



# Advancing Natural Capital Accounting

## A New GEO initiative:

# Earth Observations for Ecosystem Accounting (EO4EA)

A new initiative: demand and user driven

John Matuszak  
U.S. Department of State  
Bureau of Oceans, International  
Environmental and Scientific Affairs



# Sustainable Development and Wealth

We don't judge a company solely on the basis of its income statement—look at both **income and balance sheet**.

- Increasing assets (wealth) support *long-term* growth.
- In the short term, income can appear to grow by liquidating assets, but this undermines long-term growth.

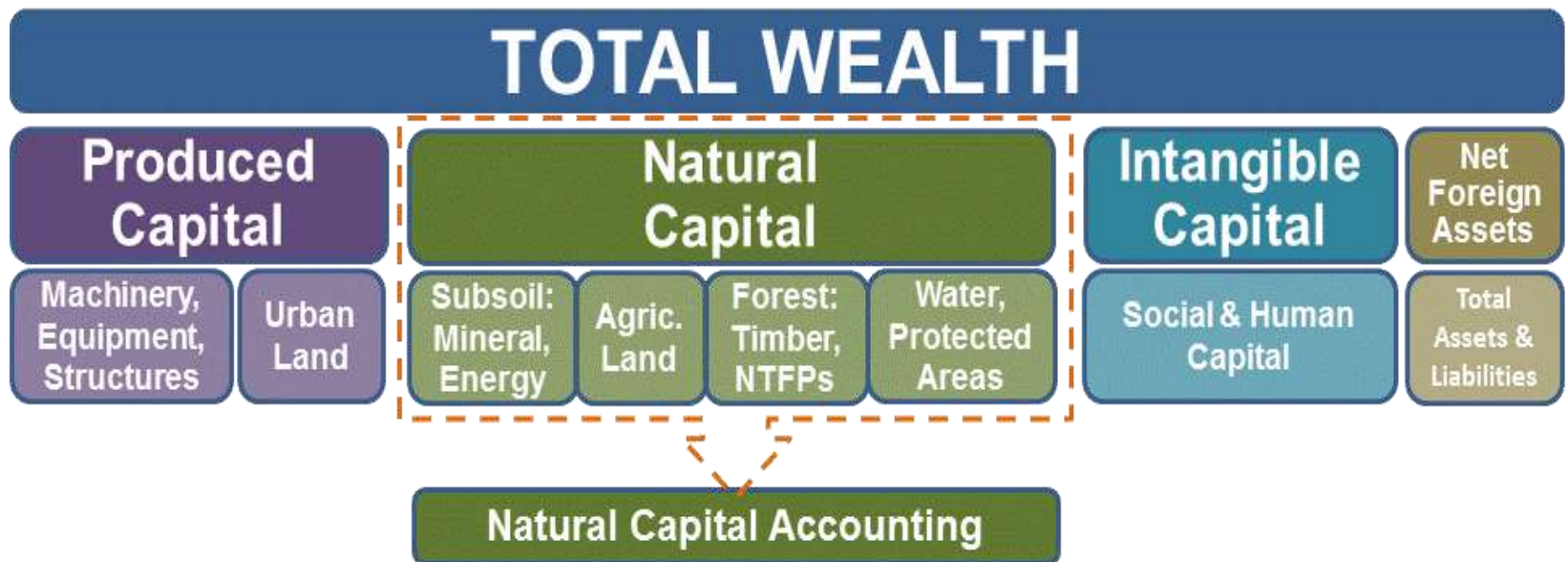
Why do we assess country economic progress on the basis of national income, GDP alone? (J. Stiglitz,, WB Nobel prize, economics former Chair President's Council of Economic Advisors, former WB Chief Economist )

The source of income and well-being is **wealth**, broadly defined to include

- Tangible/Manufactured capital (land, physical equipment infrastructure, Natural capital, 'Intangible' capital (human capital and social capital)

# Where does NCA focus?

The source of income and well-being is wealth, broadly defined to include:  
Manufactured capital, Natural capital  
'Intangible' capital – net financial assets, human capital and social capital  
NCA focuses on the part of total wealth that comes from mineral, energy, agricultural, soil, timber, and water assets



