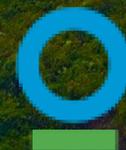


EXPERIMENTAL ECOSYSTEM ACCOUNTING: SAN MARTIN, PERU CASE STUDY

Daniel Juhn

EO4EA Workshop
EEA - Copenhagen
March 27, 2017



“We need to take stock and attach value to our natural resources and ecosystems such that we may include their value in planning and decision making processes as well as in our national accounts and balance sheets”

President Ian Khama

President of Botswana

“Natural capital – our ecosystems, biodiversity, and natural resources – underpins economies, societies and individual well-being. The values of its myriad benefits are, however, often overlooked or poorly understood. They are rarely taken fully into account through economic signals in markets, or in day to day decisions by business and citizens, nor indeed reflected adequately in the accounts of society”

President Ellen Johnson Sirleaf

President of Liberia

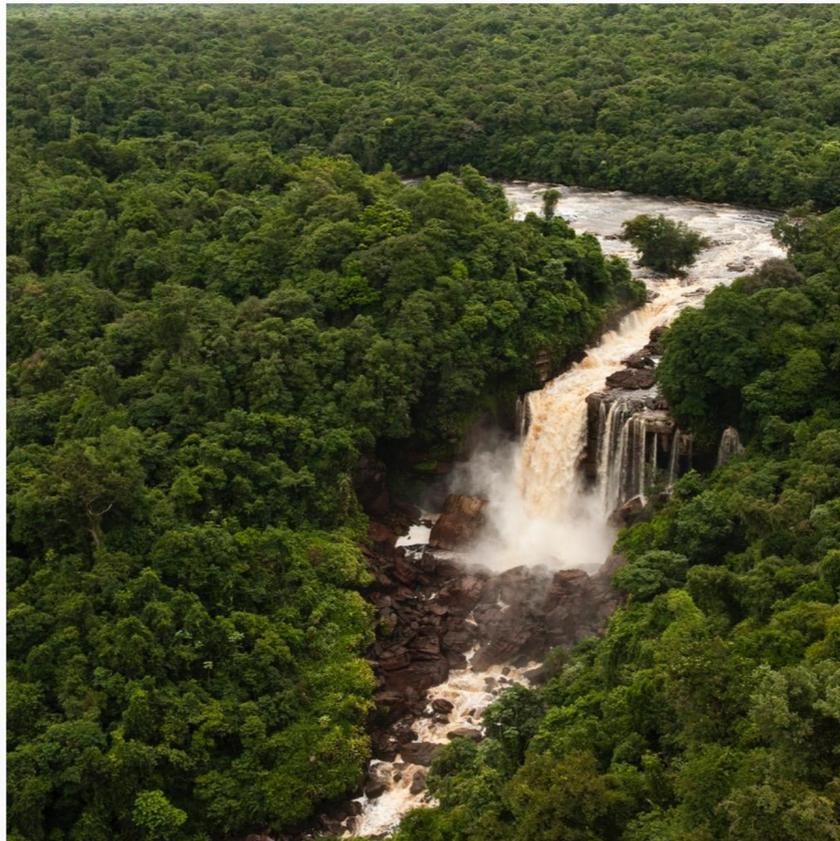
POVERTY WILL ONLY BE MADE HISTORY WHEN NATURE ENTERS ECONOMIC CALCULATIONS IN THE SAME WAY AS DO BUILDINGS, MACHINES, ROADS AND, FOR EXAMPLE, SOFTWARE.

DASGUPTA, 2005



IGNORING NATURE JEOPARDIZES PROSPERITY

Economies and societies need nature to thrive.



Impacts and dependencies are ignored

**As a result we are losing the natural capital that humans depend
on**



NATURAL CAPITAL ACCOUNTING

- Measures the value of ecosystems (stocks) and the services they provide (flows)
- Integrates this information into accounting systems that governments already use in their decision-making
- Provides a more complete view of a country's assets



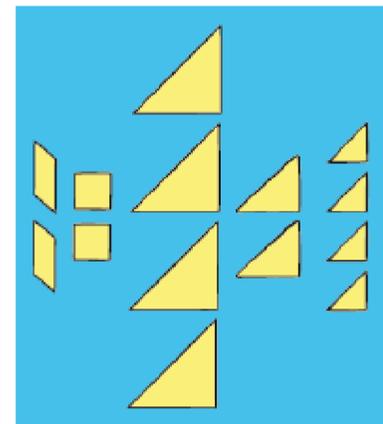
WHY AN ACCOUNTING FRAMEWORK?

