# National progress on SDG indicators reporting and SEEA: Mexico

Expert Meeting on SEEA indicators for SDGs and Post-2020 Agenda for Biodiversity. Cambridge, United Kingdom, 12-14 February 2019

System of Environmental Economic Accounting

United Nations

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- National progress on indicators for SDG reporting
- Other environmental and environmental-economic indicators for policy making
- Data needs, barriers for regular indicator calculation and enabling factors
- Links to the SEEA and next steps

# Background: INEGI and the NSGIS

- Mexico´s National Statistical and Geographic Information System (SNIEG: NSGIS)


  - National Statistics and Geography Institute (INEGI)
    - Coordination of the SNIEG
      - Standards
      - Integrate and facilitate dissemination
      - Information producer: National Mapping and Statistics Office – Agency
  - Themmatic Commitees
    - Statistics: sociodemographic, economics, environmental
    - Spatial: basic, water, emmissions, forests.
  - Advantages.
    - SNIEG
    - INEGI: Geospatial information and Statistics in the same agency, better integration of data

# National Subsystems of Information

Specialized Technical Committees

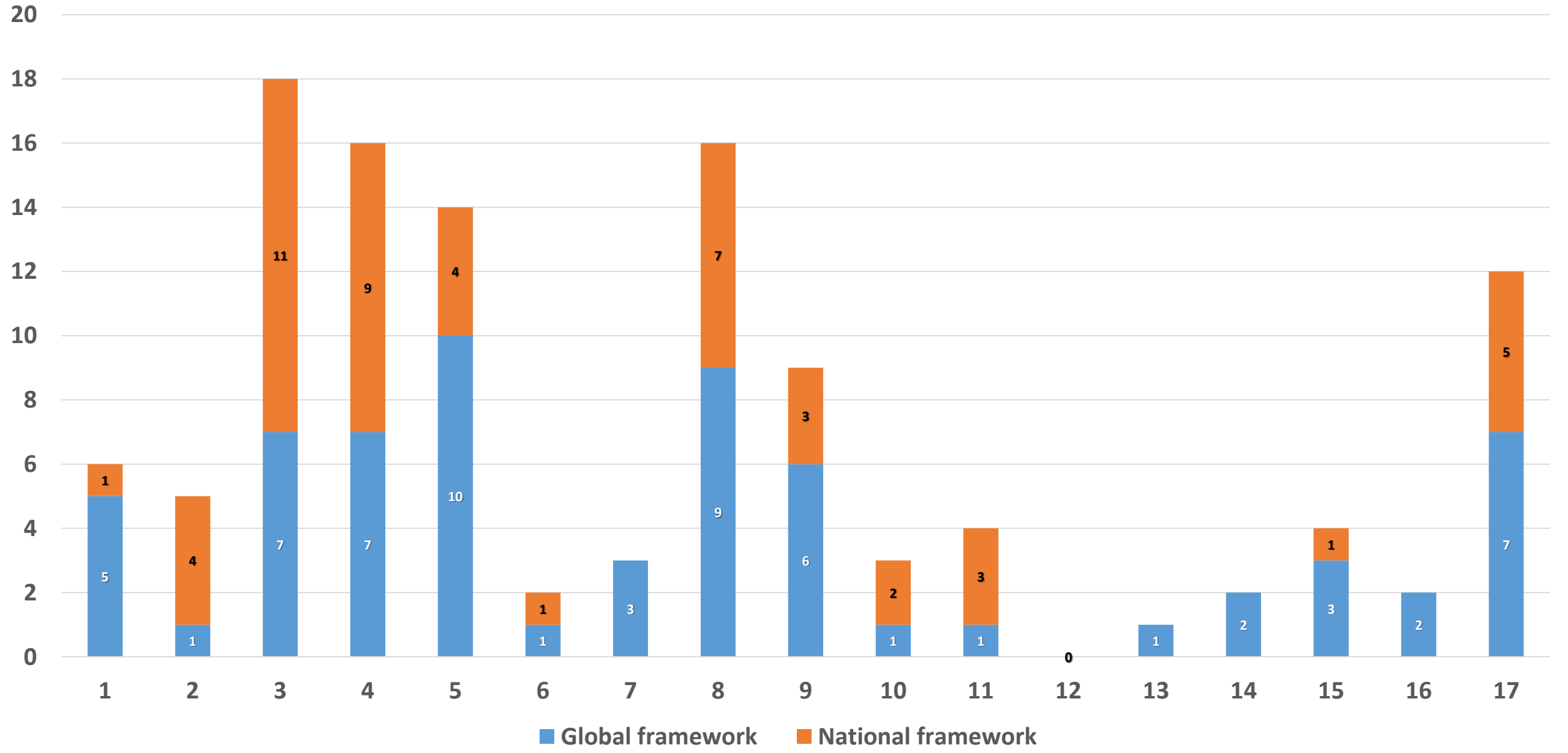

**Sustainable Development Goals**

# Results from working groups

## Global framework indicators

| Total | Total for Mexico | Total analyzed | Total agreed | Total published |
|---|---|---|---|---|
| **232** | **169** | **122** | **89** | **54** |