# Benefits of Natural Capital Accounting ?



Better indicators for **monitoring sustainable development:**

Wealth and Adjusted Net Savings

SCP - Resource Productivity and Material Consumption

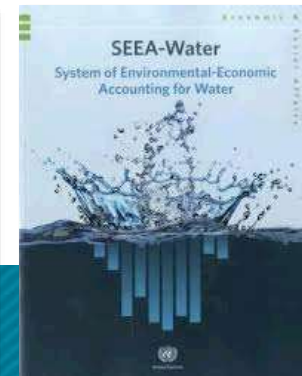
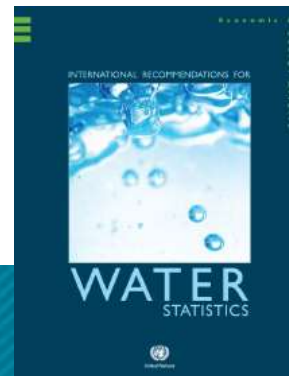
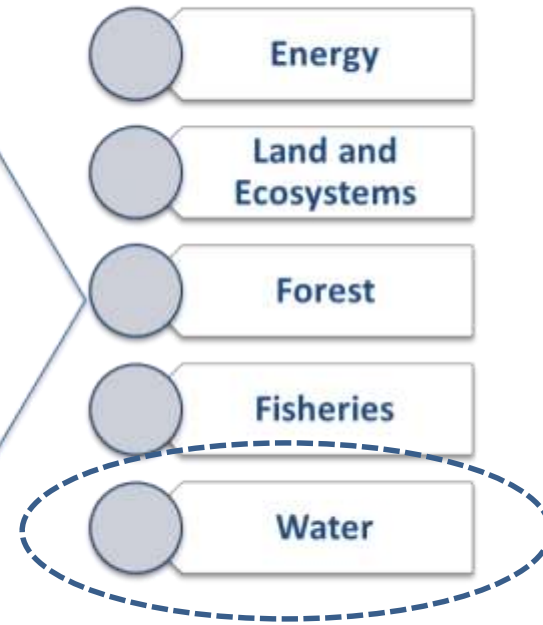
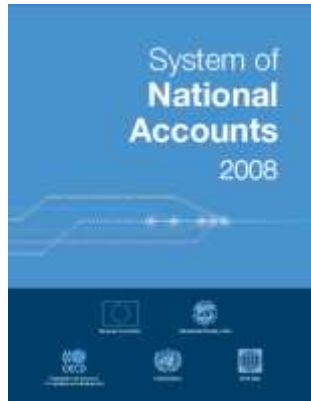


Better tools for **managing natural capital to promote growth and poverty reduction**

- Weighing tradeoffs for water, land use
- Prioritizing investments in resource management, protected areas
- Impacts of current production and consumption patterns
- Effects of economic policy measures - Environmental taxes (pollution, energy, transport and resource), subsidies and expenditures



# What is the methodology for NCA?



## **SEEA Experimental Ecosystem Accounts**

**A measurement framework for integrating biophysical data, tracking changes in ecosystems and linking those changes to economic and other human activity**

