



# Mapping Ecosystem Services to Human well-being (MESH): managing landscapes to achieve Sustainable Development Goals



Mapping Ecosystem Services to Human well-being – MESH – is an ecosystem service assessment and mapping toolkit developed by Bioversity International, CGIAR, and the Natural Capital Project in support of a Science for Nature and People (SNAP) project on ‘Making Ecosystems Count in the Sustainable Development Goals (SDG)’.



MESH is an integrative modelling framework that calculates ecosystem service production functions and maps ecosystem service provision under different landscape management scenarios. The base model of MESH integrates and extends ecosystem service models from the Natural Capital Project’s ‘InVEST’ toolkit into a graphical framework (Figure 1) and includes methods to automatically create input data, define scenarios and visualize outputs (without the need to use, e.g., ArcGIS). Development is underway to integrate models from King’s College London’s ‘WaterWorld’ policy support tool. Other models can easily be incorporated into MESH via a model plugin framework.



[www.naturalcapitalproject.org/mesh](http://www.naturalcapitalproject.org/mesh)

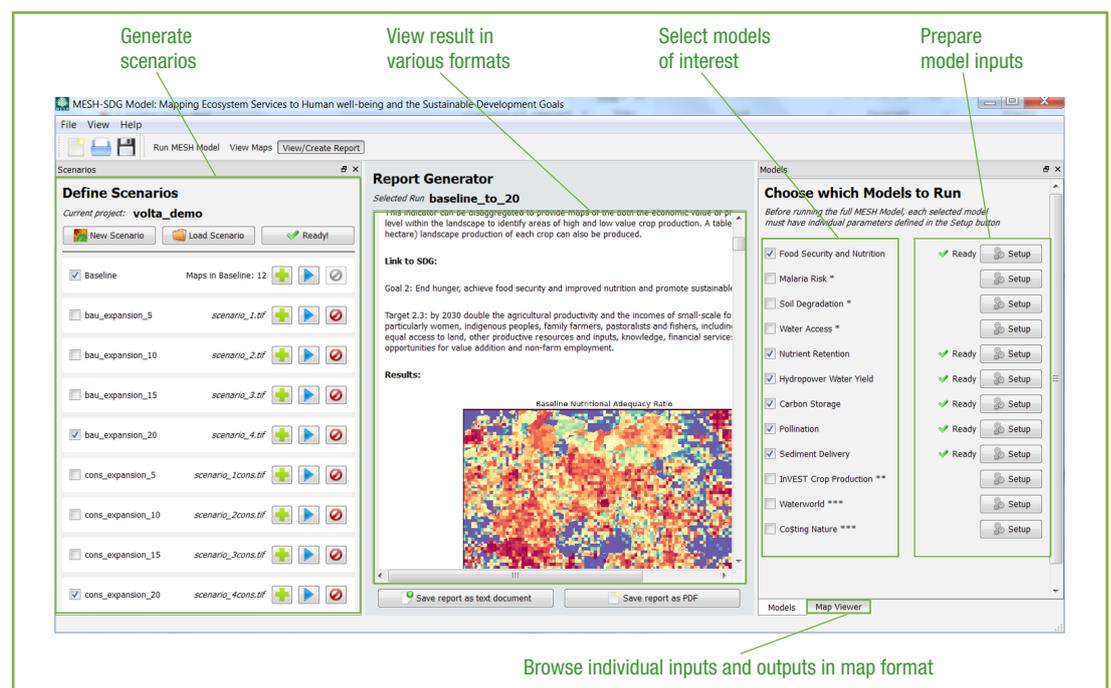


Figure 1: MESH interface

An extension to MESH that is under development, MESH-SDG, will generate outputs and indicators that are specific to the SDGs, based on findings from research and stakeholder consultation during the SNAP project. MESH-SDG will be designed to populate values for up to twelve SDG-relevant indicators (see Figure 2). These outputs will provide a basis for making comparisons of progress towards multiple national SDG targets across different scenarios of ecosystem change, for example, arising from land-use planning or investment decisions.

MESH can either run on global datasets where local data is not available or user-provided datasets for specific contexts and finer scale studies. Pilot studies in the Volta Basin will be used to test and validate the accuracy and utility of MESH in decision-making and feedback into model improvements.

