

# EXPERIMENTAL ECOSYSTEM ACCOUNTING: SAN MARTIN, PERU CASE STUDY

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“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

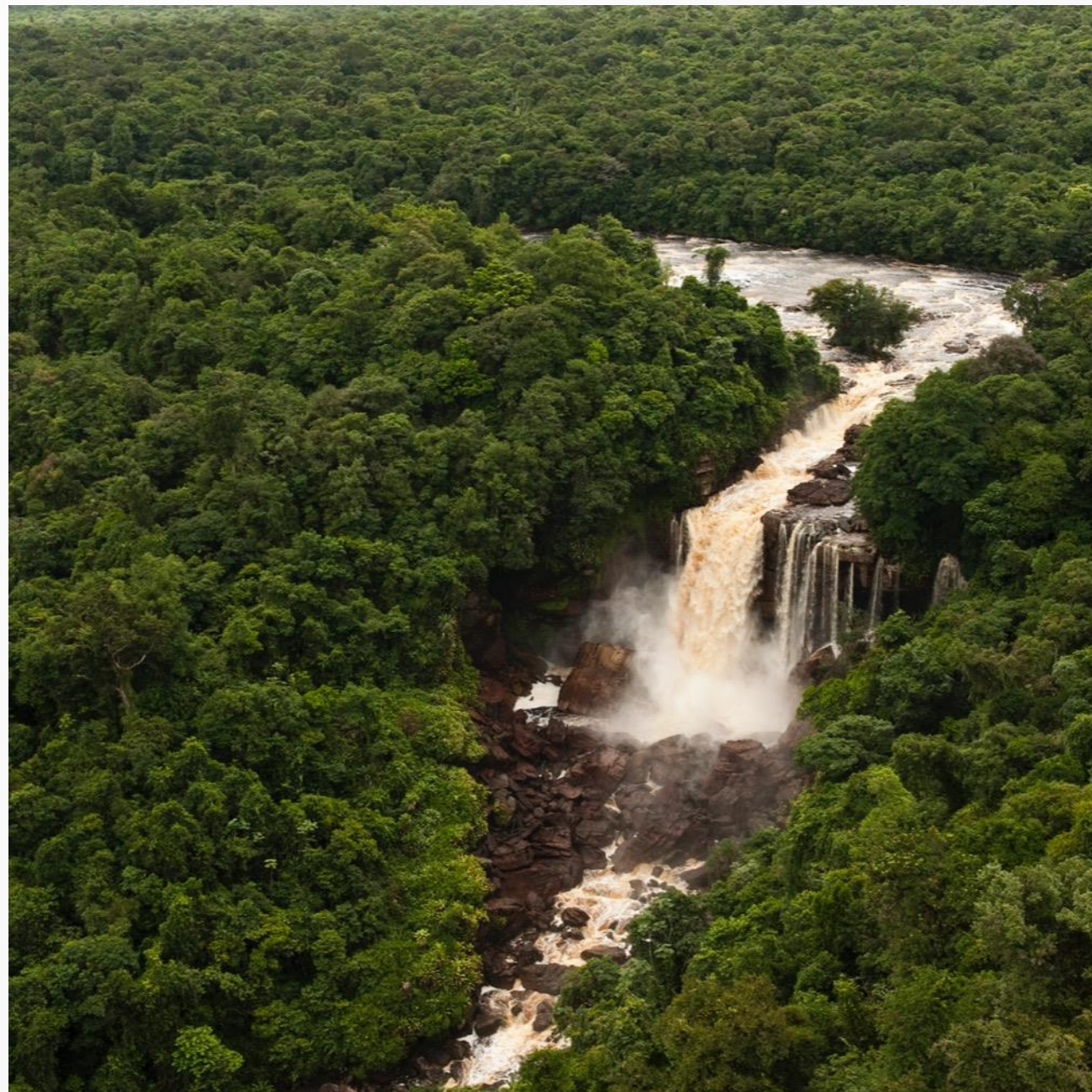
POVERTY WILL ONLY BE MADE  
HISTORY WHEN NATURE ENTERS  
ECONOMIC CALCULATIONS IN THE  
SAME WAY AS DO BUILDINGS,  
MACHINES, ROADS AND, FOR  
EXAMPLE, SOFTWARE.