**Which ecosystems generate which ecosystem services?**

**What is the extent of the contribution of ecosystem services to economic and other human activity?**

**Which ecosystems are in the best condition and which are the most degraded?**

**What changes have occurred over time and what has been the impact on the generation of ecosystem services?**

**What monetary values might be attached to ecosystems?**



# Key differences with ecosystem services assessment

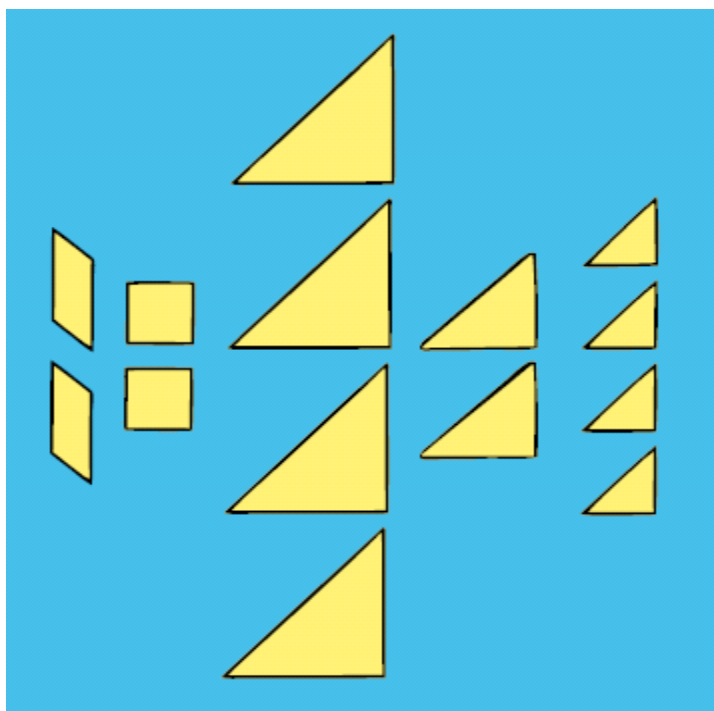
1. Uses accounting framework (opening & closing stocks) to track *stocks* and *flows*
2. Explicit focus in tracking change over time
3. Measured in biophysical & monetary terms
4. Different approaches to valuation (exchange value, not consumer surplus)
5. Direct connections to national accounts – potential to engage finance ministries that we don't often engage



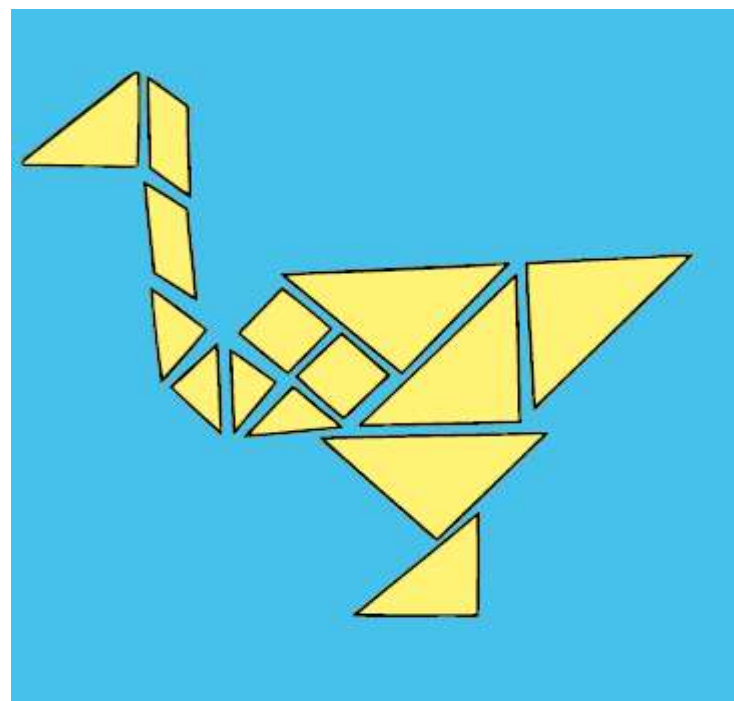
# From Statistics to Accounts

SEEA integrates environment and economic statistics by following the same statistical principles (those of the System of National Accounts)