# Indicators published by goal



# Challenges

- Work with the tier II & tier III indicators

- Use of geoespatial information
  - Geospatial data from INEGI and other agencies
  - Satellite imagery: Open Data Cube
- Data disaggregation
  - Administrative: State, municipalities
  - Physical divisions: Basins, watersheds

# Challenges facing Mexico at the subnational level


**State councils to follow the agenda 2030**

SNIEG

National System of Statistical and Geographical Information

**State Statistical and Geographical Information Committees**

# Other environmental and environmental-economic indicators for policy making

# Natural Resources and Environment Ministry (SEMARNAT) - INEGI

- SEMARNAT: National Environmental Indicators System
  - Core set of environmental indicators
  - Green growth indicators
  - SDGs
  - SEEA
- Other government agencies:
  - INECC; National Institute of Ecology and Climate Change
  - Energy Ministry.
  - ….

- Framework for the Development of Environment Statistics, United Nations Statistical Division

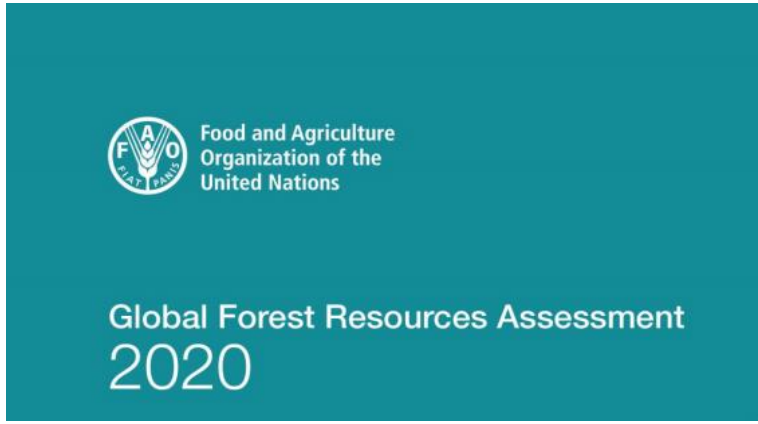
- Regional efforts: development, standards of environmental indicators in Latin America (CEPAL)

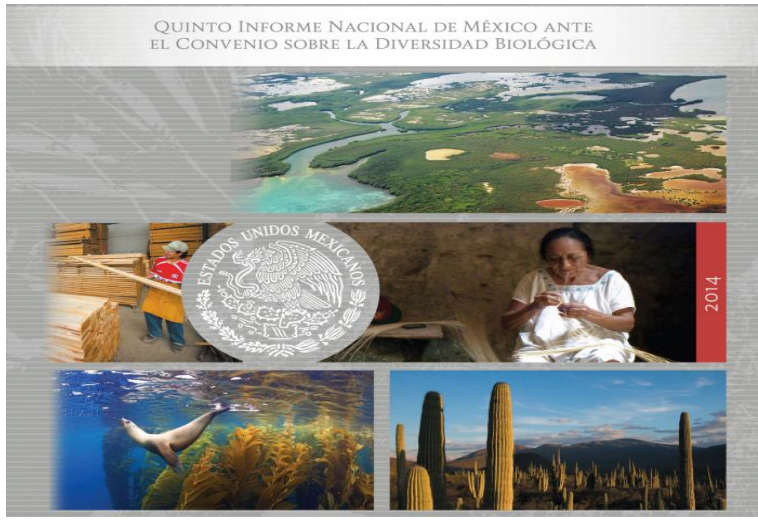
# Natural Resources and Environment Ministry (SEMARNAT) and INEGI

- Themmes:
  - Physical, ecological, biodiversity
    - Remaining natural vegetation
      - Forests: CONAFOR, INEGI
    - Protected areas
    - Species
      - **CONABIO**
    - Water
  - Environment
    - Wastewater
    - Solid waste
    - Emmissions

# National Reporting

- National commitment in a variety of National Reports.
  - Climate Change: INECC
  - CBD: CONABIO
  - Forests (FAO – FRA): CONAFOR
  - SDGs

# Data needs, barriers for regular indicator calculation and enabling factors

# Data needs

- Data are needed in a great diversity of themmes.
  - Territory
  - Environment
  - Population
  - Economy

- Forms:
  - Statistical
  - Geospatial

- Time and geographical scope
  - Different dates, scales, spatial domains.