Assessments or Statistics

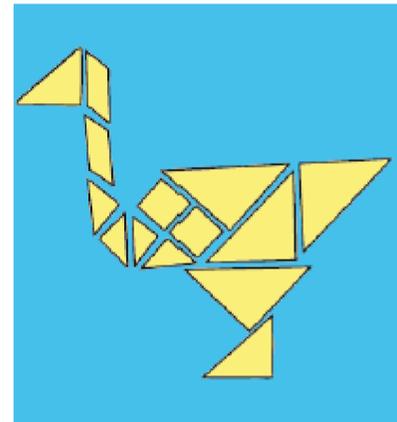
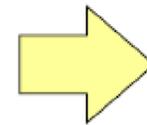
- Often developed to answer one particular question or problem
- Difficult to figure out if all information is included
- Not always easy to see the whole picture, or how it relates to other things

Accounts

- Help to make sense of the larger picture
- Help to identify pieces that are missing
- Can make connections to other statistics - especially economic statistics



Sectoral Data



Integrated information



WHAT USES?
WHO USES?
HOW MUCH?
WHAT VALUE?

assessments

- Economic Valuation
- Mapping

- TEEB-like approaches

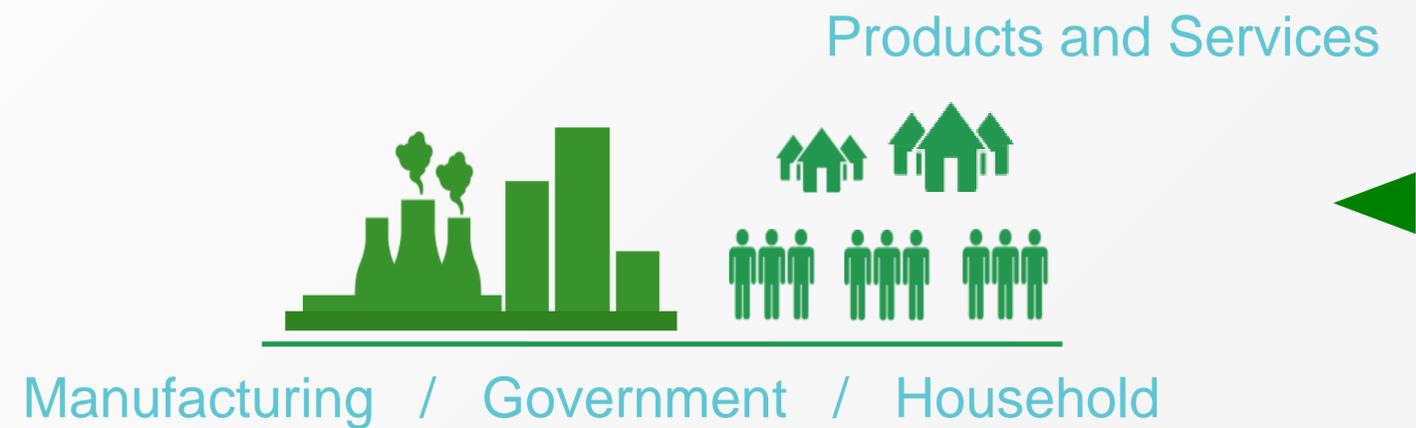
accounting

- Central Framework
- Ecosystem Accounting



SEEA: CENTRAL FRAMEWORK AND ECOSYSTEM ACCOUNTING

System of National Accounts



Central Framework

Water
Carbon
Land
Soil
Timber

Aquatic,
Biological,
and Water
Resources

Ecosystem Accounting

Sources + Flows
from Nature

Ecosystem Extent
Condition
Ecosystem Services
Supply and Use
Capacity
Biodiversity