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



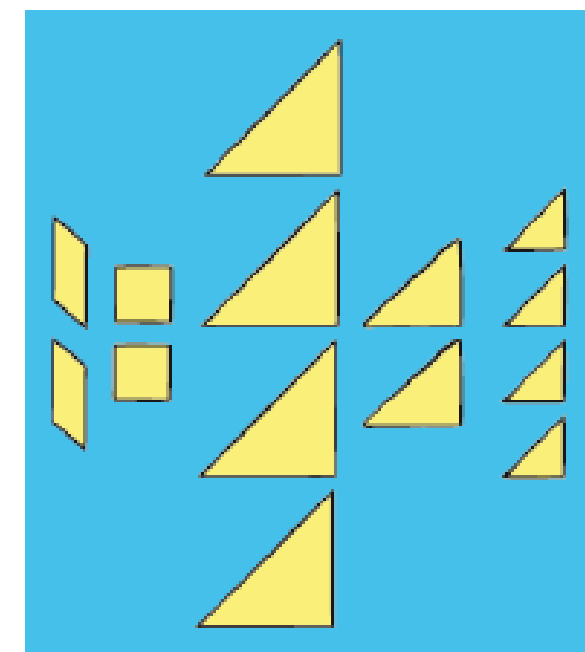
# WHY AN ACCOUNTING FRAMEWORK?

## Assessments or Statistics

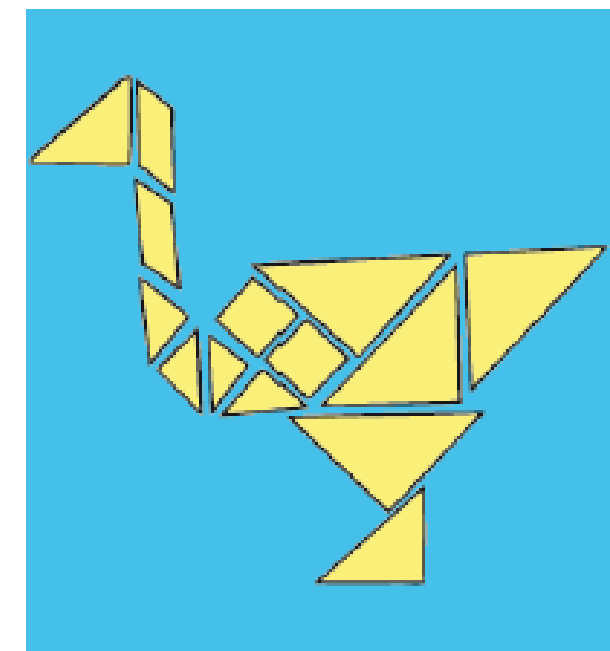
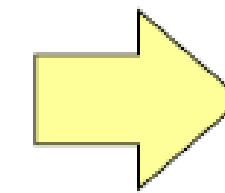
- Often developed to answer one particular question or problem
- Difficult to figure out if all information is included
- Not always easy to see the whole picture, or how it relates to other things