# Barriers

- Dispersion among government agencies and administrative levels
  - Federal
  - State
  - Municipal
- Barriers for exchange
- Different time periods
  - Census: 10 yr
  - 1 yr, 2, 5, …
- Definitions
  - The many definitions of Forest

# Others:

- Map projection
  - Is the projection used suitable for area calculation?
- Classification systems.
  - Definitions
- Communication between experts in different fields:
  - Water, soil, vegetation, geology
  - GIS, Remote Sensing
  - IT, developers
  - Statitiscians
  - Economists

# Enabling factors

- A coordinating system:
  - SNIEG
  - INEGI: information producer and coordinator
  - Changes in data sharing and dissemination policies

- Technological advances
  - Satellite Imagery and other spatial data
  - Big Data
  - Machine learning
  - IoT
  - **Need to combine with experts (human) knowledge**

MÉXICO
PRESIDENCIA DE LA REPÚBLICA

INEGI
INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA

20 Ministries:

- ✓ Environment
- ✓ Finance
- ✓ Labor
- ✓ Energy
- ✓ etc.

# Ecosystem services valuation review: 150 studies, mostly local.

Table 3. Summary of ecosystem services valuation studies in Mexico. References are listed in Appendix 1. Key to valuation methods used: AC Avoided Cost; BT Benefit Transfer; CV Contingent Valuation; CM/CE Choice Modelling/Choice Exper
Valuation approaches; HP Hedonic Pricing; MC/RC Mitigation/Restoration Cost; PF Production Function; PL Productivity Loss; RC Replacement Cost ; TC Travel Cost; VSL Value of Statistical Life

| Reference | Year of publication | Purpose | Type of implementor | Institutions | Geographical extent | Location | Central coordinates | SERVICES VALUED | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Provisioning services | | | | | | Regulating services | | | | | | | | | C |
| | | | | | | | | Food | Water | Raw materials | Genetic resources | Medicinal resources | Ornamental resources | Air quality regulation | Climate regulation | Moderation of extreme events | Regulation of water flows | Waste treatment | Erosion prevention | Maintenance of soil fertility | Pollination | Biological control | Aesthetic information |
| 1.- Aburto-Oropeza et al., 2008 | 2008 | Hypothesis testing with implications for public policy | Academic institution + NGO | Scripps Institution of Oceanography Universidad Autónoma de Baja California Sur, San Diego Natural History Museum, Pronatura Noroeste A.C., University of South Carolina, Centre d'Estudis Avancáts de Blanes | Local | The Gulf of California | | | | | | | | | | | | | | | | | |
| 2.- Acuayte-Valdés, M. C. 2011 | 2011 | Estimating the economic value of restoring ecosystem services | Academic institution | Colegio de Posgraduados | Local | Río San Bernardino, Texcoco | 19° 26' N 98° 46' W | | | | | | | | | | | | | | | | |
| 3.- Adger et al. 1994 | 1994 | Valuing non-marketed services supplied by Mexican forests, with implications for forest policy | Academic institution | University of East Anglia, University College London | Country-wide | Mexico | | DMP + BT | RC + BT | DMP + BT | | AC + BT | | | DMP + BT | | RC + BT | | RC + BT | | | | |
| 4.- Aguilar-Ibarra et al., 2013 | 2013 | Valuing non-marketed services supplied by a urban agroecosystem, with policy implications | Academic institution + NGO | UNAM, Restauracion Ecologica y Desarrollo AC | Local | Xochimilco, Mexico City | 19° 16.502'N 99° 5.447'W | DMP | | | | | | | DMP | | | RC | | | | | |

# Data for Ecosystem extent and condition: Vegetation vs Land Cover maps

Land cover:

- Simple classification (usually between 7 - 20 classes).