## Statistics



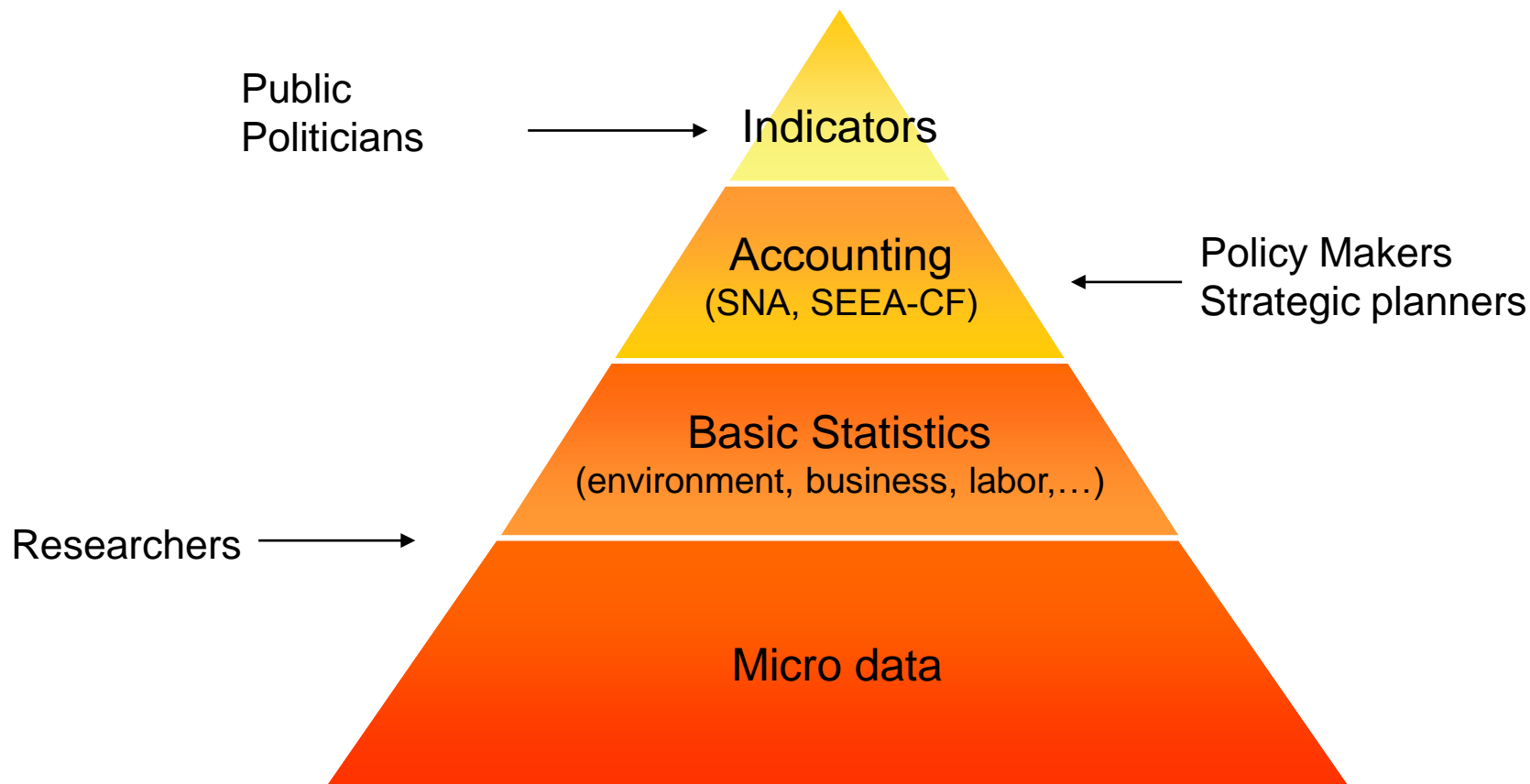
## Accounts



Source: United Nations Statistics Division



# Audiences for information





To enter widespread use,  
ecosystem service assessments need to  
be  
quantifiable, replicable, credible, flexible,  
and affordable.”



# GEO Vision

**To realize a future  
wherein decisions and actions,  
for the benefit of humankind,  
are informed by  
coordinated, comprehensive & sustained  
Earth observations & information.**



# 103 GEO Members

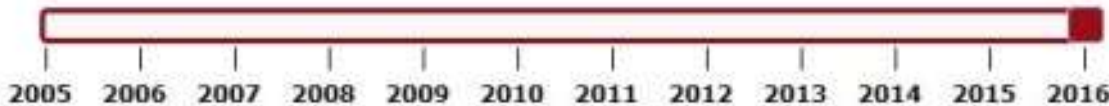
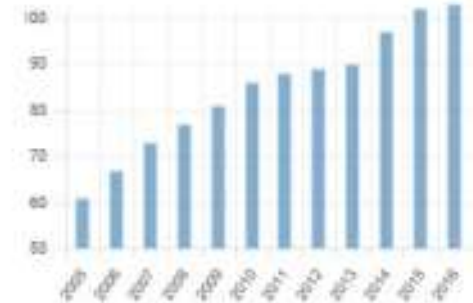


Number of Members (2016)

