



# System of Environmental-Economic Accounting (SEEA)



# Experimental Ecosystem Accounting (EEA)

- Measurement of ecosystems and the flows of services from them into economic and other human activity
- Chain of relationships (DRR) from ecosystems to well-being = socio-ecological system
  - Each ecosystem asset generates a set of ES -> benefits (SNA+other)
  - Assets and changes = extent and condition (area, characteristics and processes)
  - Relation ecosystem condition and ecosystem services
  - Integrated, considering trade-offs

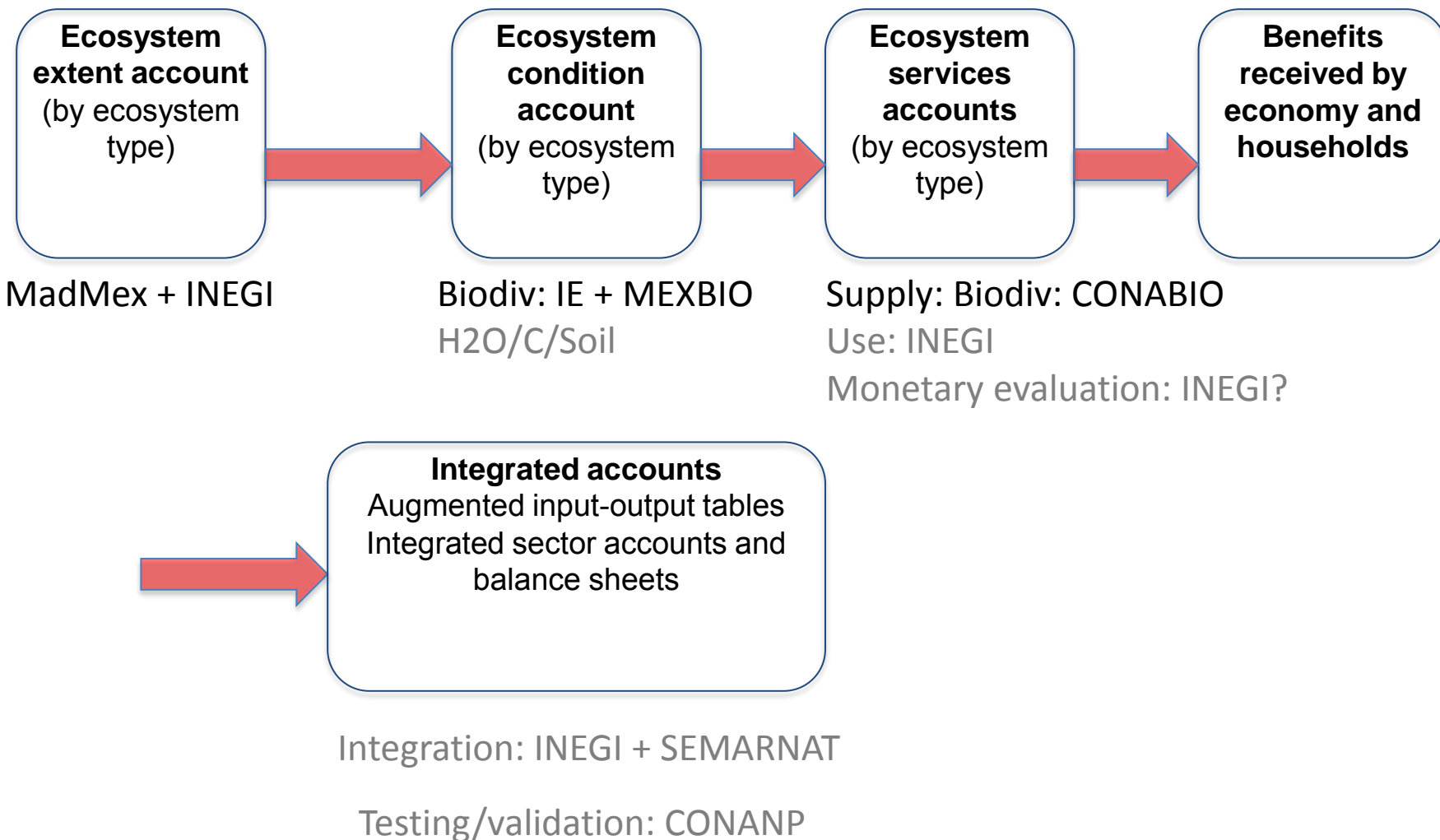
# Spatial dimension

- SNA = tables for administrative units vs. EEA = spatial ecosystem unit
  - (i) appropriate **scale**
  - (ii) **relationship between** the delineation of **spatial areas** (ecosystem assets) and the generation of **ecosystem services**
  - (iii) **connecting** spatially ecosystem services with the beneficiaries
- Convention on Biological Diversity – “ecosystems are a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a **functional unit**” (CBD, 2003, Article 2, Use of Terms).
- Depending on the service evaluated different ecosystem units could be used:
  - Biodiversity, carbon, soil: Ecoregions, Holdridge life zones (which level of detail?)
  - H2O: hydrological basins and subdivisions (high-intermediate-lower basin)
- Resample/integration into systematic grid (size?)