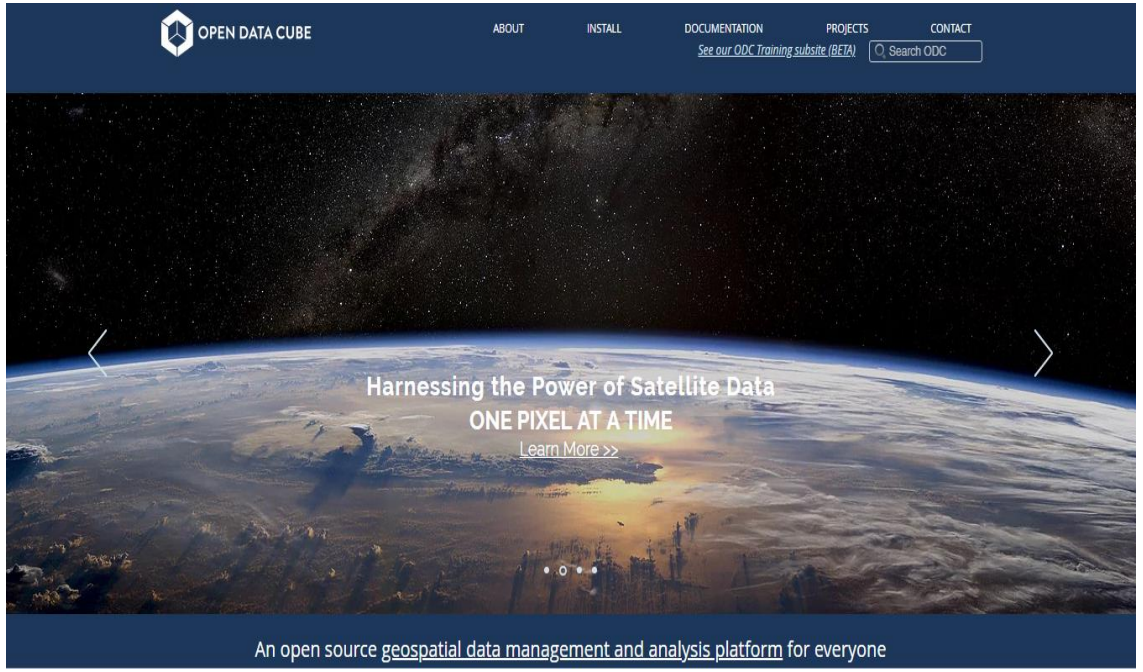
  - Descriptive

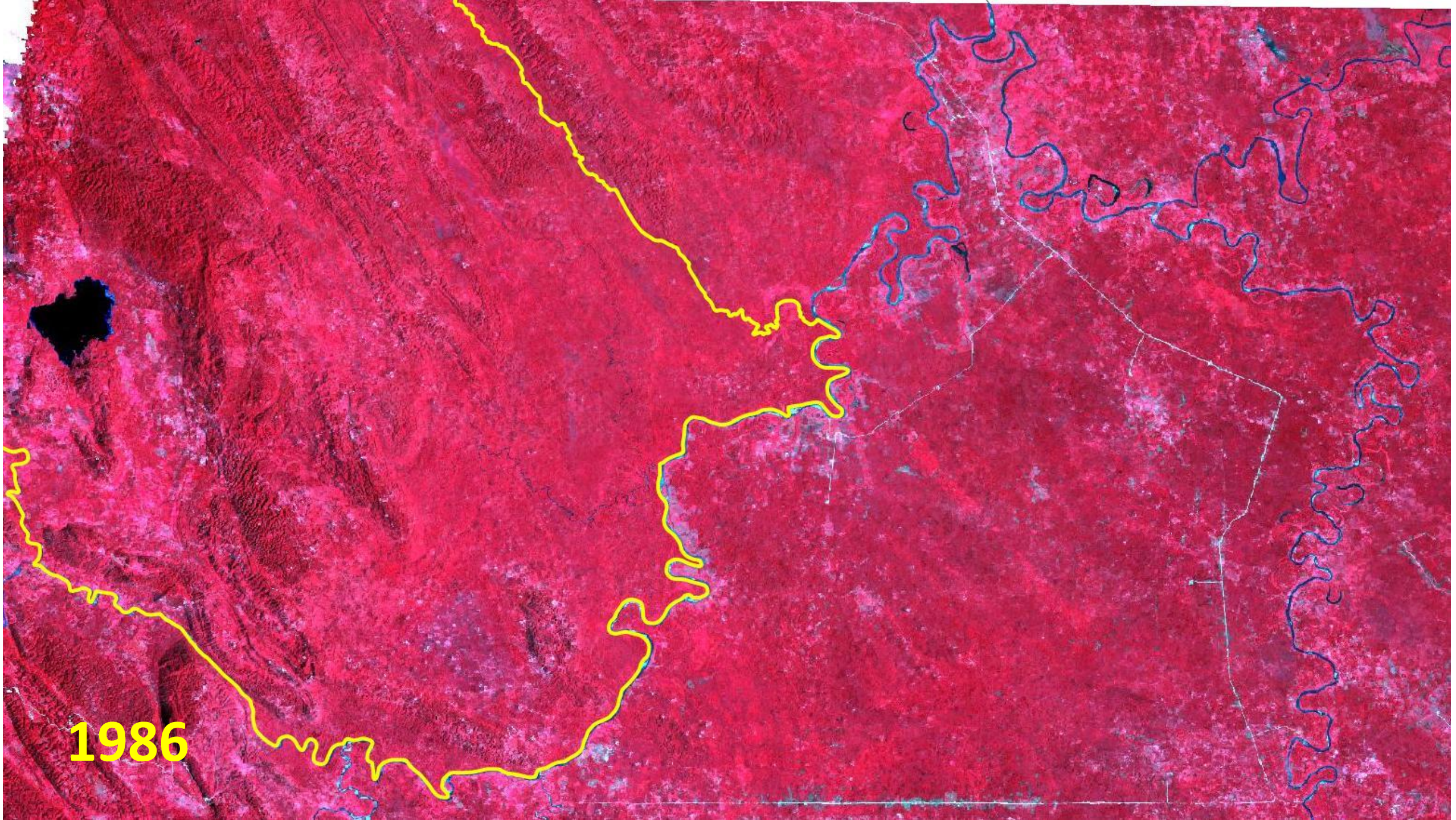
Vegetation:

- Plant community, vegetation types: 58
- Composition, structure, Result of climate, soil, ecological processes
- Successional status: primary, secondary
  - **A total of close to 200 categories**
- Important for:
  - Ecosystem distribution and condition
  - Protected Areas
  - Biodiversity

# Open Data Cube: GEOS, Geoscience Australia, CSIRO

- Open source software
- Set of tools to:
  - Massive storage and management of raster data (mainly imagery)
  - Access
  - **Processing and analysys**
- "Analysis ready data"
- More oriented to analysis than management
- Massive analysys and processing capabilities
  - Space: state, country, continent
  - Time: month, year, years, decades

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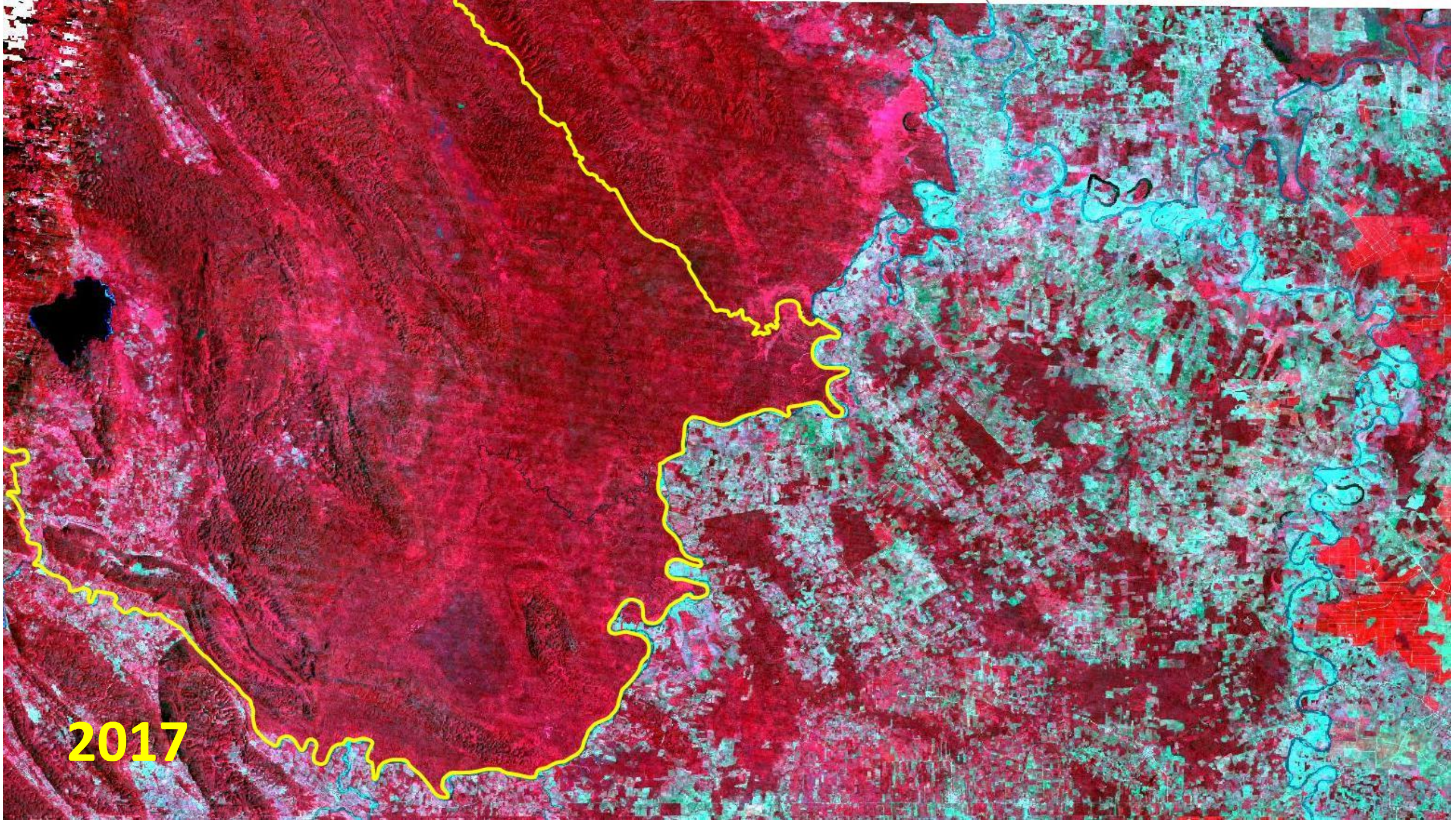
2017


