



# Decision-support science-based information needs in Mexico for meeting Aichi Targets

Patricia Koleff



Regional Bio-Bridge Initiative Round Table for Latin America and the Caribbean  
27-29 November 2017 - Bogota, Colombia



# CONTENT

**General background**

**Current knowledge of biodiversity**

**State of conservation and trends of change**

**Public policy and perspectives to sustainability**

**Gaps and information needs**



# Mexican Commission for the Knowledge and Use of Biodiversity

- Inter-Ministerial Commission
- Funded by the Federal Government
- “Its mission is to promote, coordinate, support and carry out activities aimed at increasing awareness of biodiversity and its conservation and sustainable use for the benefit of society.”

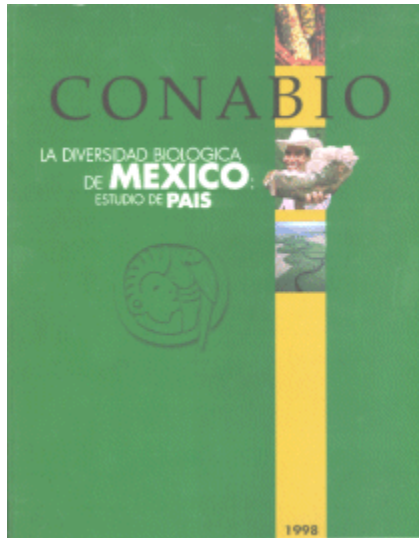


# Main functions

- Implement and operate the National Biodiversity Information System
- Support and carry out projects and studies focused on the knowledge and use of biodiversity
- Provide data, information and advice to governmental institutions and other sectors
- Implement national and global biodiversity information networks and agreements



# Background



As a result to Mexico's commitments under the Convention on Biological Diversity (CBD), in 1994 the government began to prepare the country's ***Biological Diversity Assessment: A Country Study***.

Published in 1998, it was the first national-level assessment of the state of conservation and sustainable use of Mexico's biodiversity.

This study was a basis for the National Biodiversity Strategy for Mexico (ENBM), which identified strategic priorities and action required to meet the CBD objectives.

As a sequence to that study, we embarked in a new assessment, this time inspired on the MA conceptual framework and structure.