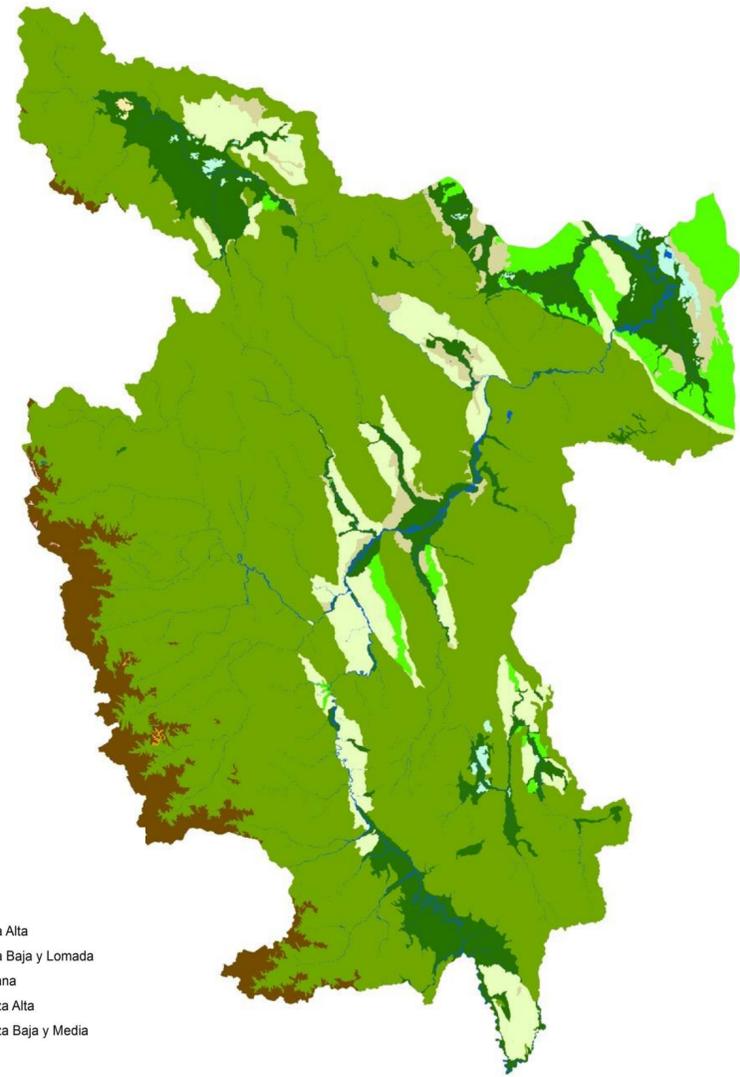


KEY ECOSYSTEM ACCOUNTS

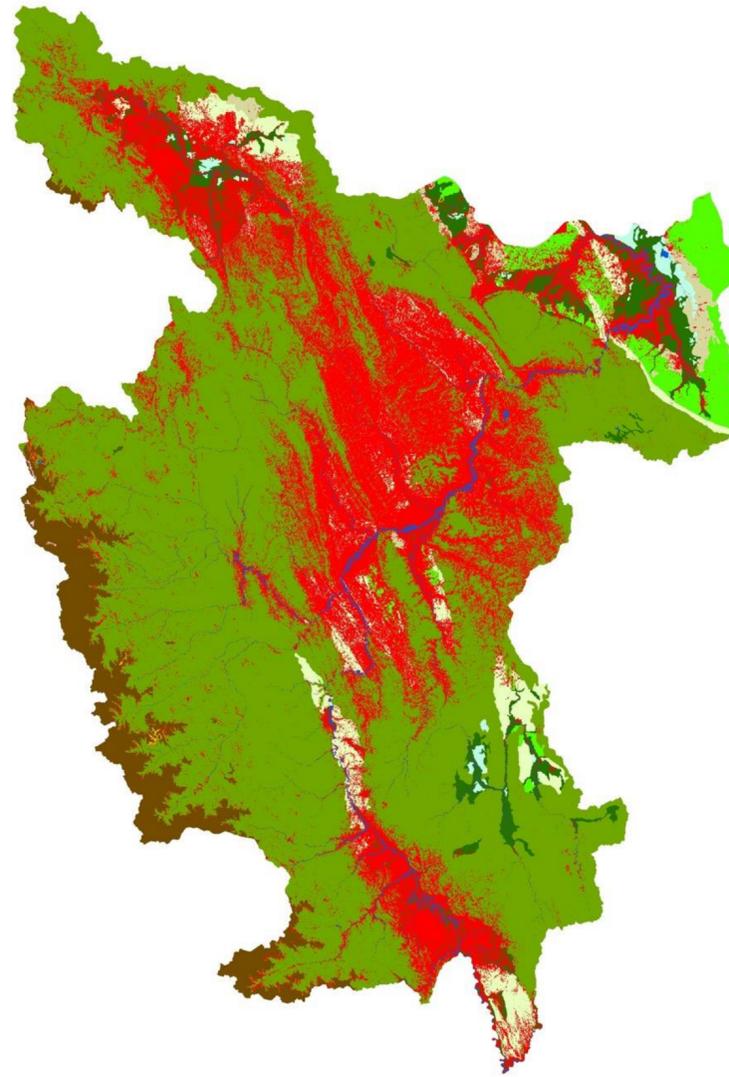
Ecosystem Accounts	Description	Type of Account
Ecosystem Extent	Records statistics on the area of ecosystem distributions over an accounting period.	Primary
Ecosystem Condition	Records statistics on the characteristics that reflect the condition or quality of an ecosystem.	Primary
Ecosystem Services Supply and Use	Records ecosystem services flows from the ecosystems (i.e. its supply) and flows to beneficiaries (i.e. its use). Measurements are in physical and where appropriate monetary values.	Primary
Extended Supply and Use Table	The aim of extended supply and use table is to embed the measures of ecosystem service flows into the SNA Supply Use Table	Primary
Biodiversity	A cross cutting account that records statistics independent of different ecosystem types on biodiversity values. It is a standalone account but also used as input for the ecosystem condition account.	Thematic
Carbon	Contains information on the stocks and flows of carbon within ecosystems	Thematic
Water	Contains information on the stocks and flows of water including inter-ecosystem flows	Thematic