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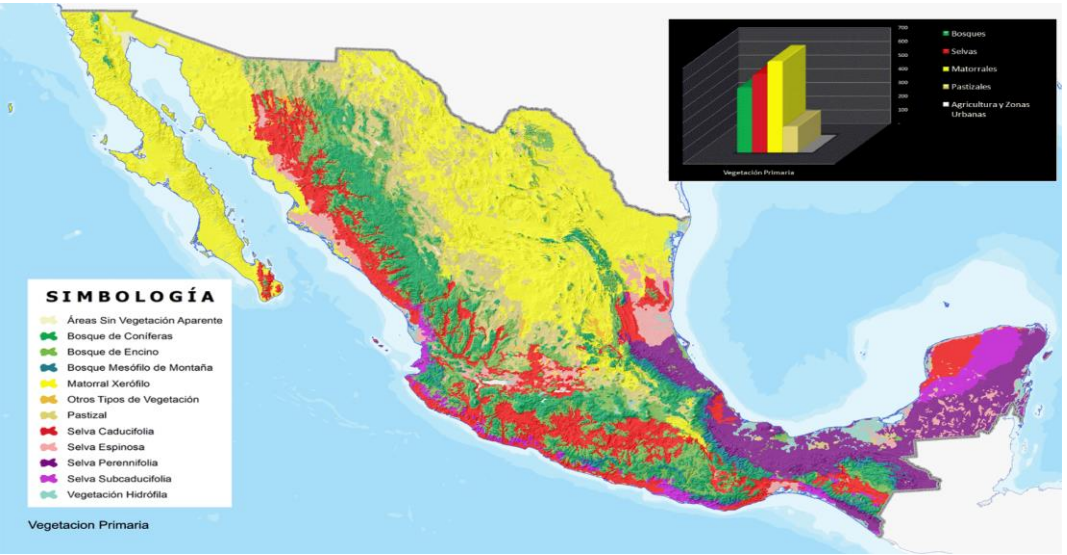
# Links to the SEEA and next steps

# Role of INEGI

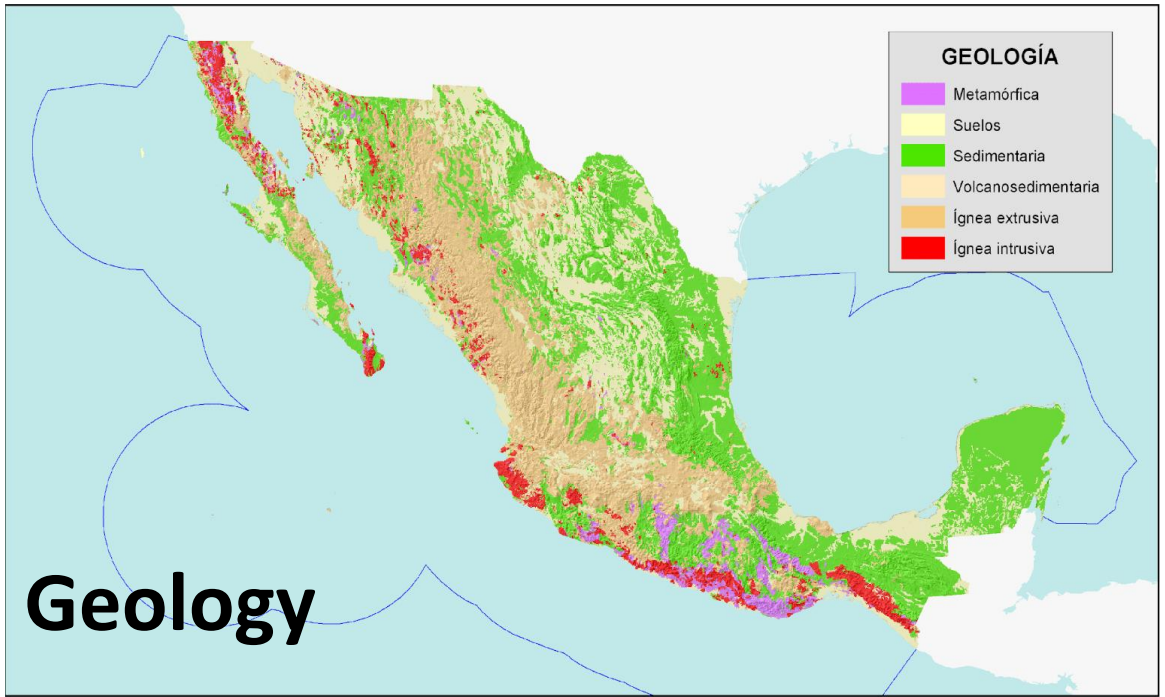
- As a producer:
  - Physical data: extent and condition
  - Geospatial data on most of the themes:
    - Water, soils, vegetation, climate
    - Topographic data: terrain, hydrography
    - Infrastructure
  - Valuation of services (participation)
  - Valuation Monetary
  - National Accounts Division




