



Showcasing results and demonstrating impact

Subject 2 - Methods and Tools: Lessons learned in measuring agricultural innovation and its impacts

The Conference

Third Global Conference on Agricultural Research for
Development



Theme 2
**Showcasing results and
demonstrating impacts**



RESEARCH
PROGRAM ON
Water, Land and
Ecosystems

MESH-ing Ecosystem Services & Human well-being for the SDGs



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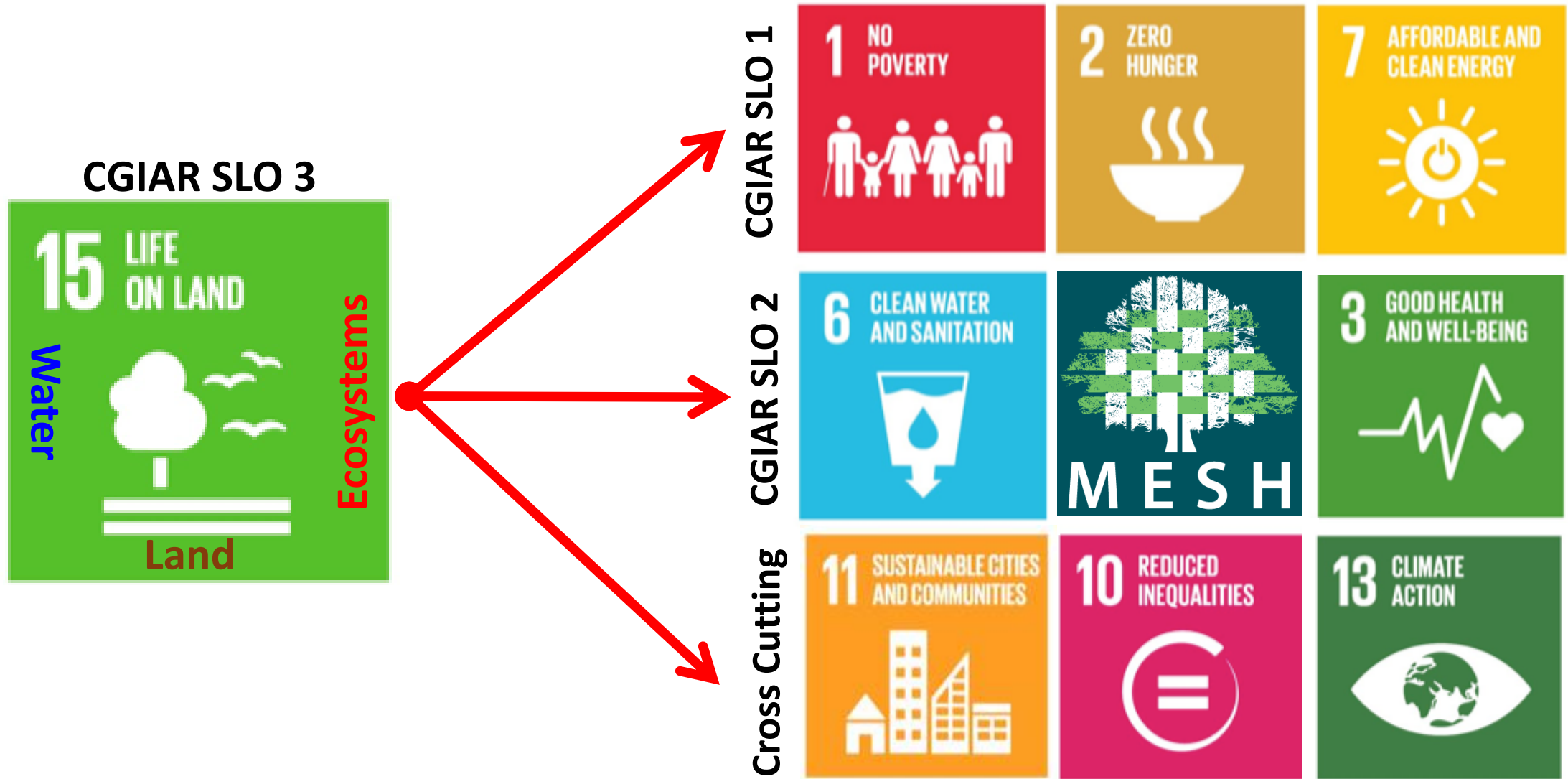
Fabrice DeClerck, Sarah Jones, Sylvia Wood (Bioversity International)

And

Justin Johnson, The Natural Capital Project (University of Minnesota)

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What does environment contribute to development?



Step 1

Identify Infrastructure investment choice

Step 2

Generate scenarios from mgmt. and other drivers

Step 3

Model ecosystem dynamics

Step 4

Map ecosystem supply/services

Step 5

Assess effect on SDG targets

Management options

- Riparian Buffers
- Flow regime
Illustrated example
- Up-stream reforestation
- Green-economy plan
- Business as usual

Additional factors or drivers of change

- Population projections
- Climate change
- Price Changes

S_1 Natural flow



S_2 Hydropower max



S_3 Mixed strategy



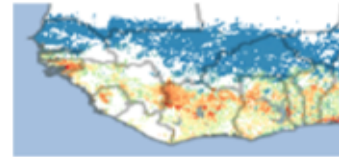
Existing Models

- Water yield
- Hydropower
- Carbon storage
- Nutrient retention
- Sediment retention
- Habitat quality
- Pollination
- etc.

New Models

- Landscape nutritional potential
- Landscape degradation
- Malaria exposure
- Water availability to agriculture

Ecosystem service maps



Biophysical statements:

e.g.