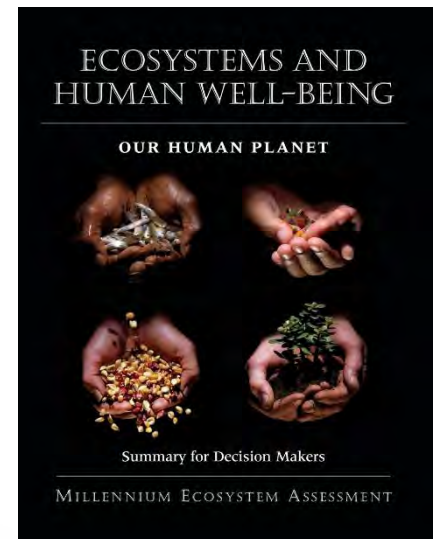


# Ecosystem Assessment approach

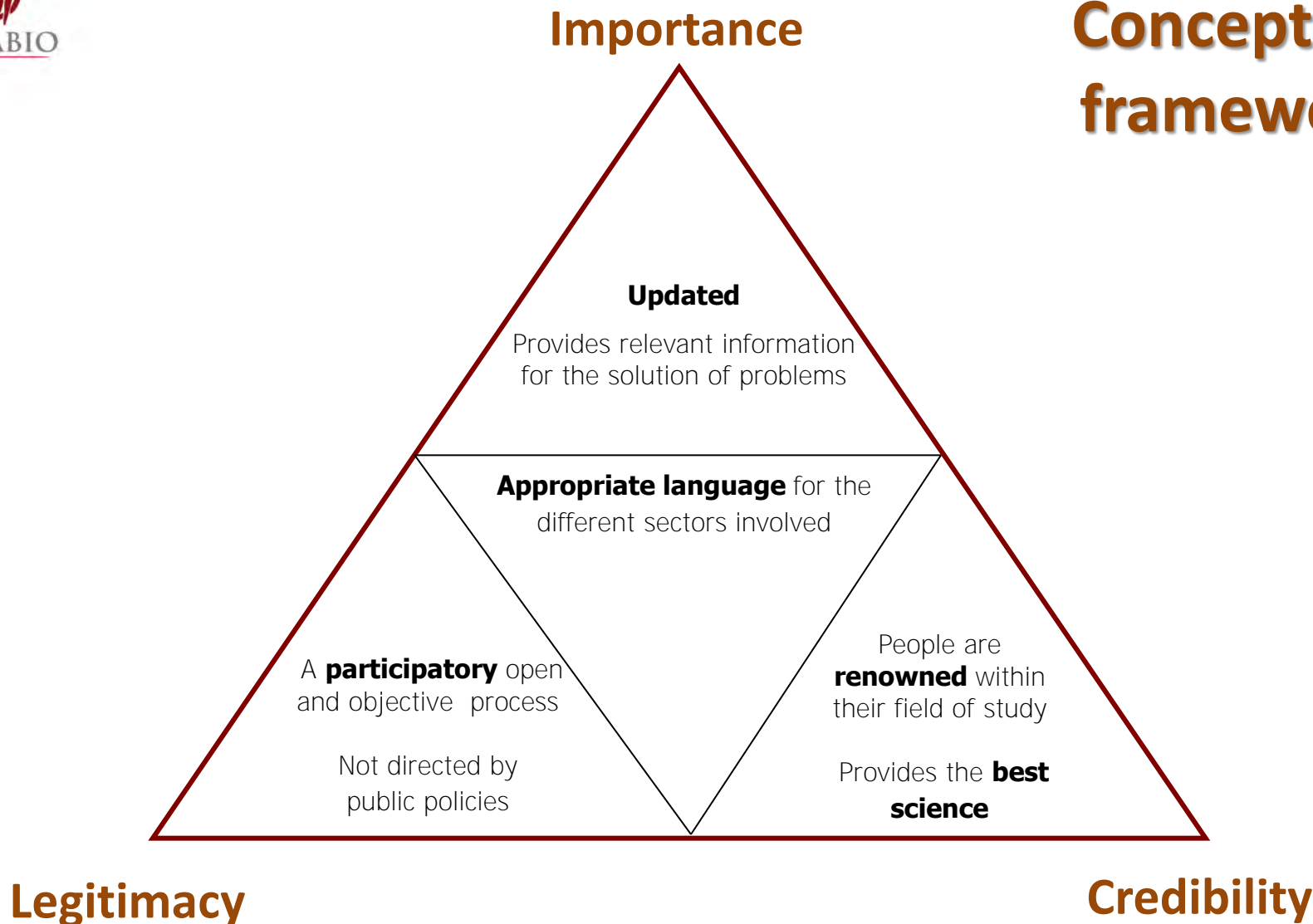
- ❖ Assess the consequences of ecosystem change for human well-being
- ❖ Establish scientific basis for actions needed to balance nature conservation and human needs
- ❖ Reach out decision-makers

## Millenium Ecosystem Assessment (MA)

> 1,300 authors  
from 95 countries



# Conceptual framework





# NATURAL CAPITAL OF MEXICO



- Inspired by the **Millennium Ecosystem Assessment**
- Adapted to particular **circumstances and characteristics of Mexico**
- Emphasizes the **importance of ecosystems** for the provision of the goods and services for human well-being.
- Baseline regarding their **conservation status** and a clear description of the **major threats** facing ecosystems
- How environmental challenges that were met in the past
- **Tasks ahead** in order to preserve the natural capital of Mexico.

**Policy relevant, not policy prescriptive**







## 2006 “Natural Capital and Human Well-Being”

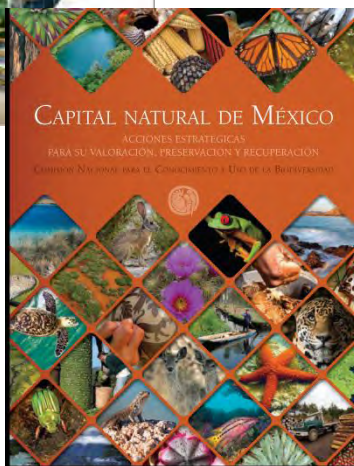
Prepared to provide main ideas during election times