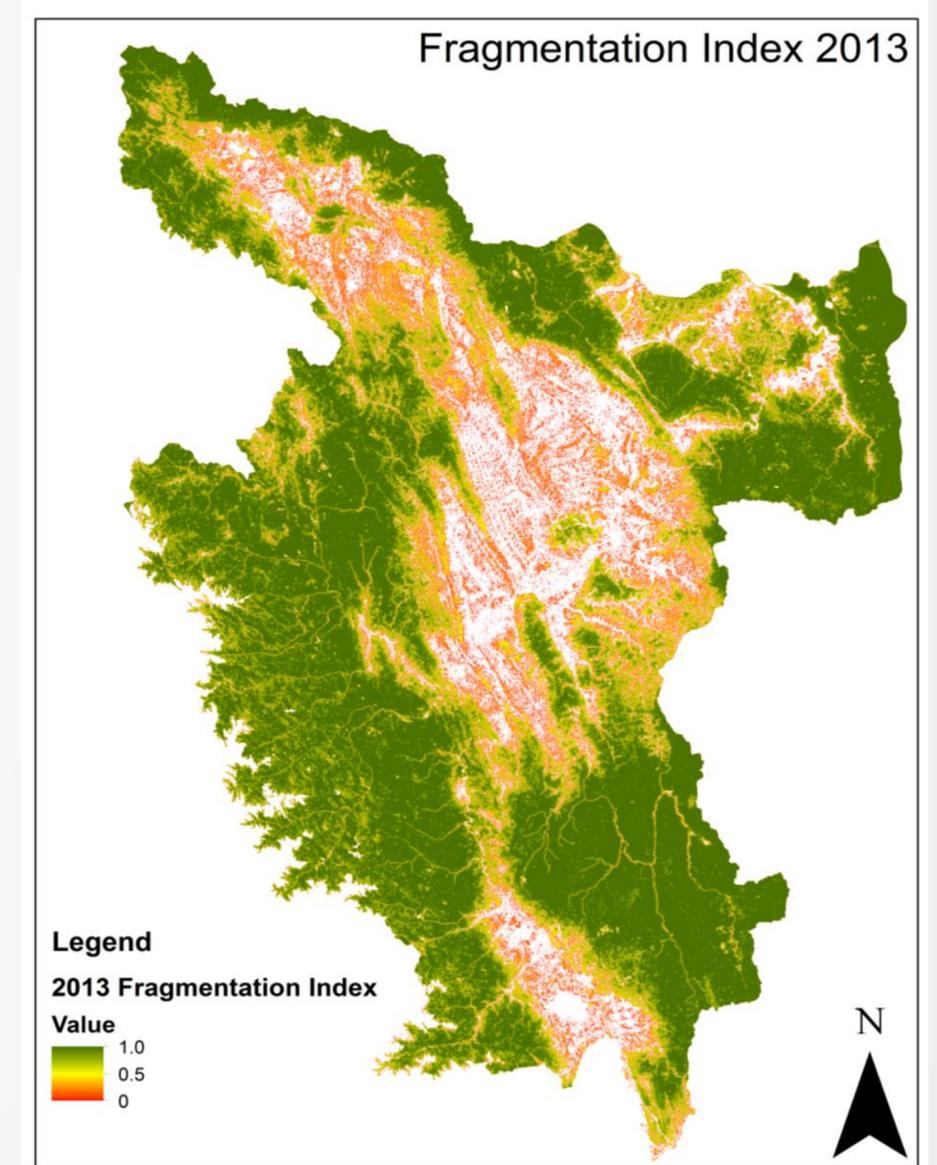
EXTENT AND CONDITION



EXTENT: ORIGINAL
DISTRIBUION



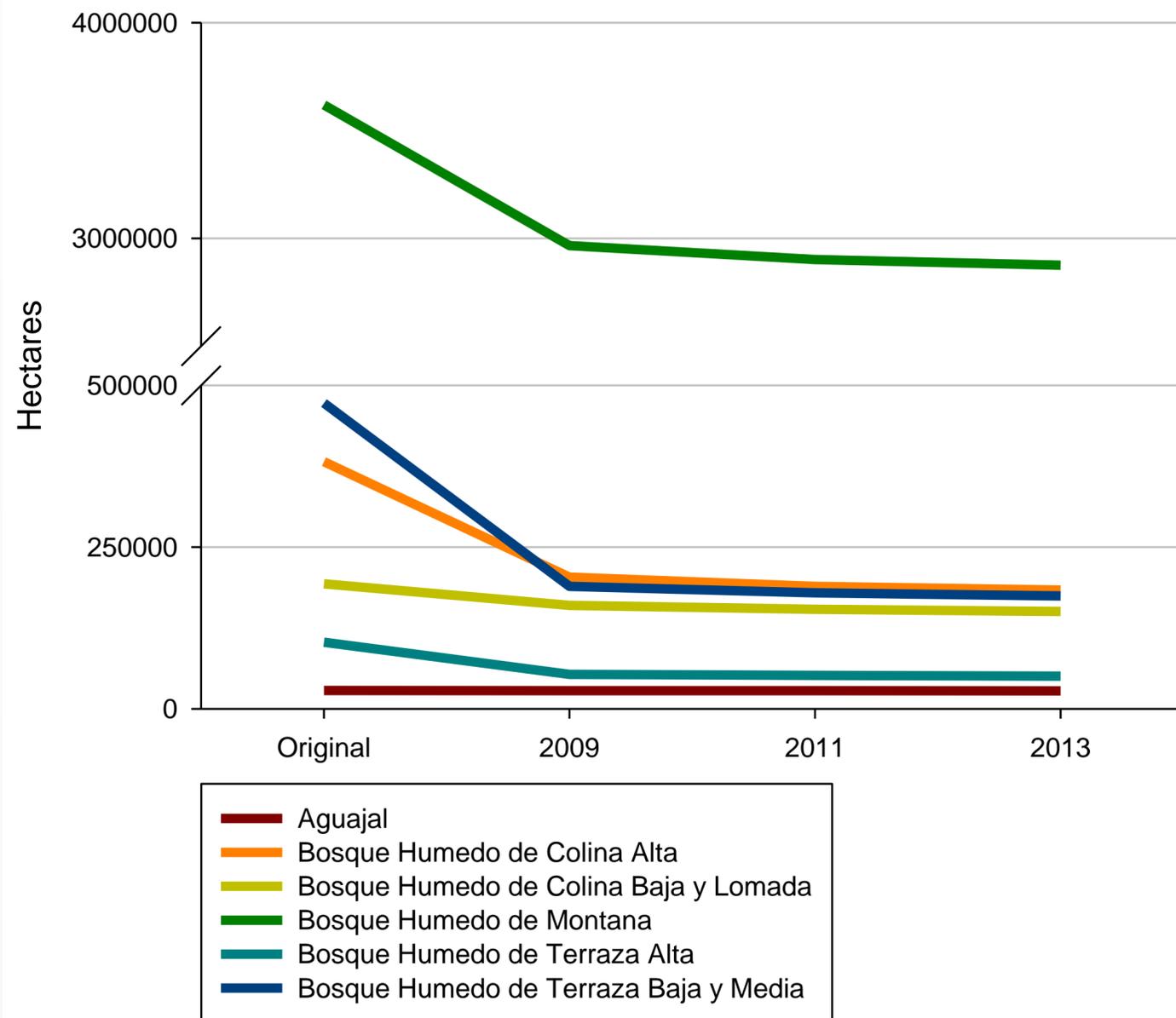
EXTENT: 2012



FRAGMENTATION

- Boques**
- Bosque Humedo de Colina Alta
 - Bosque Humedo de Colina Baja y Lomada
 - Bosque Humedo de Montana
 - Bosque Humedo de Terraza Alta
 - Bosque Humedo de Terraza Baja y Media
- Herbazal**
- Matorral Arbustivo
 - Herbazal Hidrofitico
- Pastizal**
- Paramo y Pajonal Altoandino
- Bosques Inundables y Cuerpos del Agua**
- Bofedal
 - Aguajale
 - Cuerpos del Agua
- Ecosistemas Modificados**
- Ecosistemas Modificados