# What to measure - stepwise

- Biophysical measures of ecosystem assets
  - Extent
  - Condition (changes in biodiversity - DEGRADATION)
  - Capacity
- Ecosystem services
  - supply, flow, use
- Economic valuation
  - Monetary valuations ascribed through various non-market valuation techniques, link to SNA
- Integration with standard accounts

# Compilation of ecosystem accounts – data inputs



# Other potential inputs

**Ecosystem capacity** account: ROBIN + BD traits + BD efectos

**Ecosystem asset/degradation** account: Change in the net present value of ecosystem assets

**Vulnerability**: Assess ecosystem degradation and the extent to which current ES supply can be maintained



# Indicators for assessing ecosystem condition and ecosystem services



# Ecosystem extent

## INEGI

- Ca. 70 clases
  - Cobertura y uso del suelo
  - Estado sucesional

<b>Bosques</b>	<b>1</b>
<b>B secundarios</b>	<b>11</b>
Incluye plantaciones forestales	
Incluye bosque inducido	
<b>Selvas</b>	<b>2</b>
<b>S secundarias</b>	<b>12</b>
Incluye BMM secundario	
Incluye Palmar (ind)	
<b>Matorrales</b>	<b>3</b>
<b>M sec</b>	<b>13</b>
Incluye bosque de mezquite	
<b>Agricultura</b>	<b>5</b>
<b>Pastizales</b>	<b>6</b>
<b>Urbano</b>	<b>7</b>
Incluye desprovisto	
<b>Otros</b>	<b>4</b>
Incluye sin vegetación	
Incluye veg hidro	
Incluye agua	

## MAD-Mex

- 32 clases
  - Cobertura del suelo

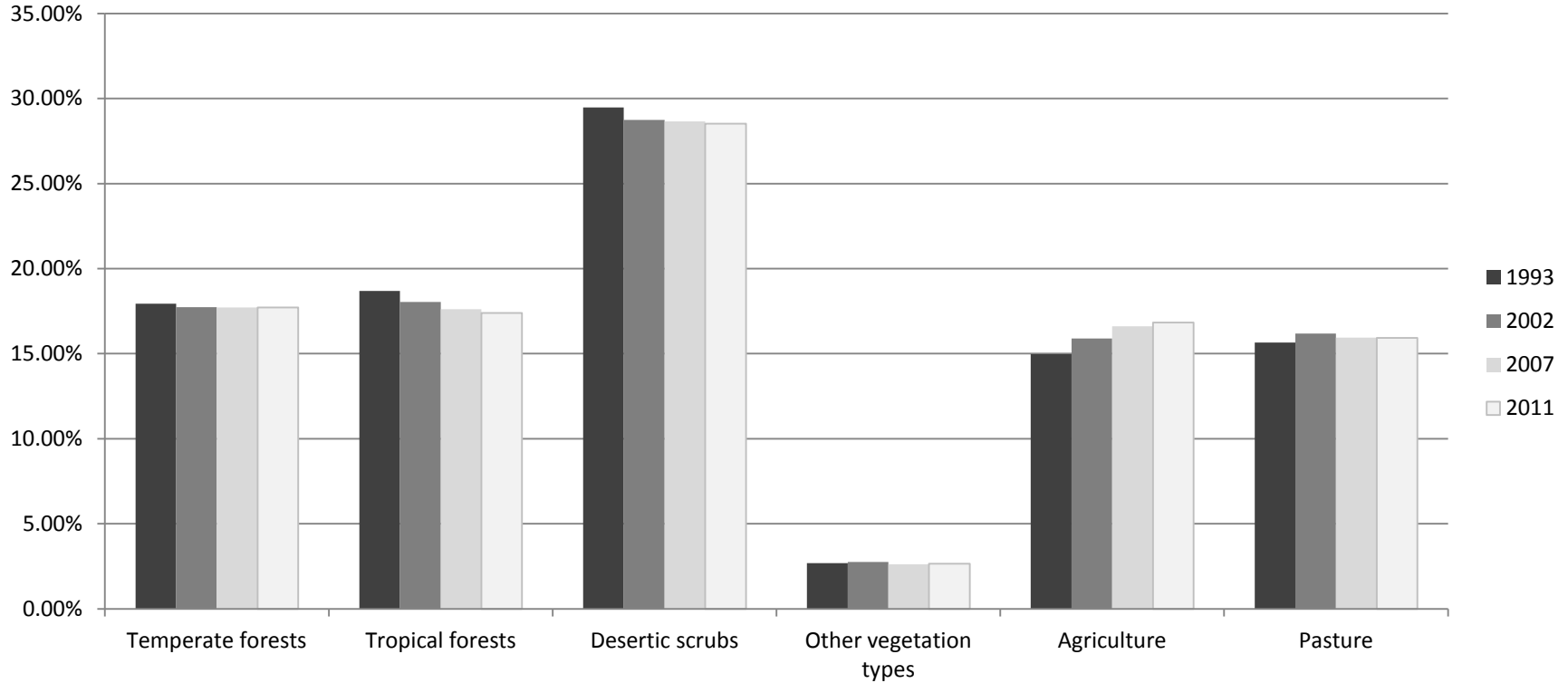
<b>Temperate forest</b>	<b>1</b>
<b>Tropical forest</b>	<b>2</b>
<b>Desertic scrubs</b>	<b>3</b>
<b>Other vegetation</b>	<b>4</b>
<b>Land use</b>	<b>5</b>