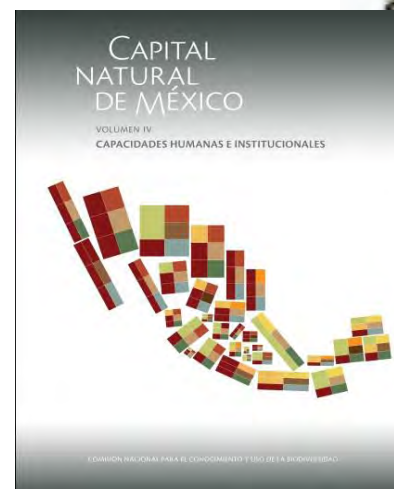
**2008-2009** 3 of 5 volumes published, prepared by **648 authors** from **227 institutions** **96 independent chapter reviewers**



**2009** Synthesis and key messages for decision makers of the first three volumes.



**2012** Strategic actions to value, conserve and restore Mexico's natural capital



**2016** Volume IV  
*Human and institutional capacities*

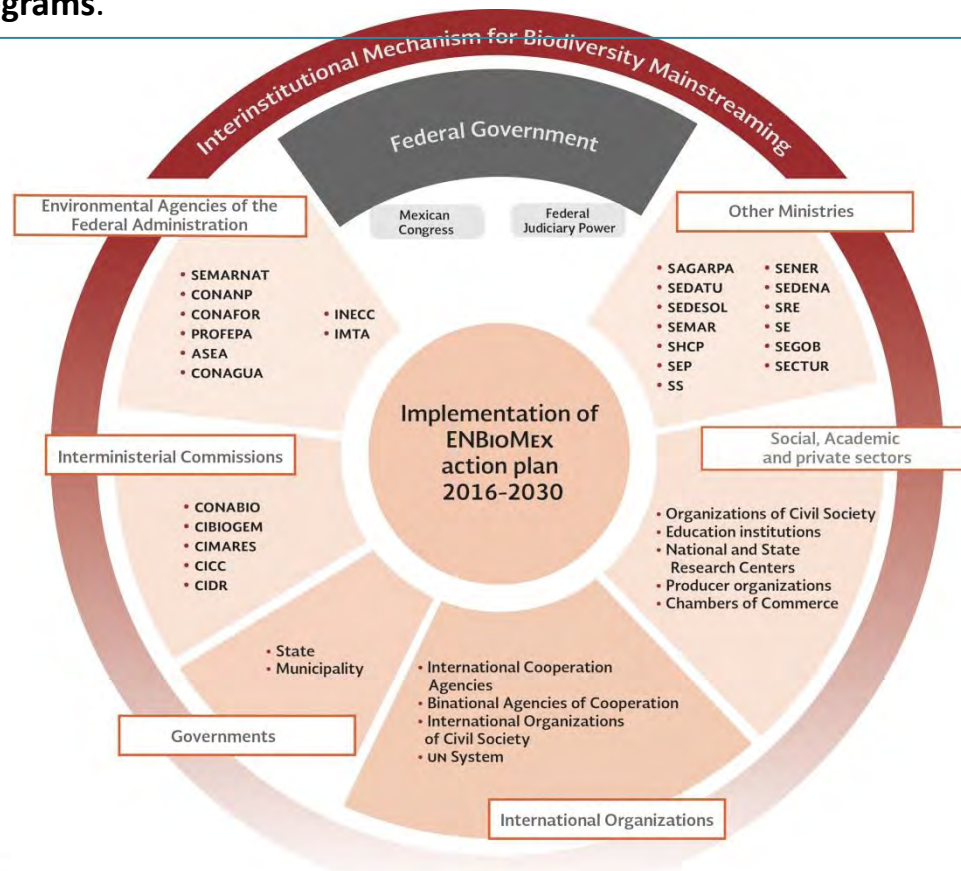
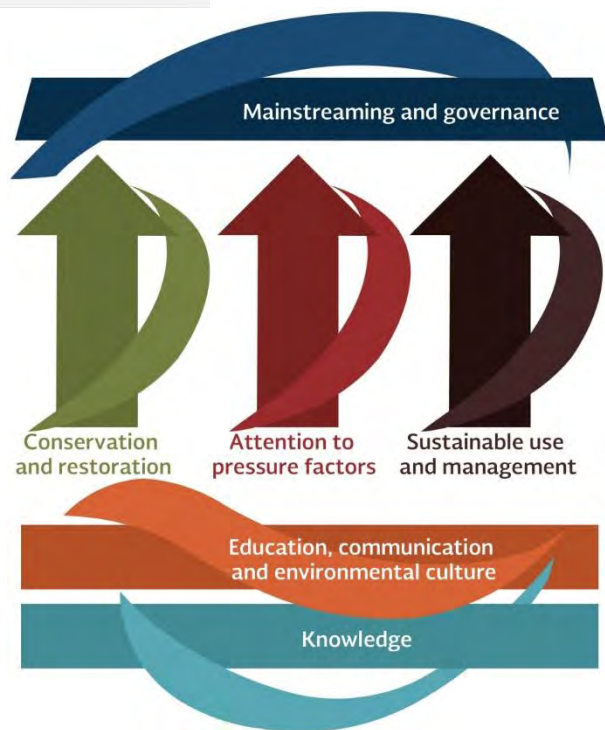
# Mexico's updated NBSAP (ENBioMex)