Africa:	27
Americas:	16
Asia/Oceania:	19
C.I.S.:	7
Europe:	34

<b>Total:</b>	<b>103</b>
---------------	------------

Number of Members by year

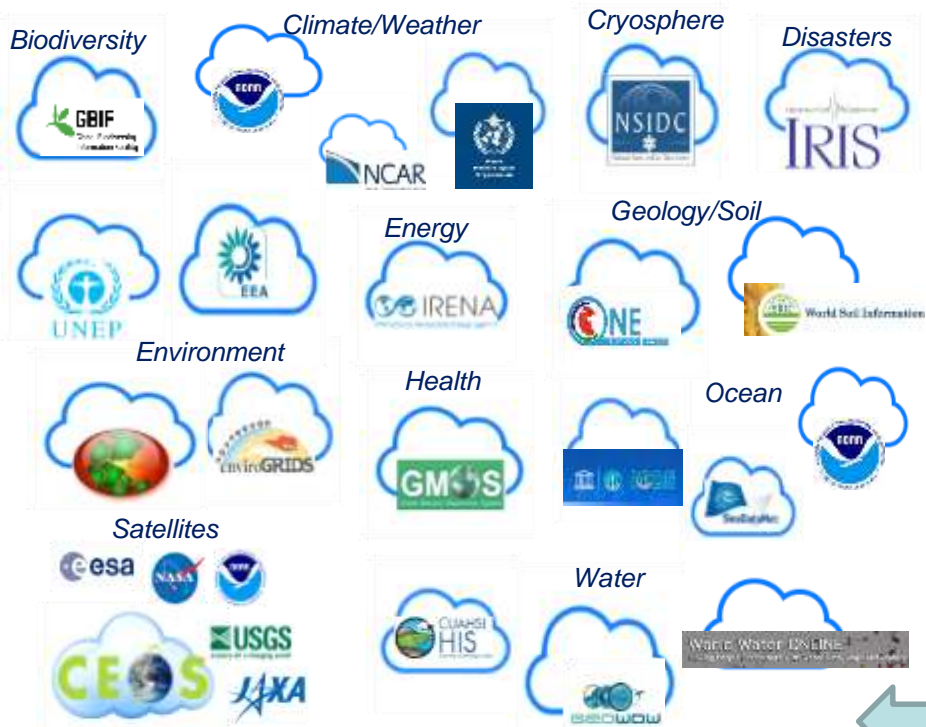




# 103 Participating Organizations



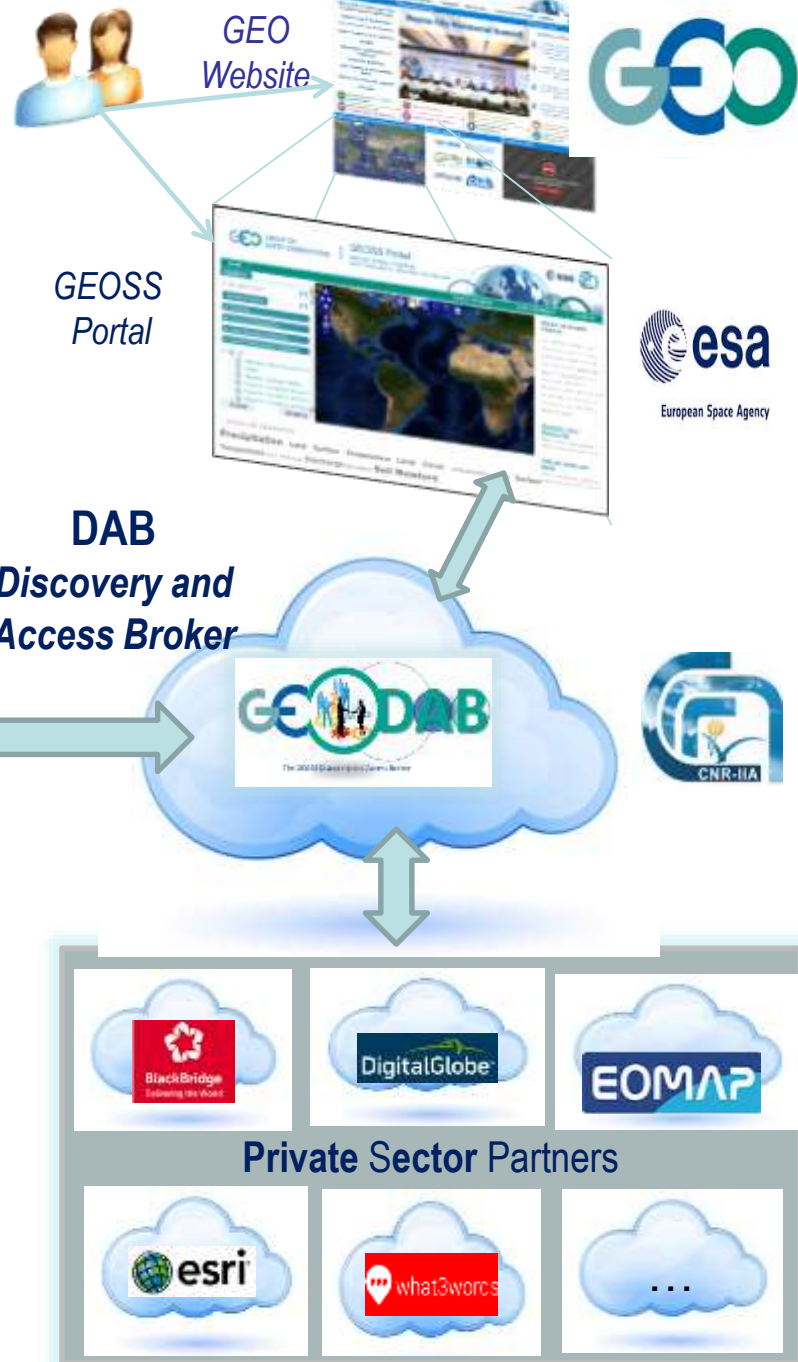

International Providers



Regional & National Providers



more than 100 Public Providers...





# **GEOSS Implementation Requires: *Data Sharing Principles***

- **Full and Open Exchange of Data -- Open by Default**
- **Data and Products at Minimum Time Delay and at Minimum Cost**
- **Free of Charge or Cost of Reproduction**





## GEO Mexico City Ministerial Declaration 2015

2) Affirm that GEO and its Earth observations and information will support the implementation of, inter alia, the 2030 Global Goals for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030, **the United Nations System of Environmental and Economic Accounts**, and the United Nations Framework Convention on Climate Change.

11) Resolve to sustain and develop the observing systems required to provide high-quality reference data and time-series Earth observations; address observation gaps; maintain and evolve the GEOSS common infrastructure as a public good to deliver data, information, and knowledge that responds to stakeholders' requests and informs their decision-making processes. **Further resolve to collaborate with statistical agencies and others to integrate Earth observations with social and economic data to multiply their collective value and to contribute solutions that are linked from the global to local levels.**