<b>Natural vegetation</b>	<b>1</b>
<b>Land use</b>	<b>2</b>

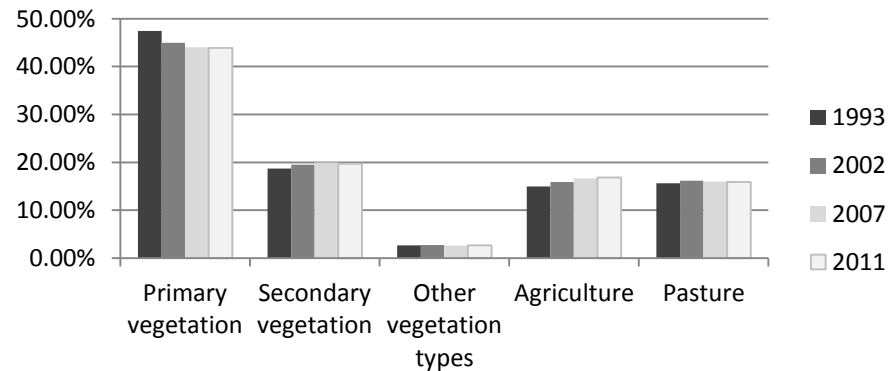




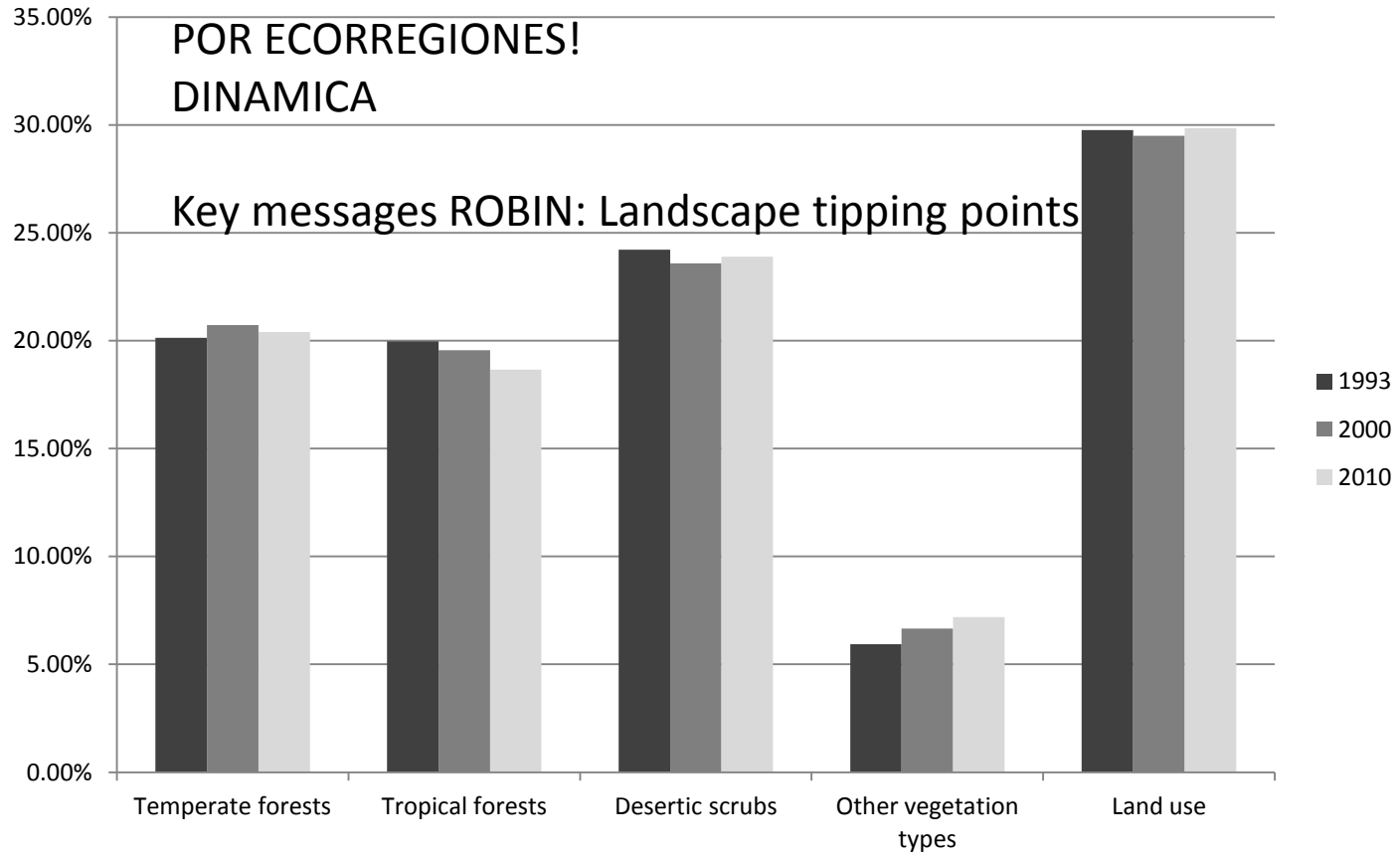
# Change analysis – overview: INEGI



POR ECORREGIONES!