## 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

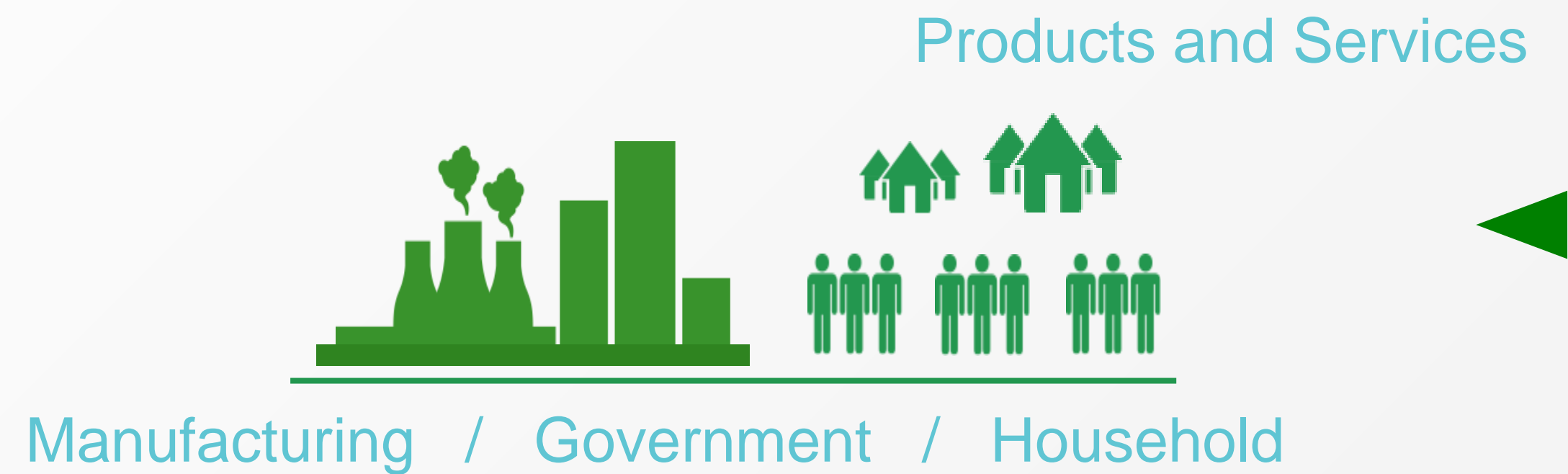
## accounting

- 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







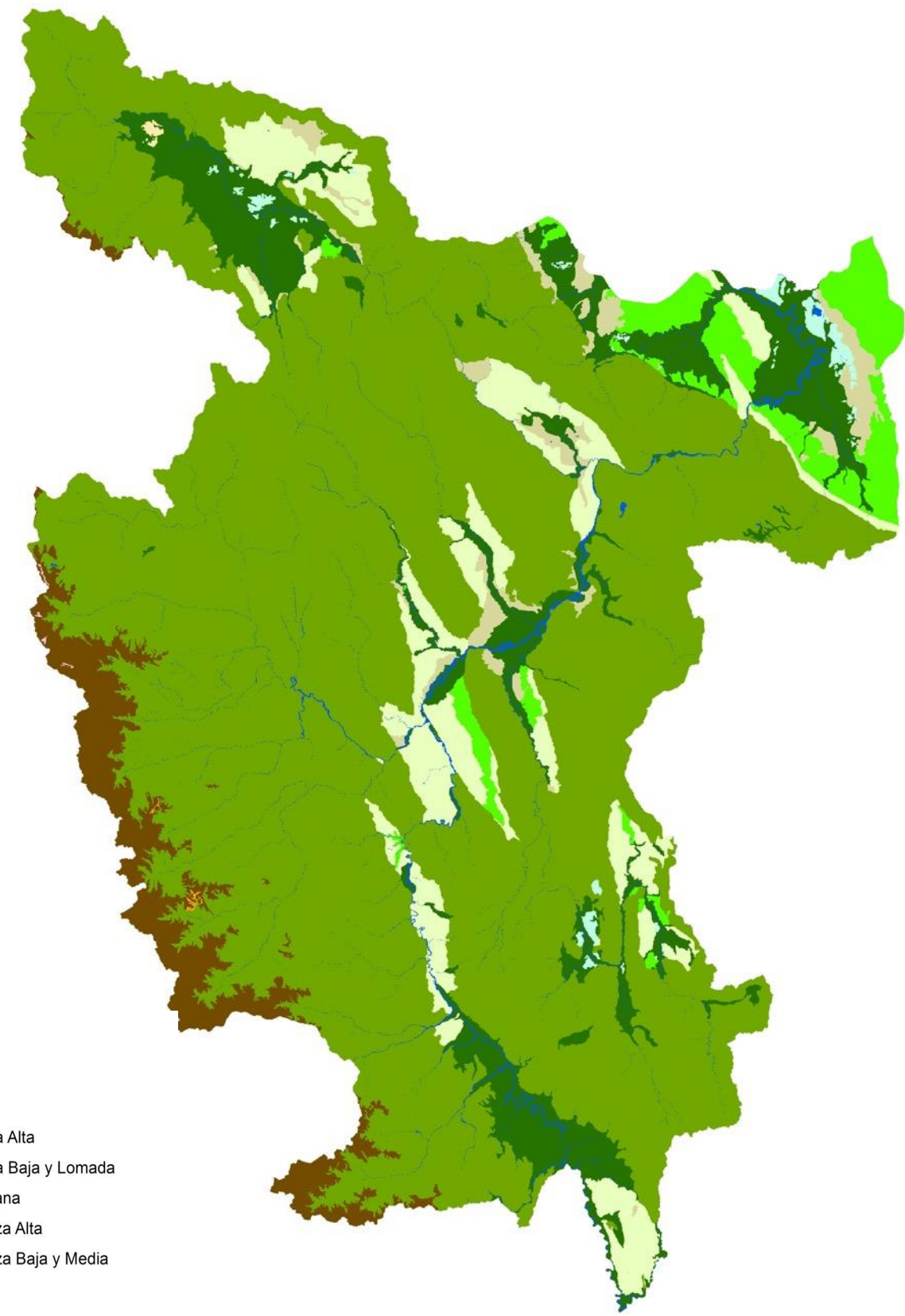
**SAN MARTIN, PERU**

# KEY ECOSYSTEM ACCOUNTS

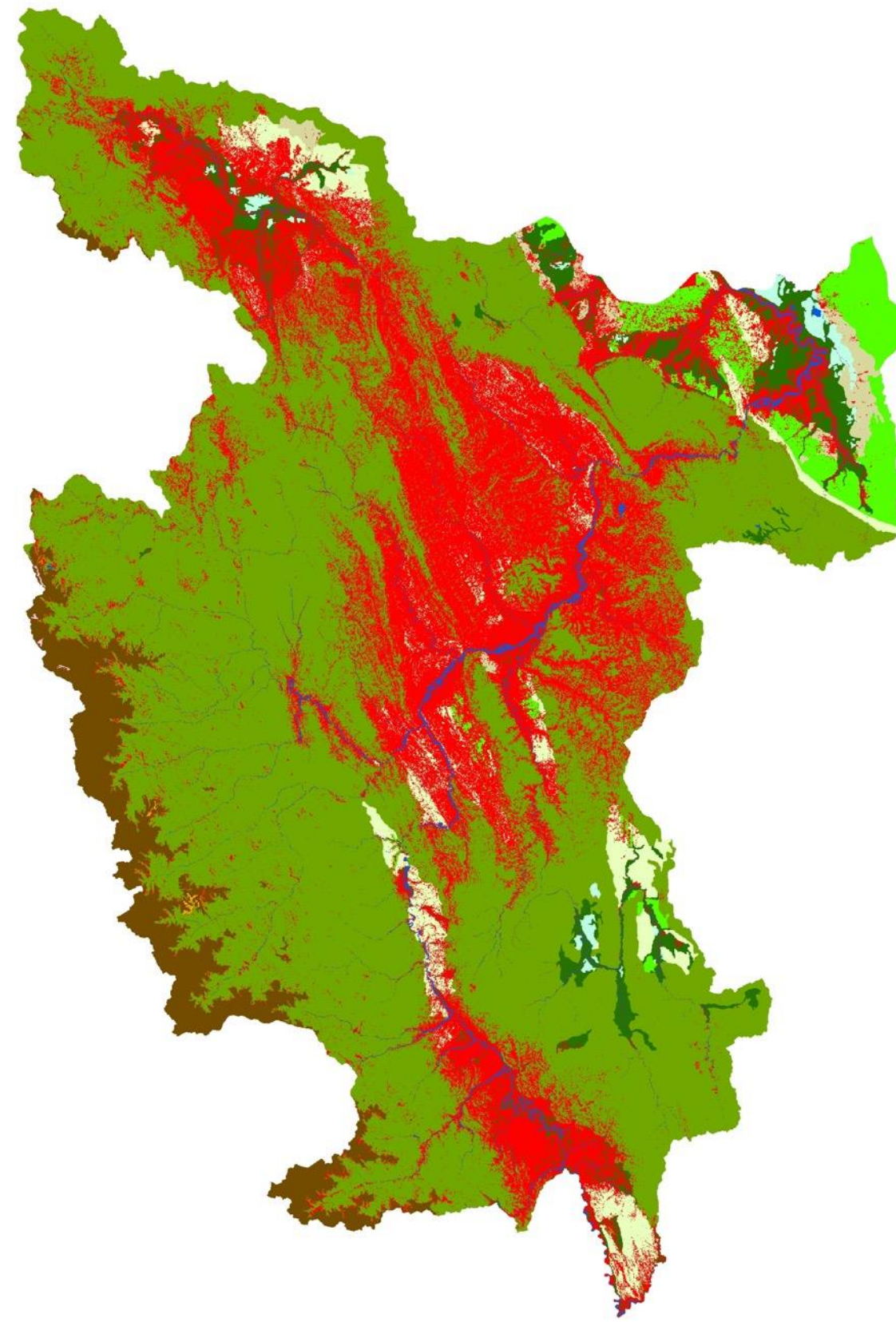
Ecosystem Accounts	Description	Type of Account
<b>Ecosystem Extent</b>	Records statistics on the area of ecosystem distributions over an accounting period.	Primary
<b>Ecosystem Condition</b>	Records statistics on the characteristics that reflect the condition or quality of an ecosystem.	Primary
<b>Ecosystem Services Supply and Use</b>	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
<b>Extended Supply and Use Table</b>	The aim of extended supply and use table is to embed the measures of ecosystem service flows into the SNA Supply Use Table	Primary
<b>Biodiversity</b>	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
<b>Carbon</b>	Contains information on the stocks and flows of carbon within ecosystems	Thematic
<b>Water</b>	Contains information on the stocks and flows of water including inter-ecosystem flows	Thematic