- The natural flow scenario reduced hydropower production by 10%
- Reforestation increased nutrient retention 20%

Effect on indicators

Progress towards achievement of:

- SDG 2.2 malnutrition (indicator: landscape nutritional potential)
- SDG 2.4 sustainable food production (indicator: landscape degradation)
- SDG 3.3: reduce communicable diseases (indicator: malaria exposure)

Existing ecosystem service assessment approaches

- Maps of priority conservation areas
- Identifying winners and losers



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What have we done so far?



The screenshot shows the MESH-SDG Model software interface. It includes a 'Project Details' panel on the left with 'Current project: volta_esp' and 'Area of interest: watersheds_robinson.shp'. Below this is a 'Setup Baseline model runs' section with four 'Setup' buttons. A central 'View Input and Output Maps' panel displays a map of 'Water Yield' with a color scale from 0 to 600 mm per year. On the right, a 'Define Scenarios' panel lists 'Baseline', 'NoAg', 'SusAg', and 'AllowAg' scenarios. Below that is a 'Map Viewer' panel with 'Display Maps from Scenarios' and a list of map files. At the bottom, there are 'Additional models can be added as plugins.' and 'Install Plugins' buttons. A status bar at the very bottom shows 'Project saved' and coordinates 'x=1373.98 y=244.144'.

1. Scenario Generator

2. Select relevant ES

4. Results output

5. Report

3. Run the models

- Led by **Bioversity International** as **WLE Contribution**
- Research supported by **WLE** and **PIM** with several partner centers (**CIAT, ICRAF, CIFOR, IFPRI, IWMI**)
- Strong collaboration with the **Natural Capital Project: Stanford, Minnesota, and TNC.**
- Implementation partners: **Volta Basin Authority, Ministries in Tanzania, Ghana, & Burkina Faso**
- Funded by **Science for Nature and People Partnership (SNAP)**



What we have done so far?

- *Matched ecosystem service outputs to SDG indicators*
- *Developed models for specific ecosystem services*
- *Develop integrative model Mapping Ecosystem Services and Human Well-Being (MESH)*
- *Feedback from Minsitry level partners in West Africa.*
- *Preliminary testing of model on Volta Basin Authority Strategic Action Programme*
- *Released model on NatCap page*

MESH	MESH-SDG
<ul style="list-style-type: none">• Landscape Carbon Storage• Watershed Water Yield• Hydropower Capacity• Avoided Sedimentation• Nutrient Exports• Pollinator abundance... More InVEST models to come!	<ul style="list-style-type: none">• Crop Production value (\$/ha and \$/m³ water)• Crop species diversity index• Prevalence of under nourishment• Agricultural carbon emissions• Land at risk of degradation• Human water quality footprints*• Urban water quality footprint*• Quantity of urban water runoff*• No. people without adequate quantity of quality water*• No. people exposed to diarrheal disease*• No. people living in malaria risk zone

* WaterWorld models

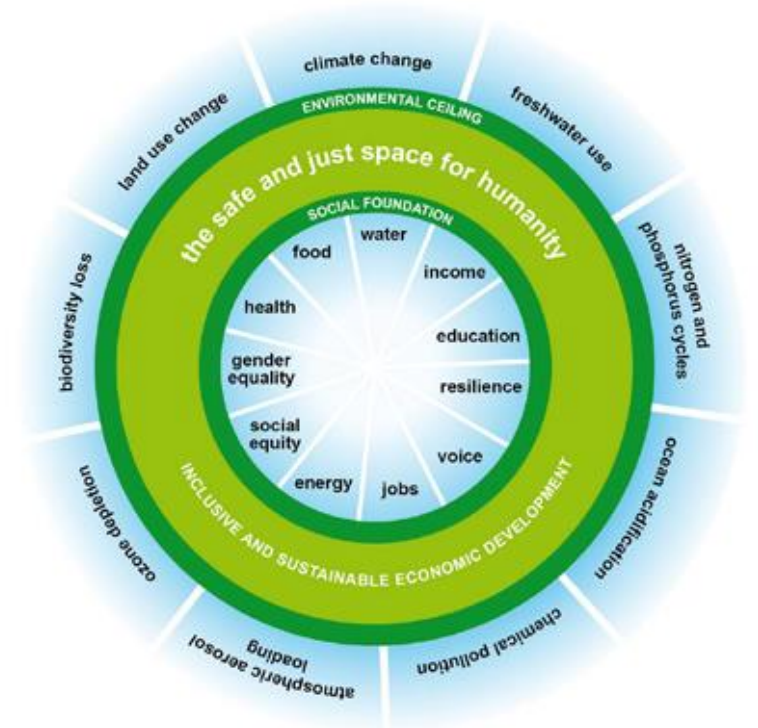
<http://www.naturalcapitalproject.org/mesh/>

What we want to achieve through GCARD3?

- *Present an approach that repositions natural resources as a means to achieving SDG's in addition to specific SDG outcome.*
- *Demonstrate progress on developing an integrative model designed for analysing trade-offs and synergies between multiple objectives in large scale investment projects.*
- *Get feedback from partners, particularly development banks and agencies charged with reporting on utility function of the model*
- *Seek potential cases for testing and refining model against real-life decisions.*

Who could be our partners?

- *Research partners to further improve model functionality and outputs.*
- *Agencies charged with developing national level SDG strategies and reporting on progress and outcomes.*
- *Development Banks and donors seeking to better understand Return on Investment and potential unintended consequences of large scale development investments:*
 - *VBA SAP*
 - *SAGCOT*
 - *Great Green Wall*
 - *Protected area establishment*
 - *New irrigation infrastructure projects*





Thank you



<http://www.naturalcapitalproject.org/mesh/>

www.biodiversityinternational.org