ESTRATEGIA NACIONAL SOBRE  
BIODIVERSIDAD DE MÉXICO  
Y PLAN DE ACCIÓN 2016 - 2030  
GOBIERNO DE LA REPÚBLICA



National Biodiversity  
Strategy of Mexico  
Action Plan • 2016 - 2030

- \* First National Strategy to include a **gender perspective**.
- \* Participation of all different **sectors**.
- \* Highlights importance of **biodiversity mainstreaming**.
- \* **Aligned to CBD Strategic Plan for Biodiversity 2011-2020.**
- \* Contribution of Mexico to **Aichi Targets and SDGs** by Strategic Axis.
- \* Aligned to **National Development Plan and Special Sectoral Programs**.





## Ejes Estratégicos ENBioMex

## Metas Aichi

## Objetivos de Desarrollo Sustentable

### Conocimiento



### Conservación y restauración



### Uso y manejo sustentable



### Atención a los factores de presión



### Educación, comunicación y cultura ambiental



### Integración y gobernanza



# I. Current knowledge of biodiversity

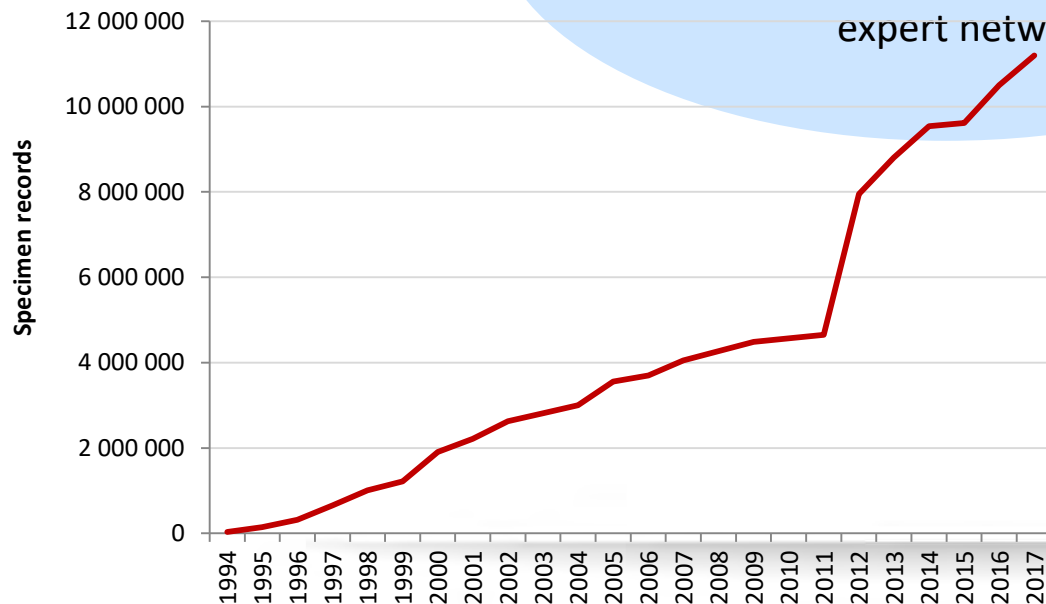
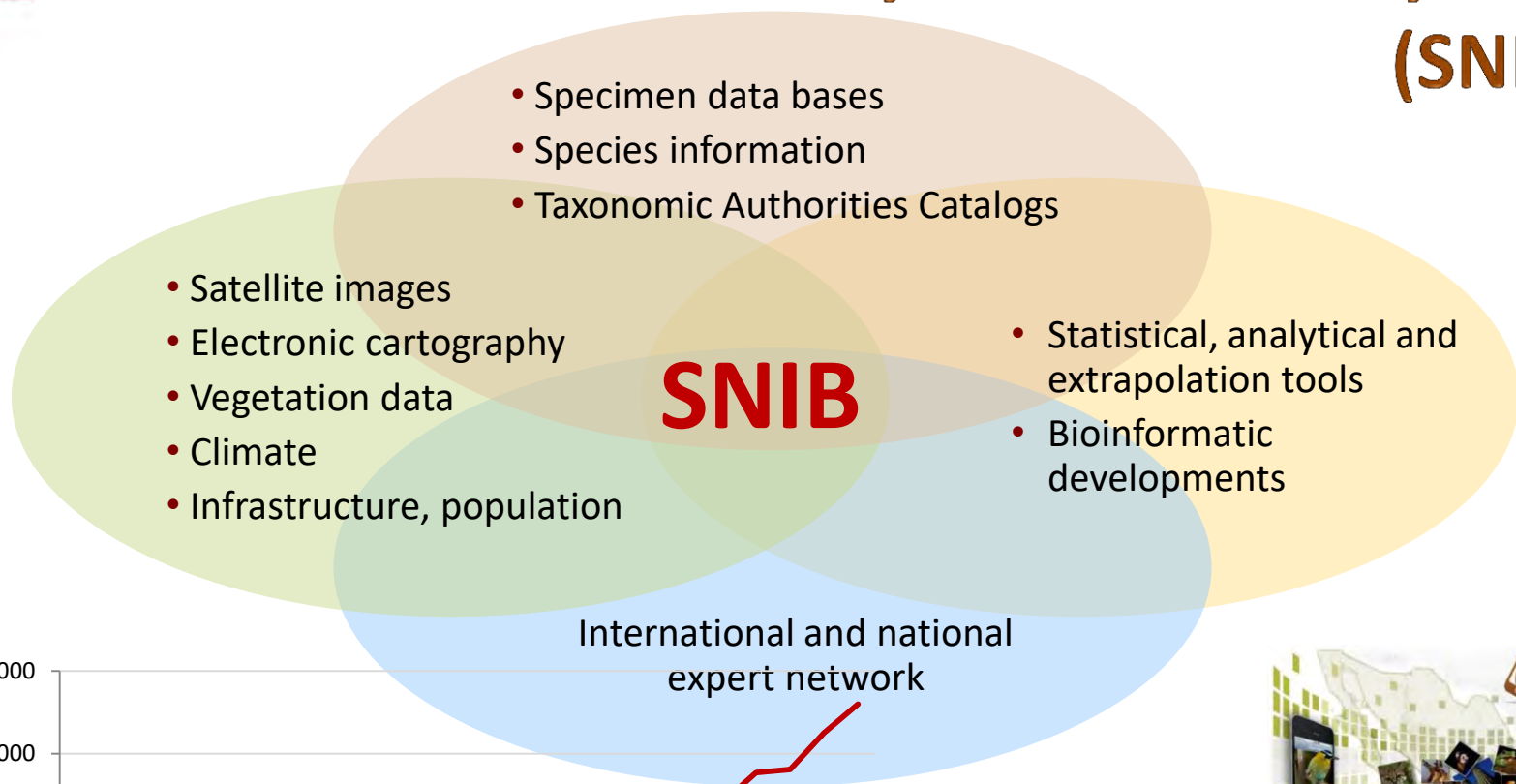
*Mexico is one of the most biologically and culturally diverse countries. The relationships between biodiversity and cultures offer Mexico great opportunities for development.*