# Change analysis – overview: MAD-Mex

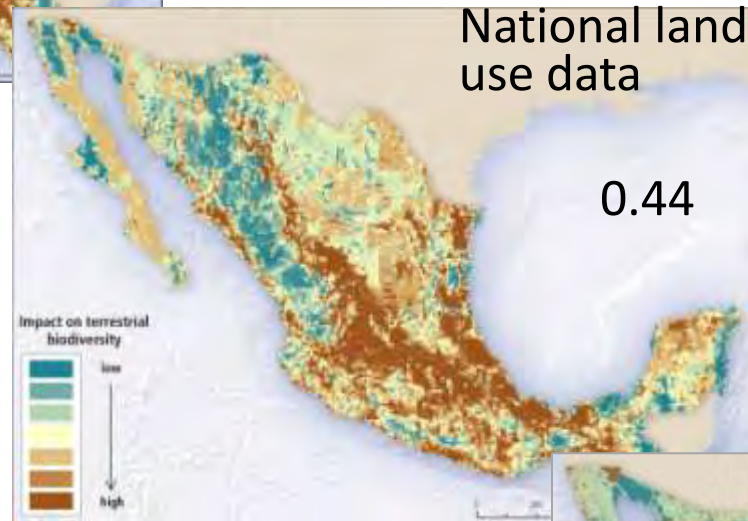


# Ecosystem condition 1 MEXBIO



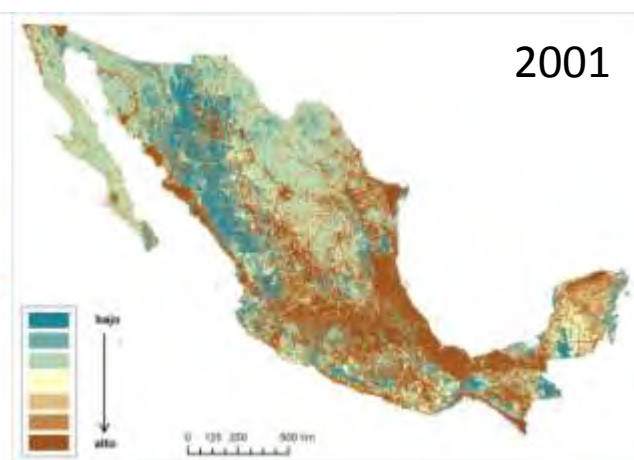
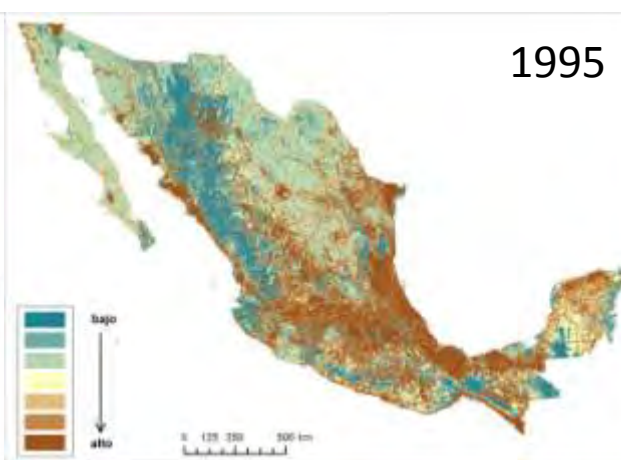
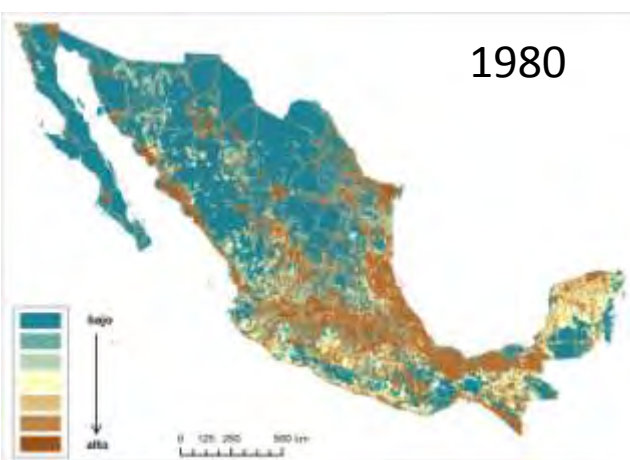
GLOBIO