# Vegetation

# Soils

# Hydrology




# Geology

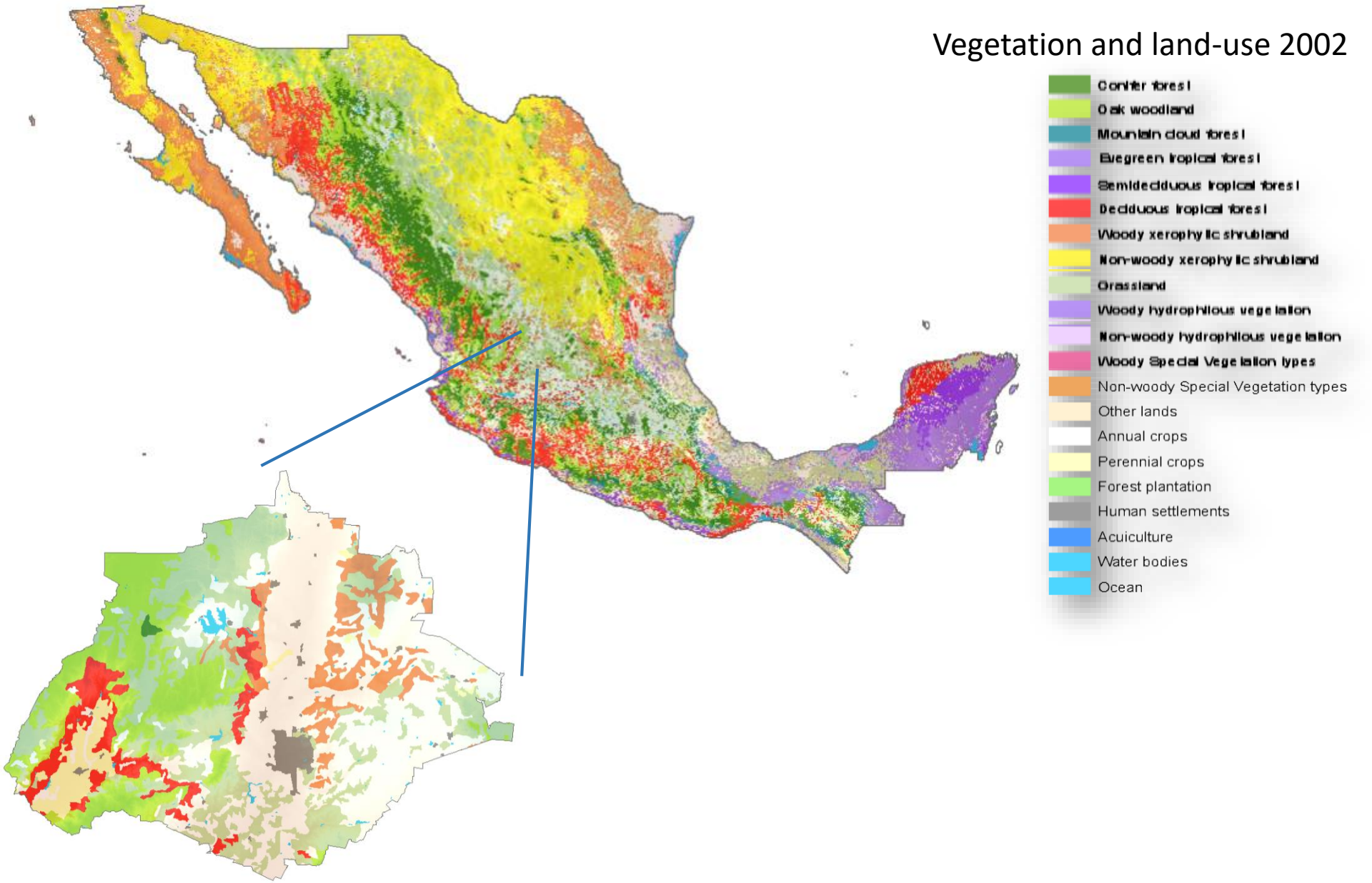
# Role of INEGI

- As a coordinator for information; spatial and statistical.
    - From other agencies, ministries.
    - Natural Resources and Environment
    - Agriculture
    - Energy
    - Water
    - Climate Change

