide food, medicine, livelihoods from non-timber forest products, and opportunities for spiritual and cultural experiences.

Despite their significant value, ecosystem services are not usually included in political and economic decisions. The challenge is that you can only manage what you can measure and ecosystem services are difficult to measure. Data is often missing or inaccessible, meaning that the contributions ecosystem services make to regulating the climate or providing recreation / tourism are not accounted for. As a result of this undervaluation, these ecosystem services are being depleted. Without properly accounting for these benefits, we risk losing them. It is therefore increasingly important to ensure that we implement economic development that accounts for the protection of ecosystem services.

3. How can Ecosystem Services and Natural Capital be Mapped and Valued?

A joint venture of NGOs, a university and a research center came together under the banner of The Natural Capital Project to create a powerful tool called InVEST (which stands for Integrated Valuation of Ecosystem Services and Tradeoffs) to map and value ecosystem services.

InVEST | Integrated Valuation of Ecosystem Services

natural capital PROJECT

InVEST is a suite of tools that map, measure and value the goods and services produced by nature that sustain human life. It is free and open source software. Its modular toolset enables users to quantify, visualise and compare the delivery of ecosystem services under different scenarios of land uses.

What Does InVEST Provide?

InVEST identifies where ecosystem services are provided and where they are delivered. It provides information about:

Supply – the potential for nature to provide benefits
Service – the type of benefits delivered to people
Value – the economic and social price of these benefits

THE INVEST TOOL CAN CALCULATE AN ECOSYSTEM'S POTENTIAL TO PROVIDE BENEFITS TO HUMANS UNDER DIFFERENT ECOLOGICAL CONDITIONS.

The InVEST uses basic biophysical and economic input data to estimate the current distribution of ecosystem services. Maps can then be drawn for an easy visualisation of the natural capital stocks and ecosystem services in a specific location. InVEST can be used at local, regional or global scales and used for spatial planning and for land use decision making.

Different future scenarios can be developed and integrated into the tool to estimate how the production of ecosystem services is likely to change under different development and conservation decisions. Scenarios are narratives or maps that can help visualise the future and are used to compare options or consider new policies etc. These scenarios are developed by key stake-holders during consultations with provincial level government officials, and other relevant individuals and/or institutions.

When combined with an economic valuation of ecosystem services (using house-hold surveys, production function methods etc.) the biophysical mapping of ecosystem services can provide information on the economic value of the ecosys-tem services of a specific landscape. It can also estimate the monetary value gains or losses resulting from land use changes under alternative future develop-ment scenarios.

4. Concret Applications of InVEST for Decision Making

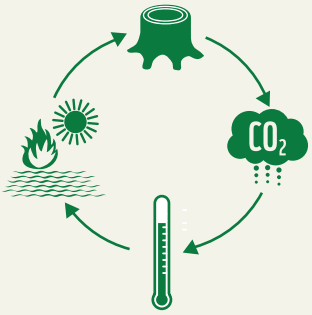
InVEST is most effectively used within a decision-making process as it helps inform decisions about natural resource planning and management. Decision makers can develop different future scenarios to analyze the effect of a specific activity on ecosystem services. The result can be used to decide where it is the most beneficial or least detrimental to a specific location to implement a specific activity.

Informed Policy Decisions

InVEST can help inform policy and program designs, such as land use and marine spatial plans, strategic environmental assessments, payments for ecosystem services, climate adaptation strategies, mitigation and offsets. *(Continue reading next page)*

For example, before deciding on land use planning, a public administration can use the InVEST tool to develop scenario maps [see Mondulkiri Scenario Maps below for an example of these] that show the gains and losses of ecosystem systems such as habitat quality for wildlife, carbon sequestration, water yield etc., under different scenarios.

It demonstrates geographical areas where conservation efforts would make the most environmental and economic sense (in areas with a high concentration of ecosystem services for instance) and where development can be done with the least harm to natural capital stocks.