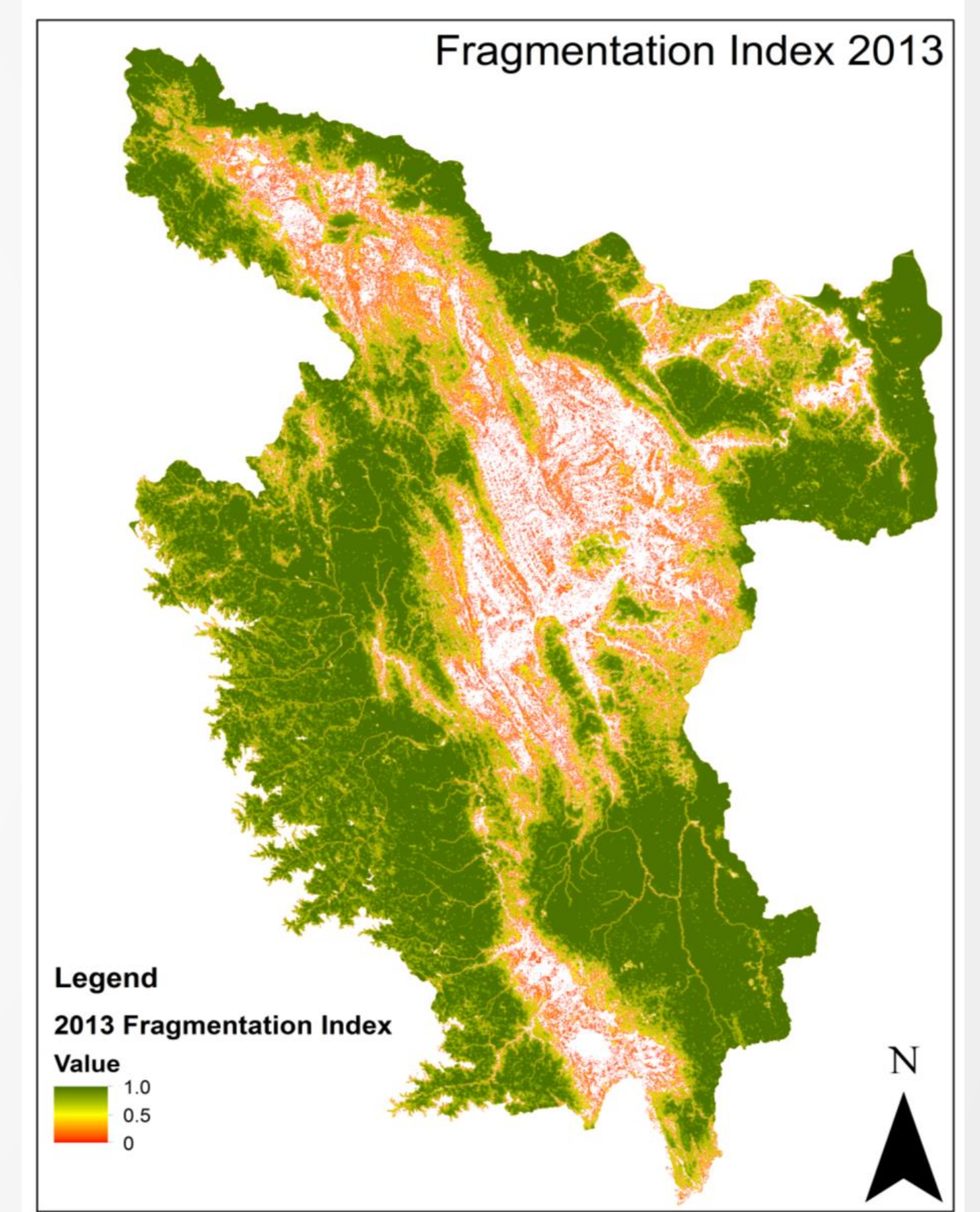
# EXTENT AND CONDITION



EXTENT: ORIGINAL  
DISTRIBUION



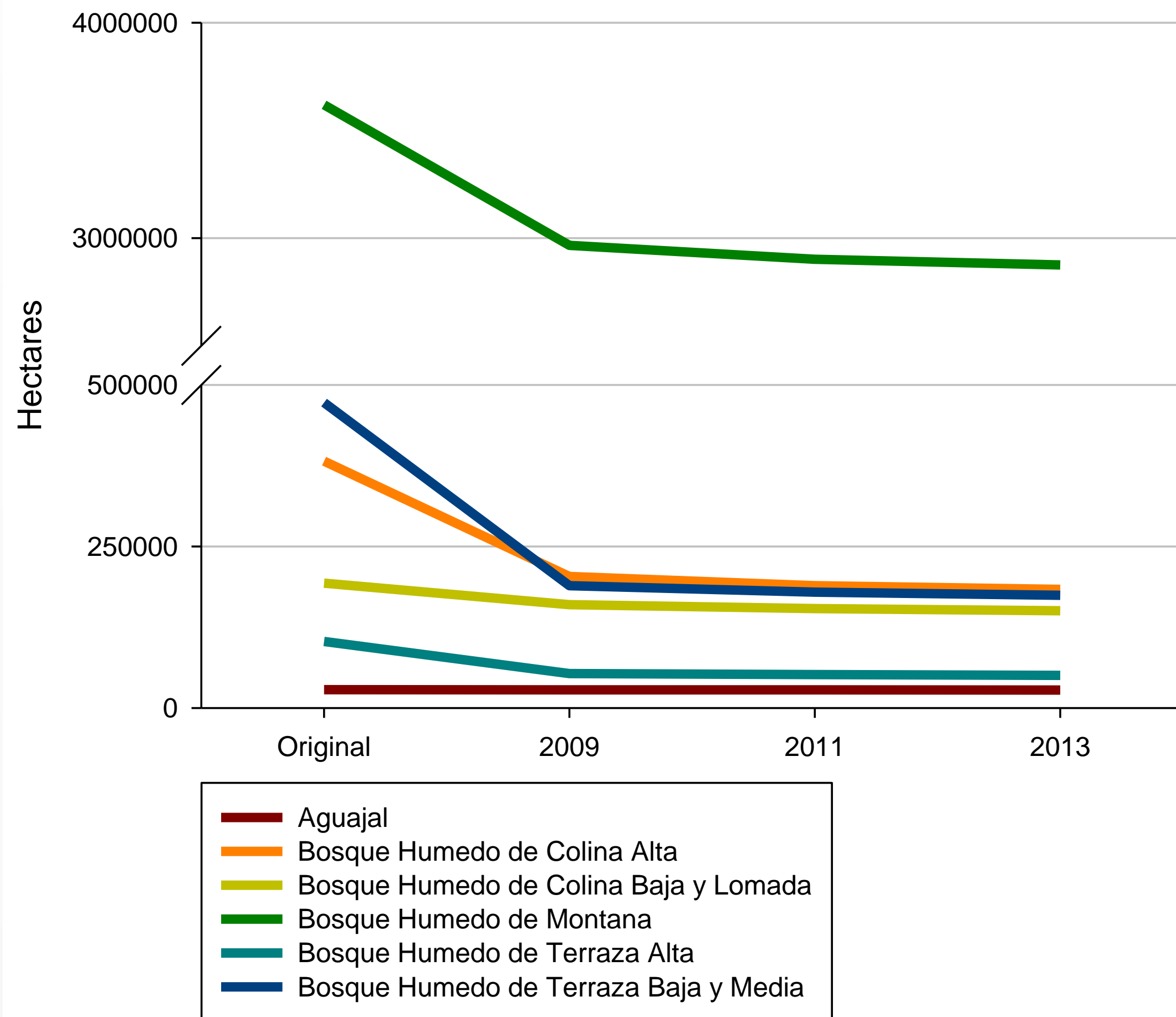
EXTENT: 2012



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

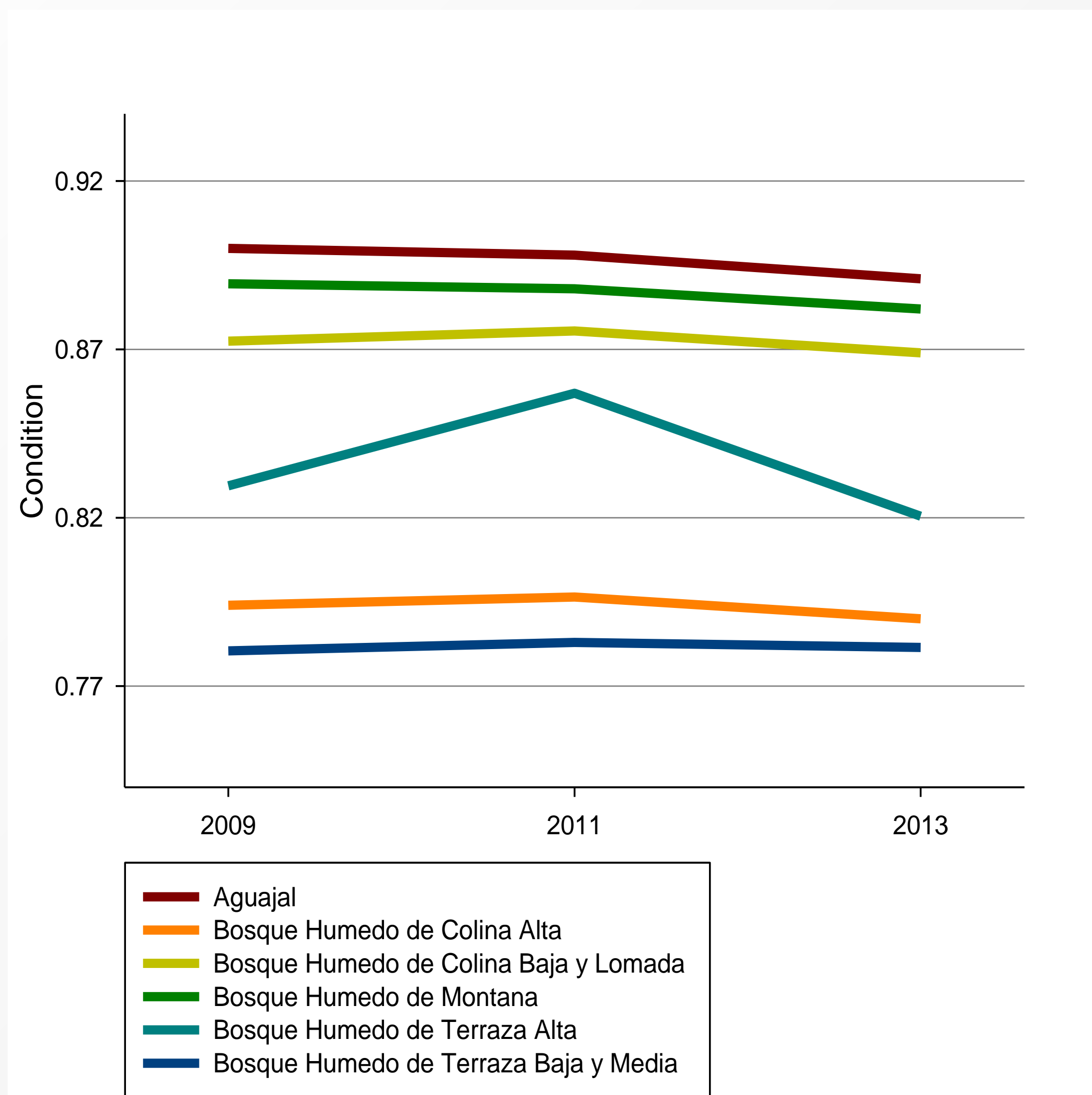