TO



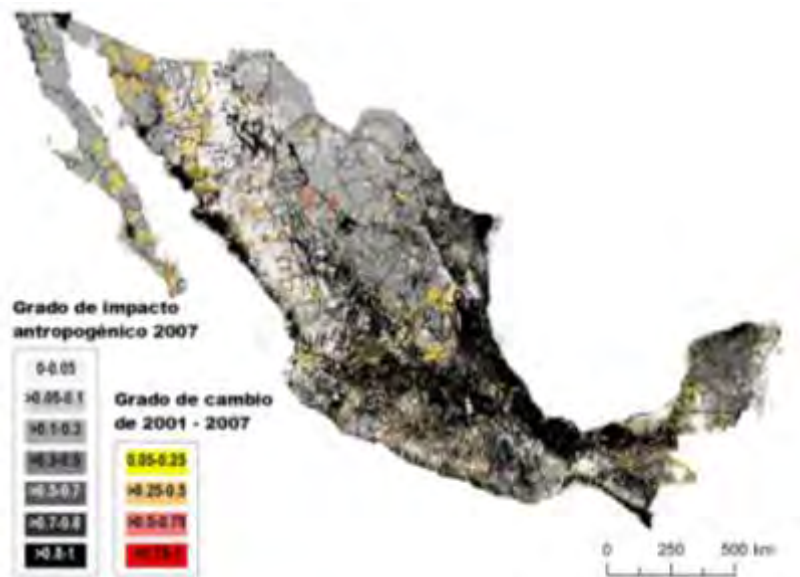
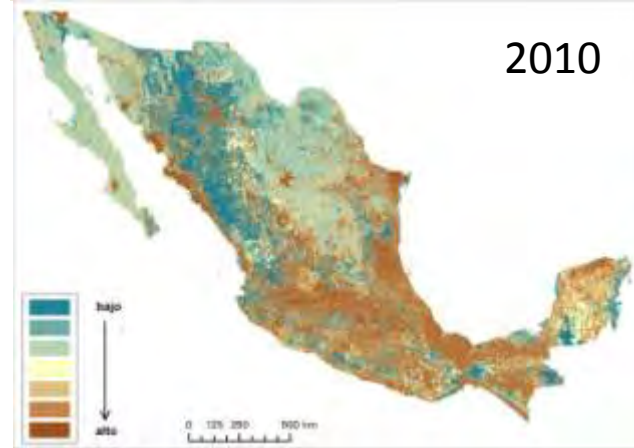
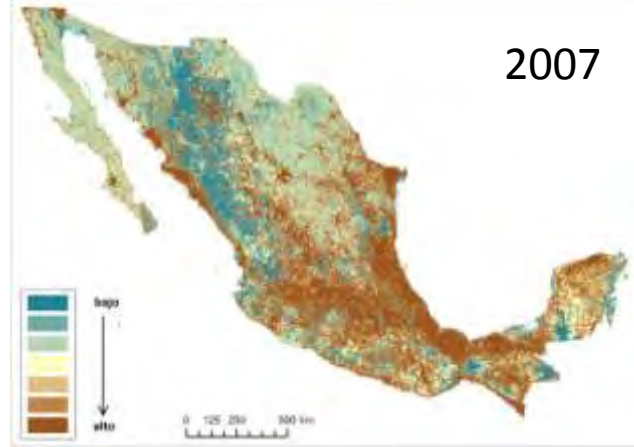
MEXBIO