CHANGE IN EXTENT OF FOREST ECOSYSTEMS

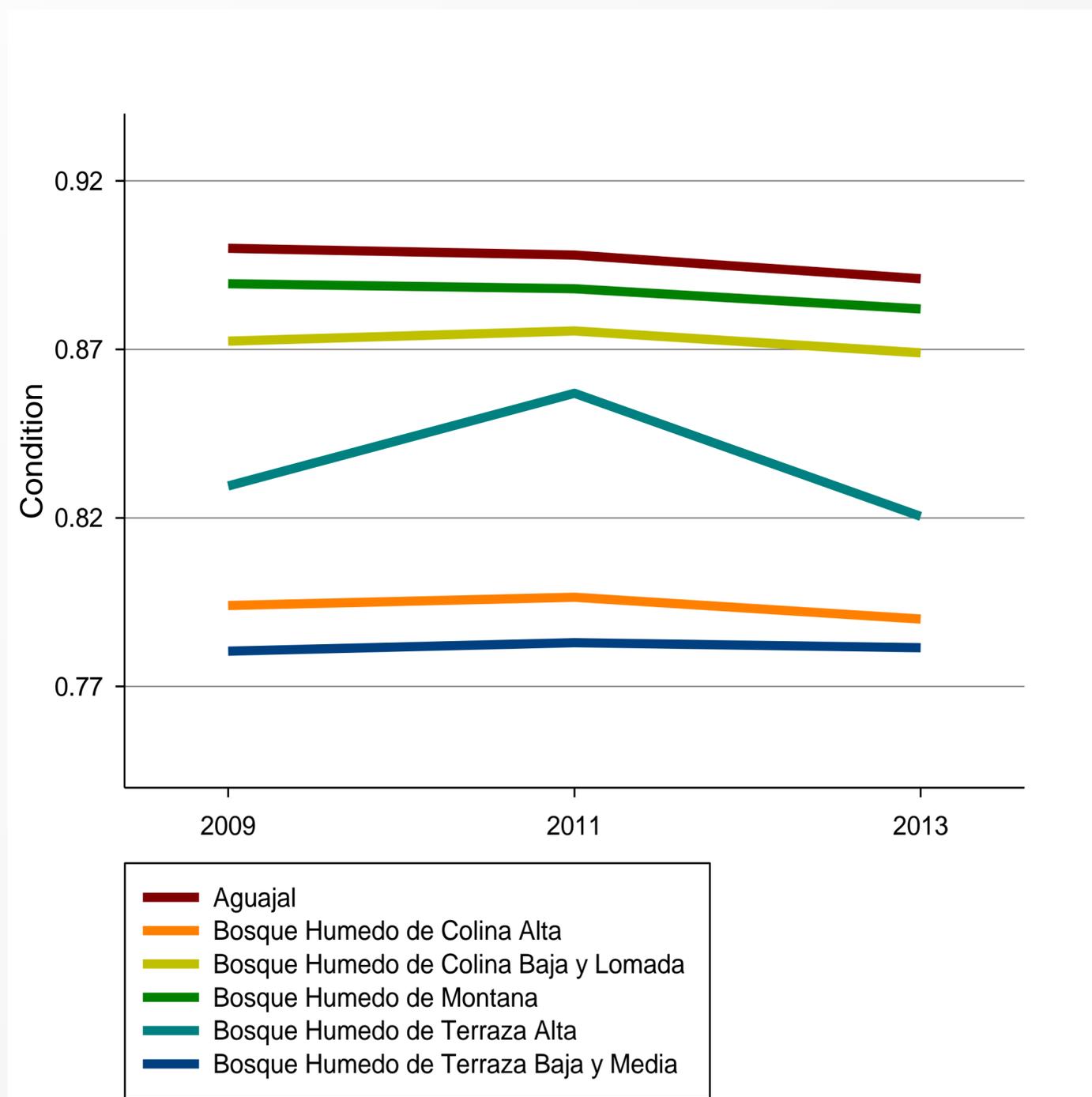


Statistics compiled for four broad ecosystem types (forests, shrublands, grasslands and water bodies) originally covering around 5 million ha

Between 2009 and 2013 ecosystems declined by 139,000 ha to 3,754,509 ha. Expansion of agriculture – primarily coffee and cocoa plantations, was identified as a major driver of land cover change



CONDITION: AVERAGE INDEX



Overall condition of ecosystems (combined fragmentation and biodiversity loss) has declined with forest types Aguajal and Bosque Humedo de Terraza Alta having the highest loss followed by Bosque Humedo de Colina Alta.



ECOSYSTEM
SERVICES:

BIODIVERSITY
CARBON STORAGE
AVOIDED
SEDIMENTATION
ECOTOURISM
TIMBER
BUSHMEAT
FIREFWOOD
WATER PROVISION



**CONTRIBUTION OF ECOSYSTEMS TO
THE REGIONAL ECONOMY WAS
ESTIMATED AS 191 MILLION PERUVIAN
SOL
(ABOUT US\$58 MILLION)**

**WHICH WOULD REPRESENT THE EIGHTH
BIGGEST SECTOR IN SAN MARTÍN.**

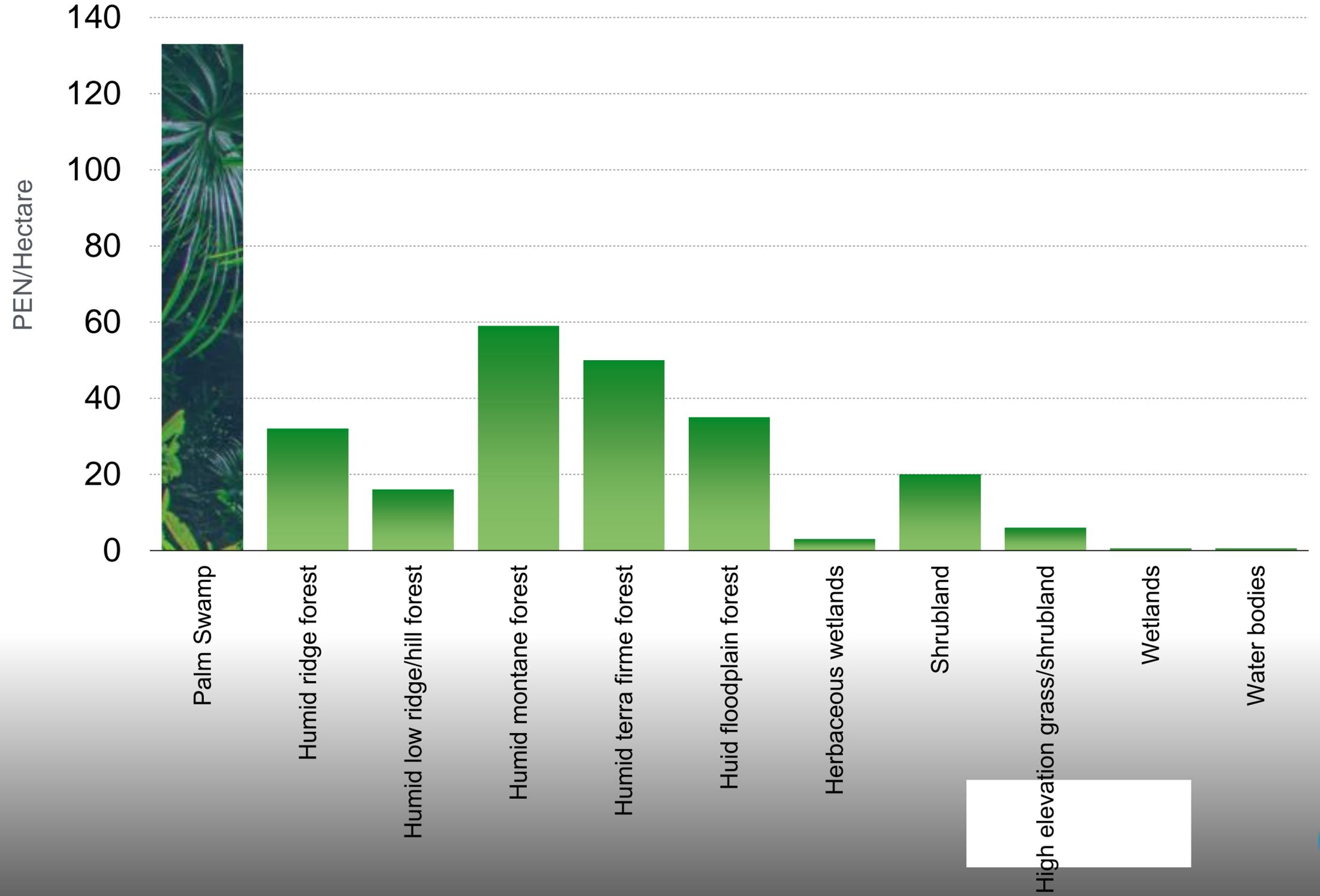
8TH OUT OF 32 SECTORS



AGUAJALE



HIGH VALUE ECOSYS TEMS



2011



Summary Stats for Peru

- Between 2009 and 2013 ecosystems declined by 139,000 ha to 3,754,509 ha. Expansion of agriculture was identified as a major driver including coffee and cocoa plantations
 - Forest fragmentation then increased again between 2011 and 2013.
- Compared to its original state, biodiversity loss was already at 12% by 2009 and since then has declined at around 0.2% per year.
- Habitat important for threatened species (including, for example, the Critically Endangered yellow-tailed woolly monkey) has been reduced on average by 17% compared to its original extent.
- Overall condition of ecosystems (combined fragmentation and biodiversity loss) has declined with forest types Aguajal and Bosque Humedo de Terraza Alta having the highest loss followed by Bosque Humedo de Colina Alta.
- Total resource rent generated by ecosystems for timber was about 31 million PEN in 2013.



Summary Stats for Peru

- Many wild species are harvested. For the pilot, the five primarily hunted species were found to be extracted at around 96,000 kg per year
- The total estimated volume of firewood extraction is 510,295 m³ (larger than predicted in Anuario Forestal)
- Total water use between 2009 and 2013 ranged between 469,531,948 and 671,110,987 m³/year. On average these terrestrial ecosystems supplied almost half of the total with the rest from modified terrestrial ecosystems.
 - The total avoided sediment load from ecosystems ranged between 1,608,869 and 2,052,758 t/year.
- Ecotourism supported by ecosystems in 2009 was 250,419 tourist days generating 70 million PEN which grew slightly in 2011.
- Ecosystems overall produced ecosystem service flows of around 200 million PEN each year. Ecosystems as an economic sector is the seventh biggest with the largest being Agriculture and Commerce.



PAPA

Developing indicators for land use planning, identification of critically important ecosystems, budget allocation and investments, development planning

- Ecosystem Benefits Index (EBI)
- Environmental Performance Index (EPI)
- Ecotourism, rice and palm swamp, hydroelectricity



NEXT STEPS IN PERU

- Post account
- Training / Capacity Building
- Other regions
- National level effort



KEY MESSAGES

- Follow SEEA ecosystem accounting framework guidelines
- Formalize institutional arrangements (MINAM, INEI)
- Utilize multi-disciplinary teams and expertise
- Ensure accounts are developed to inform key policies and decisions
- Develop extent, condition and biodiversity accounts nationally, and build ecosystem services supply and use accounts at the region level
- Use existing data
- Partial accounts are good.
- How do we meet the demand in developing countries