Statistics compiled for four broad ecosystem types (forests, shrublands, grasslands and water bodies) originally covering around 5 million ha

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  
FIREWOOD  
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.**

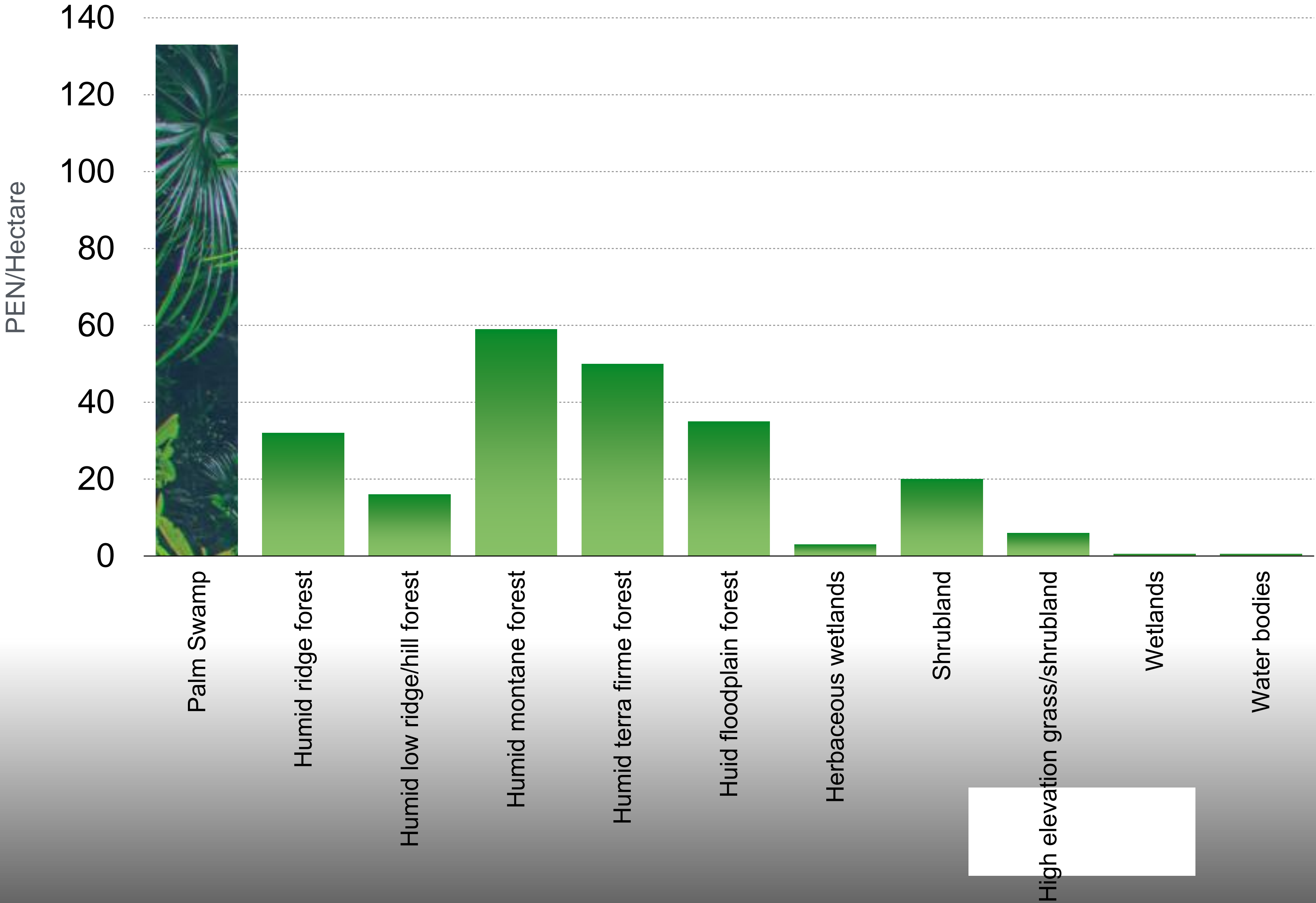
**8TH OUT OF 32 SECTORS**



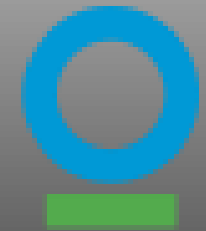
# AGUAJALE



# HIGH VALUE ECOSYS TEMS



■ 2011





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## Summary Stats for Peru

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- 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.