This analysis can support decision makers to assess the tradeoffs associated with alternative policy options and can show, for example, specific areas where protected areas might be established, where agricultural land might be converted to residential development, or where climate change is expected to affect precipitation and temperature patterns.

Sustainable Business Decisions

Private enterprises regularly take decisions on business development, including new locations for their activities. However, often they lack information on the existence and the value of natural capital.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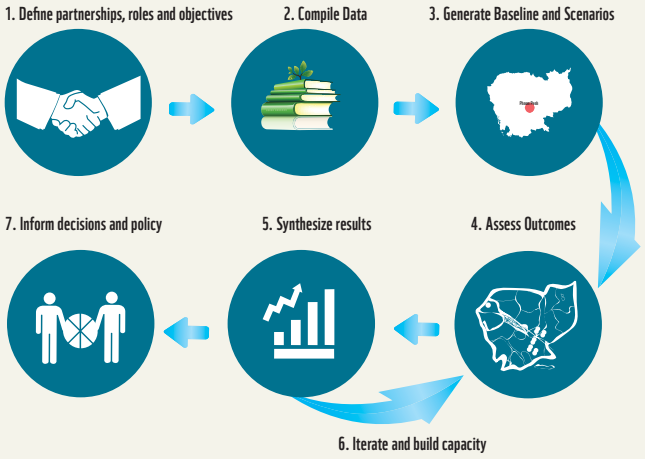
A lady makes a woven chair from the naturally occurring rattan in her village. Throughout Cambodia rattan is a key source of income for livelihoods.

For example, when a pepper growing enterprise decides to extend its activity in a new region, the InVEST tool could be used to develop scenario maps showing where the natural capital is the richest. This could help to identify where the ecosystem services that the company needs for its activities are produced (i.e water purification, soil nutrient production, floods protection etc.).

Having a clear science-based knowledge of natural capital, ecosystem services and the economic benefits provided, is likely to incentivize companies to invest in areas where their activities will have the least impact on the ecosystem and to protect the ecosystem services that they are benefiting from.

How does the model work?



5. WWF-Cambodia and RUPP implementation of InVEST in Cambodia

Based on the rich natural capital of the Eastern Plains Landscape of Cambodia, the InVEST tool is being used to map and value the following ecosystem services in the Mondulkiri Province:

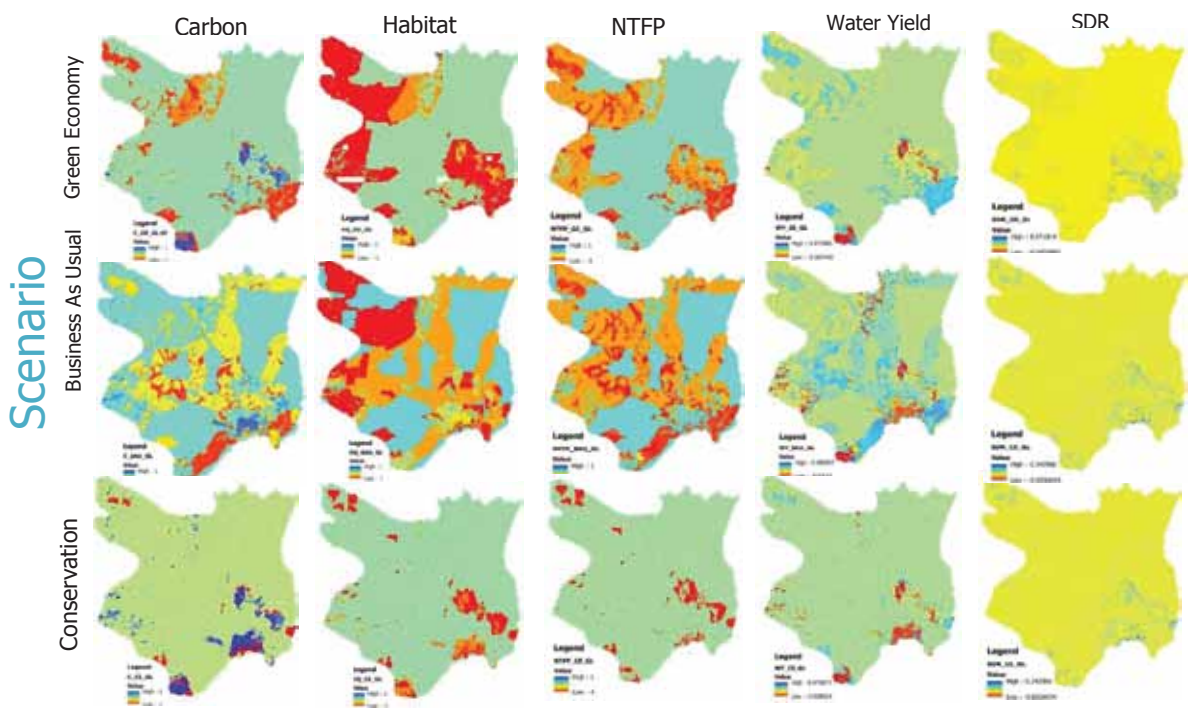
- Habitat Quality
- Water Yield
- Nutrient Retention
- Sediment Retention
- Carbon Storage and Sequestration
- Non-Timber Forest Products (NTFPs)