# Present progress

- Pilot study in the state of Aguascalientes.
  - Ecosystem extent and condition
  - Carbon storage
  - Water
  - Crops

# Ecosystem classification



# Ecosystem extent accounts

- INEGI's Vegetation and land-use charts: Series III, IV, V and VI
- CONANP's Protected Areas chart
- Social property chart (National Agrarian Registry)

**Ecosystem extent accounts: State of Aguascalientes**

| | Pine forest | | | | | | Oak woodland | | | | | | Xerophytic shrubland | | | | | | Deciduous tropical forest | | | | | | Grassland | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Indigenous community | | Ejido | | Private | | Indigenous community | | Ejido | | Private | | Indigenous community | | Ejido | | Private | | Indigenous community | | Ejido | | Private | | Indigenous community | | Ejido | | Private | |
| Year | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP |
| 2002 | - | - | 1,118 | - | 27 | - | 8,636 | 28 | 10,276 | 8,345 | 51,608 | 12,868 | 487 | - | 690 | 28,121 | 86 | 9,952 | - | - | 3,542 | 10,671 | 7,749 | 10,573 | 1,315 | 492 | 13,028 | 56,859 | 23,537 | 45,370 |
| 2007 | - | - | 1,184 | - | 68 | - | 8,436 | 28 | 10,623 | 8,371 | 51,470 | 12,878 | 487 | - | 690 | 26,315 | 86 | 9,964 | - | - | 3,237 | 10,250 | 6,862 | 9,763 | 1,515 | 492 | 12,700 | 52,717 | 23,161 | 41,204 |
| 2011 | - | - | 1,184 | - | 68 | - | 8,941 | 12 | 13,413 | 9,350 | 53,009 | 12,615 | 487 | - | 690 | 25,465 | 86 | 9,871 | - | - | 3,540 | 10,678 | 9,447 | 11,340 | 1,047 | 508 | 9,840 | 51,452 | 18,982 | 40,141 |
| 2015 | - | - | 1,184 | - | 68 | - | 8,941 | 12 | 13,355 | 9,350 | 52,984 | 12,615 | 487 | - | 690 | 25,465 | 86 | 9,871 | - | - | 3,527 | 9,996 | 9,447 | 11,165 | 1,047 | 508 | 9,911 | 51,983 | 19,006 | 39,977 |

| | Annual crops | | | | | | Perennial crops | | | | | | Water bodies | | | | | | Human settlements | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Indigenous community | | Ejido | | Private | | Indigenous community | | Ejido | | Private | | Indigenous community | | Ejido | | Private | | Indigenous communit | | Ejido | | Private | |
| Year | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP | ANP | No ANP |
| 2002 | 144 | 864 | 555 | 122,489 | 1,713 | 94,460 | - | - | 3 | 4,506 | 544 | 15,392 | 11 | 1,127 | 8 | 1,161 | 38 | 2,025 | - | 0 | - | 1,721 | - | 9,431 |
| 2007 | 144 | 864 | 772 | 126,600 | 2,995 | 95,899 | - | - | 6 | 4,622 | 622 | 16,097 | 11 | 1,127 | 8 | 1,161 | 38 | 2,025 | - | 0 | - | 3,774 | - | 12,240 |
| 2011 | 107 | 836 | 539 | 126,520 | 3,056 | 94,780 | - | - | 6 | 3,716 | 595 | 14,303 | 11 | 1,127 | 8 | 1,237 | 60 | 2,219 | - | 28 | - | 5,327 | - | 14,802 |
| 2015 | 107 | 836 | 539 | 126,135 | 3,056 | 94,702 | - | - | 6 | 3,716 | 595 | 14,478 | 11 | 1,127 | 8 | 1,237 | 60 | 2,219 | - | 28 | - | 5,862 | - | 15,044 |

# Other activities

- Augmenting the Aguascalientes pilot study.-
  - Ecosystem extend and condition
  - Carbon storage and sequestration,
  - food provision by agro-ecosystems, and
  - surface water supply services.
- Additional pilot studies to assess key ecosystem services in select states.
- Country-wide pilot studies
  - Carbon storage and sequestration services provided by ecosystems,
  - Coastal protection services provided by mangrove ecosystems,
  - Food production services provided by agro-ecosystems
  - Timber production service provided by forest ecosystems, and
  - Water provision services in priority watershed(s) or jurisdiction(s) (to be identified).
- National forum on ecosystem services valuation in Mexico. A specialized national forum will be convened with the purpose of presenting the UN SEEA-EEA framework

# Challenges (and opportunities)

- Not sufficient data
- Not easily integrable data
- Changing concepts and definitions
- Excess data
  - Example, satellite imagery
- New generation of Maps: easier for statistics developmen
- Changing technologies
- Changing policies
- Keep coordination – collaboration with government agencies.

Thankyou!