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# Summary Stats for Peru

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- 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 m<sup>3</sup> (larger than predicted in Anuario Forestal)
- Total water use between 2009 and 2013 ranged between 469,531,948 and 671,110,987 m<sup>3</sup>/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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MINAM

ARA

ALA

AAA

ANA

INEI

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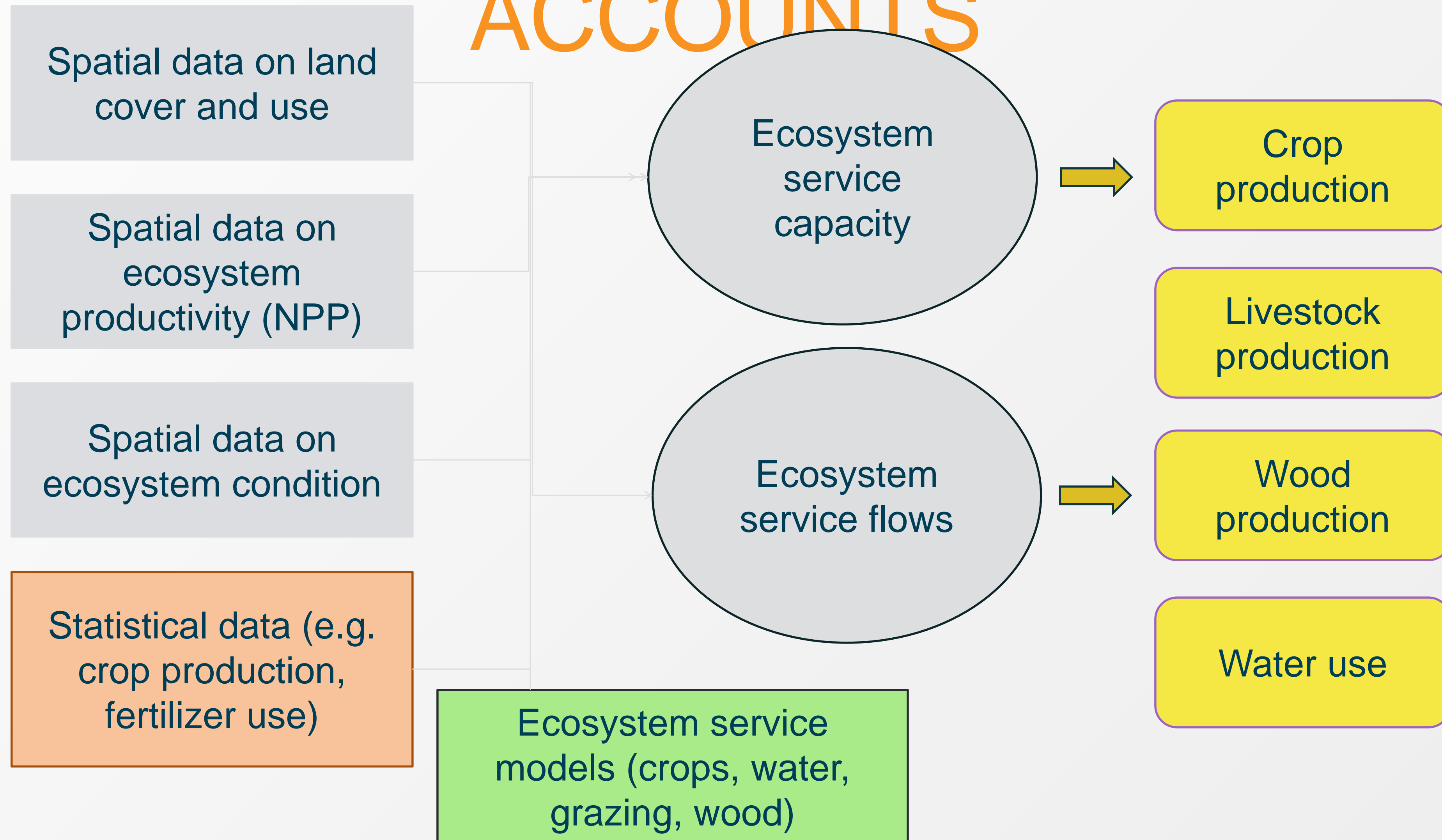
CLARK LABS



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>