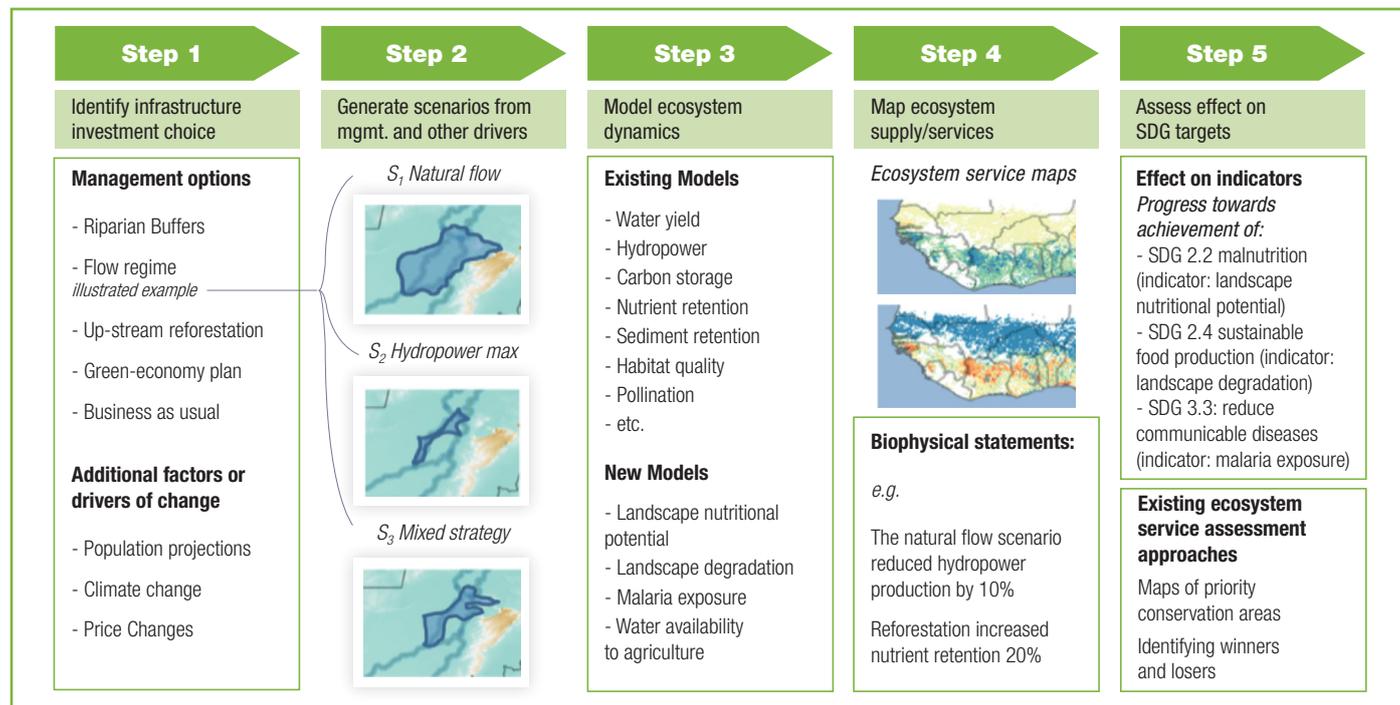
| MESH  | MESH-SDG  |
|---|---|
| <ul style="list-style-type: none"> <li>• Landscape Carbon Storage</li> <li>• Watershed Water Yield</li> <li>• Hydropower Capacity</li> <li>• Avoided Sedimentation</li> <li>• Nutrient Exports</li> <li>• Pollinator abundance</li> <li>• ...More InVEST models to come!</li> </ul> | <ul style="list-style-type: none"> <li>• Crop Production value (\$/ha and \$/m<sup>3</sup> water)</li> <li>• Crop species diversity index</li> <li>• Prevalence of under nourishment</li> <li>• Agricultural carbon emissions</li> <li>• Land at risk of degradation</li> <li>• Human water quality footprints*</li> <li>• Urban water quality footprint*</li> <li>• Quantity of urban water runoff*</li> <li>• No. people without adequate quantity of quality water*</li> <li>• No. people exposed to diarrheal disease*</li> <li>• No. people living in malaria risk zone</li> </ul> |
| <p>* WaterWorld models</p>  |   |

Ecosystem changes can be linked to some SDGs more readily than others. We consider only those SDG targets where scientific evidence for linkages between ecosystem change and the target is convincing. MESH-SDG will link ecosystem change to six SDGs: food security (SDG2), health (SDG3), water (SDG6), sustainable cities (SDG11), climate (SDG 13), and conservation of terrestrial ecosystems (SDG15).

MESH-SDG outputs are designed to respond to the information needs of stakeholders seeking to achieve the SDGs, using the best available science (see Figure 3).

MESH contributors: Bioversity International, CGIAR (WLE, PIM), Columbia University, King's College London, NCEAS, The Natural Capital Project, The Nature Conservancy

**Figure 2:** Current modelling capabilities of MESH and future modelling capabilities of MESH-SDG.



**Figure 3:** Example of MESH-SDG workflow in an intervention decision-context.



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Determining the economic value of nature, in hard numbers, is the goal of the Natural Capital Project. Founded in 2006, the Project is a partnership between Stanford-based Woods Institute for the Environment, the Nature Conservancy, the World Wildlife Fund and the University of Minnesota's Institute on the Environment.