# Ecosystem condition 1

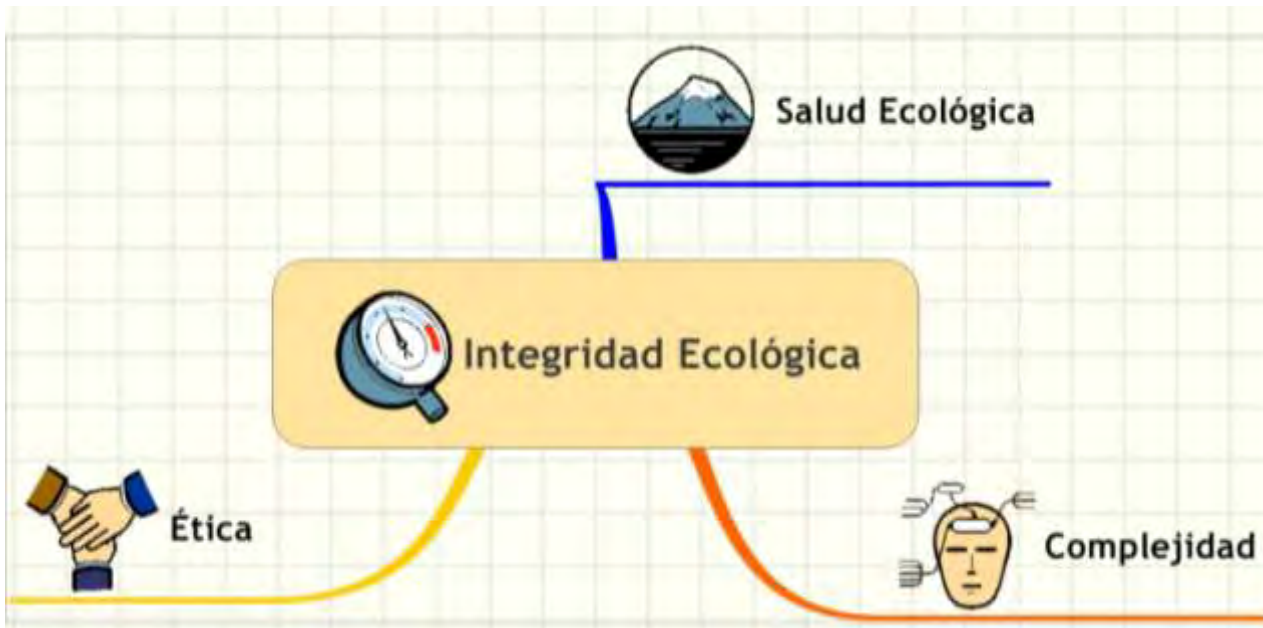
## MEXBIO Time series



# Ecosystem condition 2

## Ecological integrity

- Aldo Leopold (1949) proposed an ethical use of the earth's natural resources:
  - Algo esta bien hecho cuando tiende a preservar la integridad, estabilidad y belleza de las comunidades bióticas. Esta mal si tiende a hacerlo de otra forma.



# Ecosystem condition 2

## Ecological integrity

- Many definitions, all reflect the capability of a system to support services of value to humans.
  - Maintaining the structural and functional characteristics of a local community considered as satisfactory by society.
  - Capacity to support and maintain a balanced and adaptable community that has a taxonomic composition and functional organization comparable to what occurs in not impacted regions.
- Refers to socio-ecological systems: Humans always have an impact on ecosystems, EI cannot be measured only as naturalness.
- EI has been used as synonym for ecosystem health.
- Is considered in many country legislations – how to operationalize?