# Earth Observations for Ecosystem Accounting (EO4EA) A GEO Initiative for 2017 - 2019

## **Begin with Policy Demand**

- 1992 Sustainable Development Agenda 21 Chapter 8 - calls for Integrated Environmental and Economic Accounts, (Work undertaken by UN Statistics Commission, WB, EU and OECD).
- 2010 CBD Agrees Aichi targets and World Bank launches the Wealth Accounting and Valuation of Ecosystem Services partnership (WAVES).
- 2012 The Gaborone Declaration for Sustainability in Africa
- 2012 the UN Statistical Commission agreed the System of Environmental and Economic Accounts (UN-SEEA) and to work on the SEEA Experimental Ecosystem Accounts.
- 2014 revised European Strategy for Environmental Accounts
- 2015 US OMB-CEQ-OSTP Directive to US Agencies to incorporated Ecosystem Services into decision making.
- 2016 UNEP Resolution on Natural Capital Accounting (NCA)
- 2016 IUCN World Conservation Congress motion on NCA



# Earth Observations for Ecosystem Accounting (EO4EA) A GEO Initiative for 2017 - 2019

## Include Users in the design of the initiative

Environmental Accountants, Statisticians, Economists, Ecologists, Agronomists, Resource Managers and Policy Maker; with EO providers: Meteorologists, Hydrologists, Geographers, Soil Scientists, Chemists, Remote Sensing specialists.