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ARA

ALA

AAA

ANA

INEI

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Tom Harwood

Andrew Hoskins

Justin Perry

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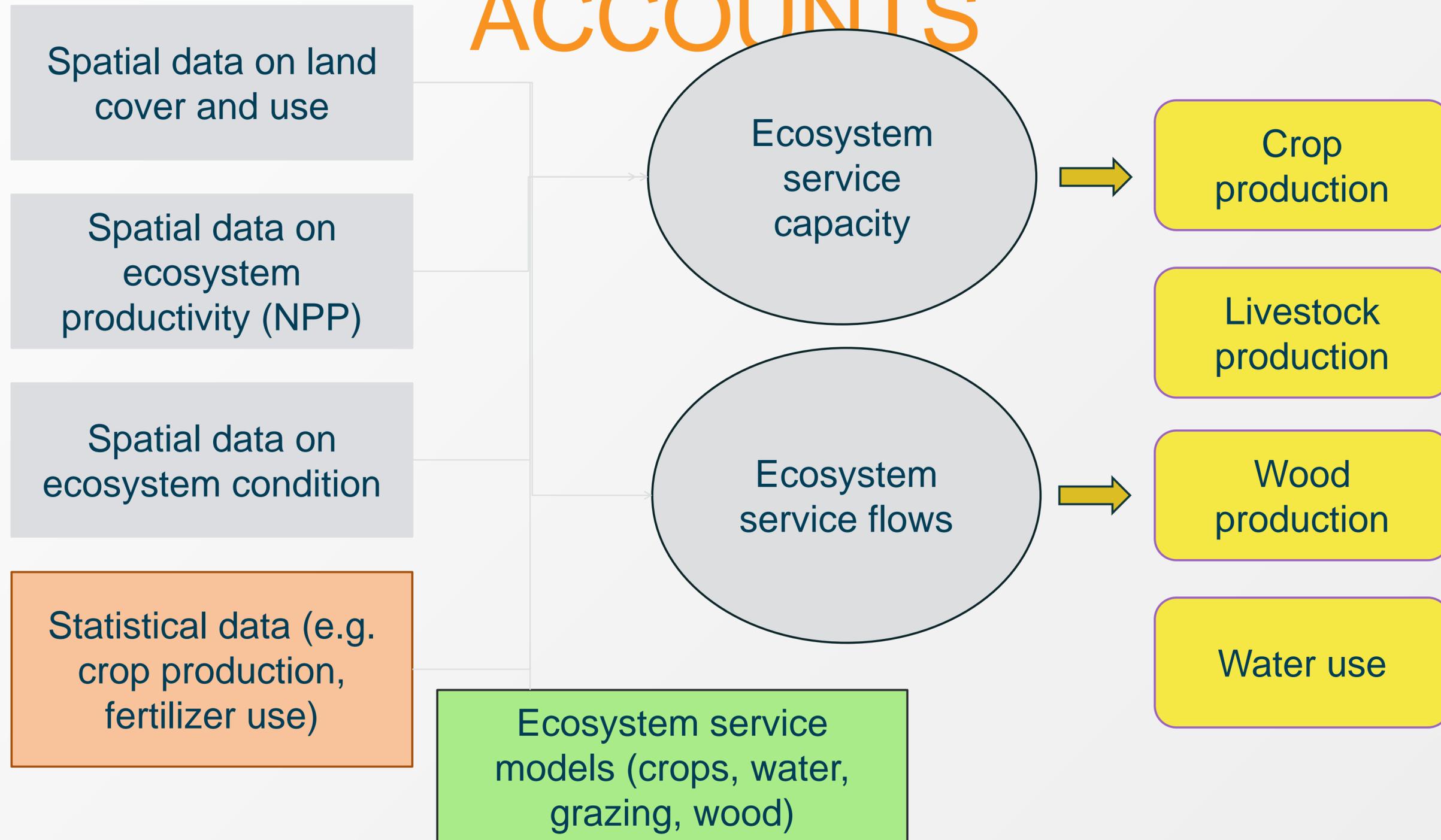
CLARK LABS



Geospatial software for monitoring and modeling the Earth system

ADDITIONAL POINTS IF THERE IS TIME

USING EARTH OBSERVATION TO INFORM ECOSYSTEM ACCOUNTS



GDSA (IN PARTNERSHIP WITH NASA)

- Map ecosystem extent across all of sub-Saharan Africa at 30 meter (or better) resolution, circa 2015
- Combination of remotely sensed (biophysical, optical, and radar) and in-situ data
- Incorporate land-cover and vegetation information to get ecosystem extent
- Ideally the classification of ecosystem extent should be able to cross walk the NCA central framework and existing accounting efforts
- Provide GDSA countries with absolutely essential information on ecosystem assets to enable further accounting.
- Further the development of extent classification for the next version of SEEA EA





THANK YOU

<http://goo.gl/cvtUeO>