# Ecosystem condition 2

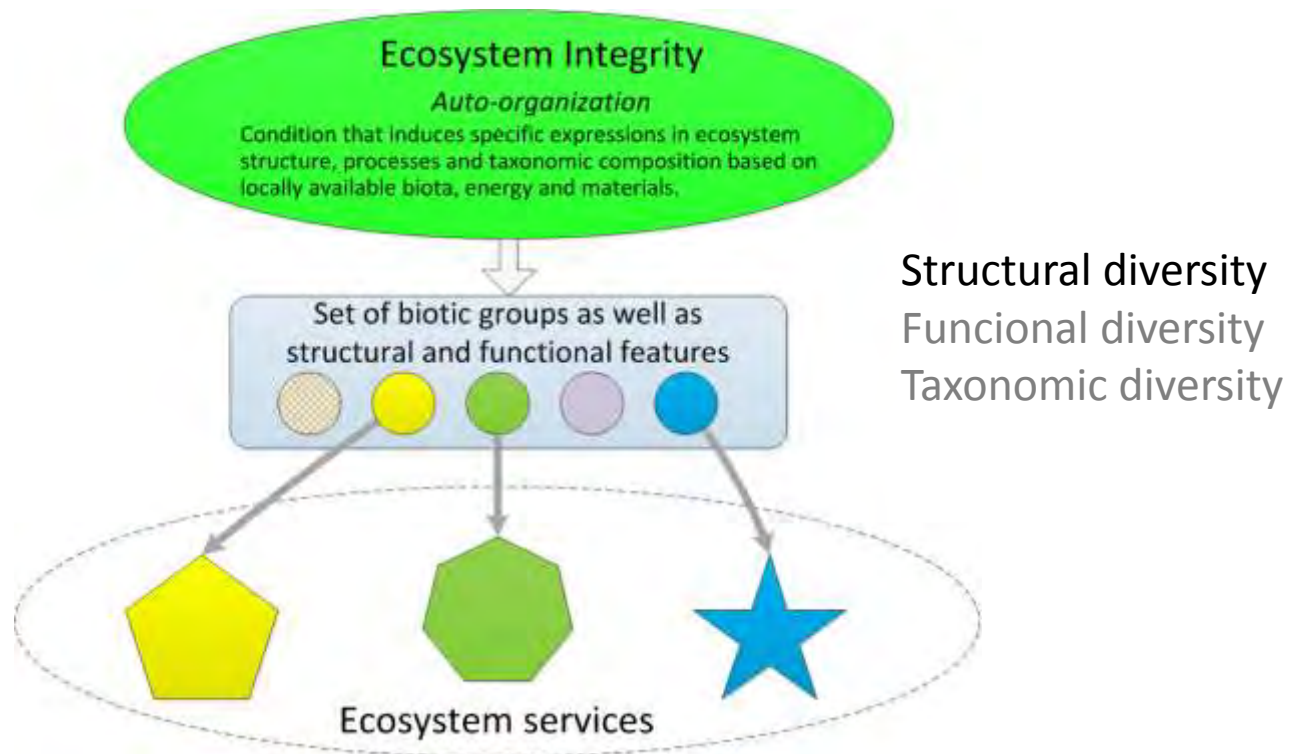
## Ecological integrity

- Thermodynamic theory:
  - Biosphere in general and ecosystems in particular are the product of continued auto-organization processes.
  - Ecosystems are dynamic and are maintained out of balance by the input of resources by humans.
  - Ecosystems get more organized the farther away from the thermodynamic equilibrium they are and like this they develop a higher efficiency to dissipate solar energy.
  - At the same time this auto-organization occurs, fluctuations are produced that attend against it.
  - The equilibrium reached between those constating processes is called operative optimum (Kay 1984, 1989).