### Interim Steering Committee

Statistics Canada, INEGI - Mexico, Colombia, Netherlands, US - GEO, ESA, World Bank – WAVES, Conservation International, Wageningen University and ESRI.

### Primary Work Streams:

- **Compilation and assessment of Ecosystem Accounts and their use of Earth Observation.**
- **Information needs to define ecosystem extent and condition – Biophysical (e.g. climate, hydrology, soils, topography, land cover, biodiversity); Classification of ecosystem types; sampling needs and gaps (including periodicity and scale of measurements needed).**
- **Ecosystem Services Classification Identification of EO measurements to track ecosystem services (e.g. carbon storage, water provisioning).**
- **Pilots at national and regional scales, in the US, Africa -Gaborone Declaration countries, South America and Europe.**





## **Compilation and assessment of Ecosystem Accounts and their use of Earth Observation.**

The initiative will:

- **compile an overview on the use of Earth Observation (EO) data in existing Ecosystem Accounting efforts,**
  - **examining at various scales and for different themes, and**
  - **inventory the extent to what types of Eos are being used.**

**Examples to included:**

**Australia Victoria Parks, Great Barrier Reef; Netherlands – Limburg; Canada – MEGS; Mexico/UNSD/CBD; WB WAVES related - Himachal Pradesh (India), the Philippines, Colombia, Costa Rica and Rwanda, Peru/CI**

**Groups involved: Conservation International and the Government of Peru, the European Environment Agency, WAVES, and several of its core implementing countries developing ecosystem accounts, Statistics Canada, INEGI, and Wageningen University and the Netherlands.**



## **Information needs to define ecosystem extent and condition**

The initiative will:

- **Review the information needs to define ecosystem extent and condition – Biophysical (e.g. climate, meteorology; hydrology, soils, topography, land cover, biodiversity);**
- **Work with EO providers to facilitate mapping and monitoring ecosystem extent and condition.**
- **Develop an outline for methodological guidance on the use of EOs for Ecosystem Accounts including recommendations on definitions, indicators, scale and temporality,**
- **Review sampling regimes and the opportunities and challenges of using various types of sensors from satellite to *in situ*.**



## **Information needs to define ecosystem extent and condition**

(continued)

- **Examine ways to assess the quality and usefulness of EO data for accounting**
  - **the ability to track change over time,**
  - **the alignment between different EO datasets, and**
  - **the consistency of EO data with statistical survey data (e.g. On land cover/use including forestry statistics) and other spatial data source such aerial photography and other forms of ground truthing.**
- **The task force will look at research needs and to the development of tools to facilitate these efforts.**
- **This aims to provide input to the UN Statistical Commission’s revision of the technical guidelines for SEEA–EEA in 2017 and beyond.**

**Partners:**

- **USGS, NOAA, CI, Mexico, ESRI, ESA, EEA and others.**



# Ecosystem Services Classification Identification of EO measurements to track ecosystem services

The initiative will:

- **Examine how EOs can contribute to the identification, measurement and monitoring of ecosystem services. (e.g. carbon storage, water provisioning).**
- **Build on the efforts of the UNSD, US EPA and EEA to understand the classification and measurements of ecosystem services and the extent to which EO may be useful in tracking biophysical changes that are a component of the Ecosystem service**
- **Identify research needs, including tools and analytics needed to translate EOs into accounting frameworks and its use in valuation efforts and as a compliment to the UN Statistics Division System of National Accounts.**

Partners include:

**US EPA, EEAStatistics Canada, Wageningen University, Conservation International, ESA and others.**



## **Pilots at national and regional scales**

The initiative will:

- **Design and implement pilots to examine methodologies and scale in countries with robust data availability;**
- **Design and develop pilots in countries and regions with limited availability of data such as the countries that have signed the Gaborone Declaration on Natural Capital Accounting; and**
- **Seek other opportunities to develop accounts based wholly or primarily on EO data.**

**Partners include:**

**CI, WAVES, ESA, NASA, ESRI**





# Earth Observations for Ecosystem Accounting (EO4EA)

Thank You

John Matuszak

[matuszakjm@state.gov](mailto:matuszakjm@state.gov)

<https://www.earthobservations.org/index.php>