WWF Cambodia partnered with researchers at the Royal University of Phnom Penh (RUPP) and the InVEST Technical Working Group at the provincial level, composed of relevant departments and local authorities interested in learning more about InVEST tools in the Mondulkiri province. The objective is for lessons learnt at the provincial level to be used at the national level as well to contribute to the sustainable development of Cambodia.

Mondulkiri Scenario Maps

The gains and losses in the 5 different ecosystem services studied: carbon sequestration, Non Timber Forest Products, Habitat quality for wildlife, Water Yield and Sediment Retention, under the different future scenarios i.e. how much additional carbon will have been sequestered in Mondulkiri in 2030 under a conservation scenario.

Gains and Losses of Ecosystem Services in Mondulkiri



The dark blue colour on the maps show gains in ecosystem services, e.g. greater carbon sequestered under a Conservation scenario in Economic Land Concessions allocated to rubber plantations in the South of the province.The orange and red colours on the maps show the greatest losses of that particular ecosystem service studied, e.g. losses of the quality of habitats for wildlife such as the Asian Elephant, under a Business as Usual or a Green Economy Scenario.

InVEST Team In Cambodia

The Royal University of Phnom Penh (RUPP) is the technical lead for the implementation of InVEST in Cambodia. Their intellectual leadership enabled local decision-makers to better understand the InVEST tool and have a greater appreciation for it as a decision support tool. Lecturers at RUPP have a wide range of expertise including spatial analysis, hydrology, policy, stakeholder engagement, NTFPs and wildlife habitat assessment. The interdisciplinary nature of this broad-based team is critical for a successful application of InVEST. WWF Cambodia received positive feedback from RUPP who considered the tool useful for planning and policy making.

The Royal Government of Cambodia (RGC) is aware of and understands the critical situation of natural resources in Cambodia. It has been expressed that they will consequently endeavor to take necessary steps toward conserving the country's remaining natural capital while providing dependent communities and involved stakeholders with the necessary options for sustainable livelihoods and commercial ventures. This effort requires up-to-date information concerning the resource situation and future development scenarios to assist in decision making and land use planning.

WWF International and WWF-Cambodia lead the overall project coordination to promote the integration of environmental and socioeconomic considerations into political and economic decisions. WWF has provided advisory and technical support to RUPP, including capacity needs assessments and training, data review and technical design on the InVEST model.

The Natural Capital Project developed the InVEST tool. It is a joint venture between Stanford University's Woods Institute for the Environment, University of Minnesota's Institute on the Environment, The Nature Conservancy, and WWF. Please feel free to visit the website for more information: www.naturalcapitalproject.org

WWF

Why we are here.
To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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