# Ecosystem condition 2

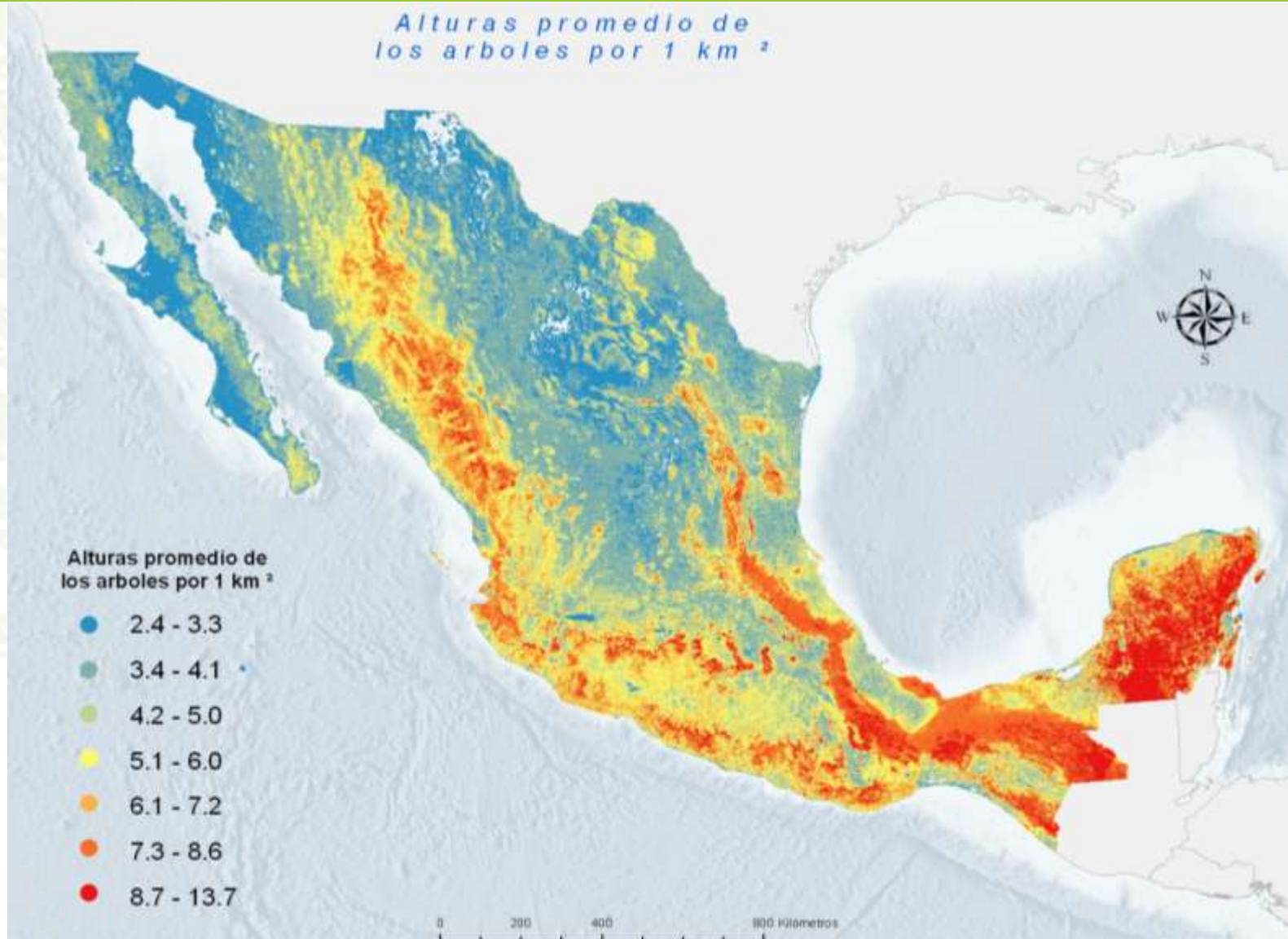
## Ecological integrity

- Ecological Integrity:
  - Inferred from biodiversity and degradation data
  - Bayesian networks

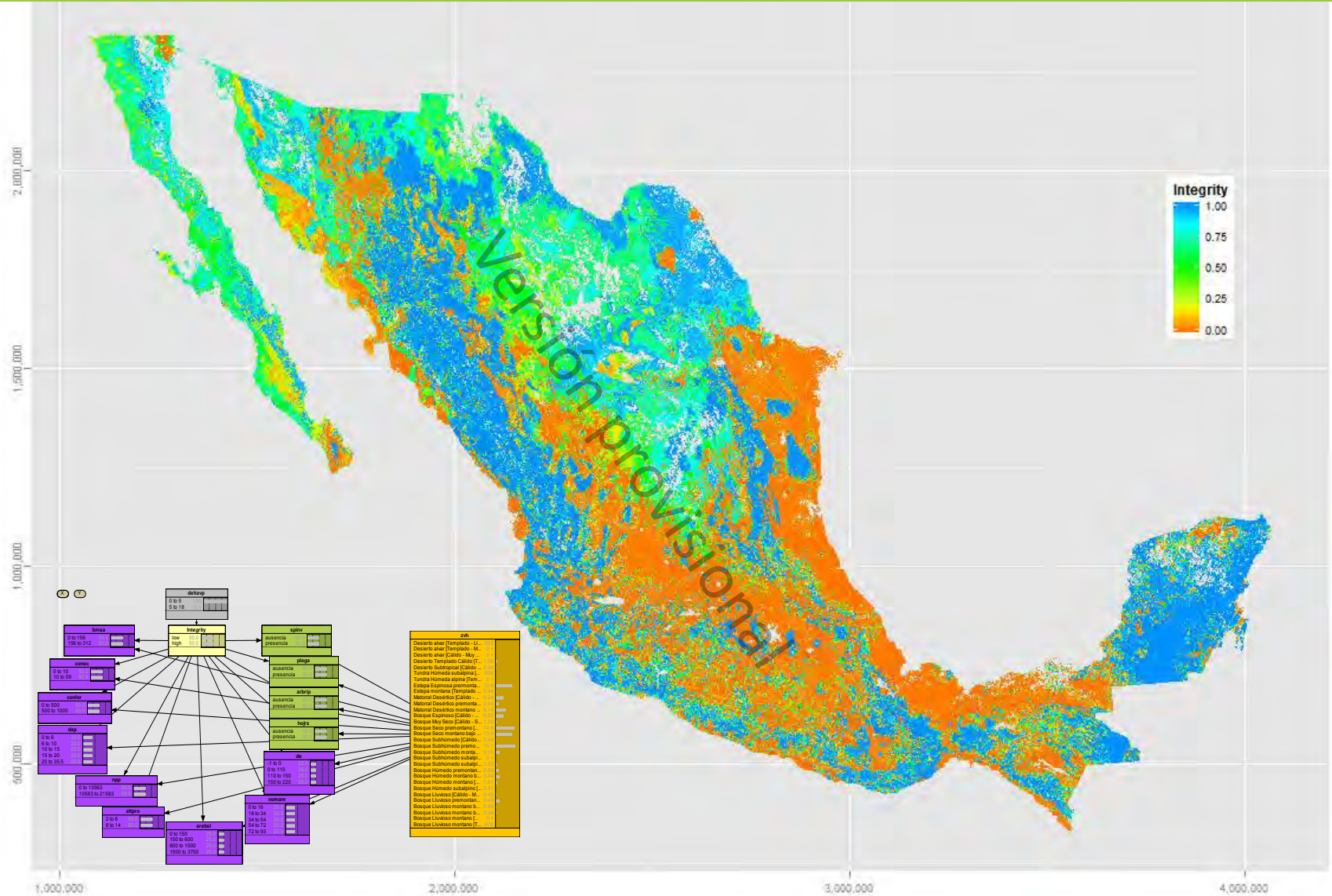




# Structural diversity



# Integridad Ecológica



# Link to ecosystem services: Dose-response relationships