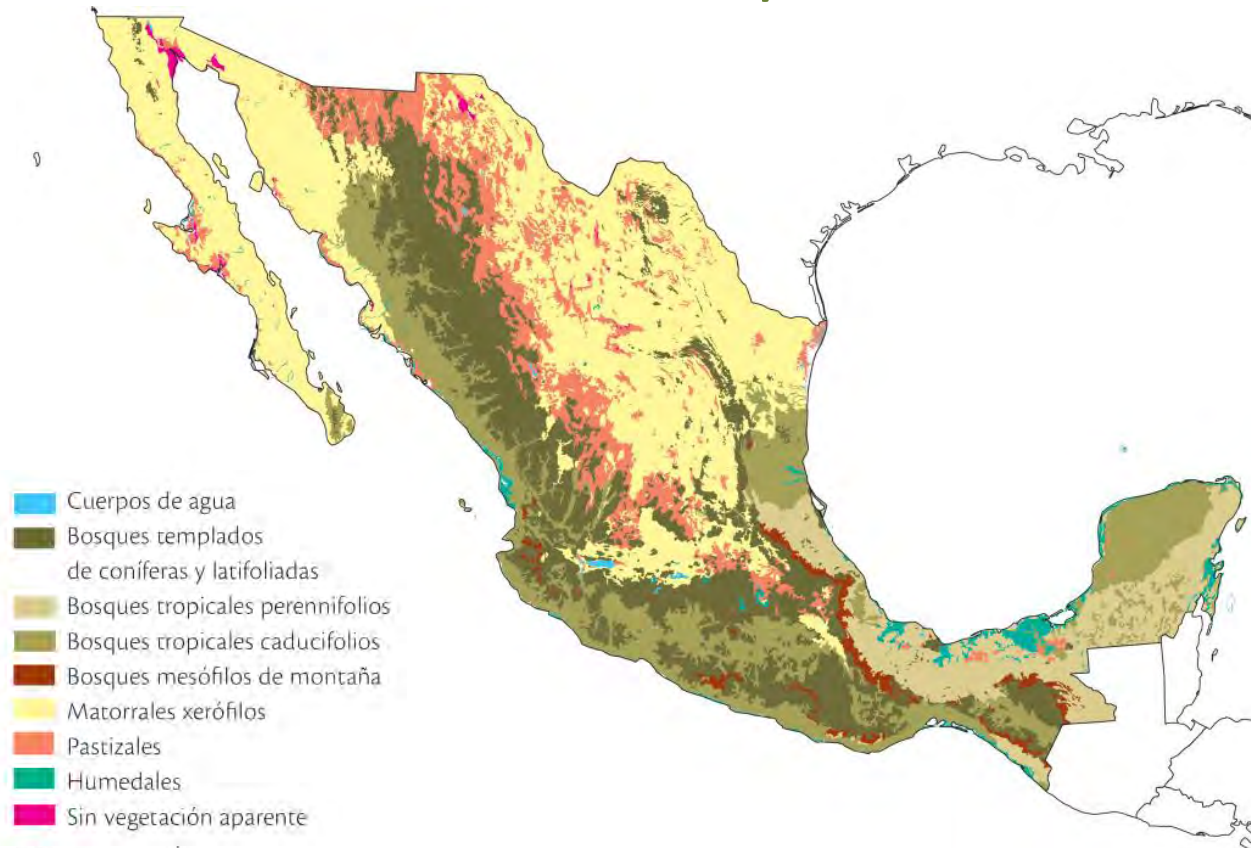
- How many species of plants, animals and microorganisms have been described in our territory and how are they distributed?
- How many species have become extinct and which were endemic and therefore now extinct on the planet?
- What types of ecosystems exist in Mexico, how are they structured and what are some of their functions?
- What knowledge do we have of the genetic diversity of wild and cultivated species?



# National Biodiversity Information System (SNIB)



*There is an enormous diversity of terrestrial ecosystems in the country. Quantitative details regarding the environmental services they provide are scarce, but there is no doubt of their economic importance.*



***Marine biodiversity in Mexico, which is exceptionally high and relatively less well-known than the terrestrial, represents a potential natural resource which continues to be badly squandered***



# Patterns of species richness for all terrestrial vertebrate groups

Distribution of bird species richness in Mexico

Distribution of bird endemism in Mexico

*Due to the great ecological variability, the biodiversity of Mexico is distributed heterogeneously, which has important implications for conservation.*





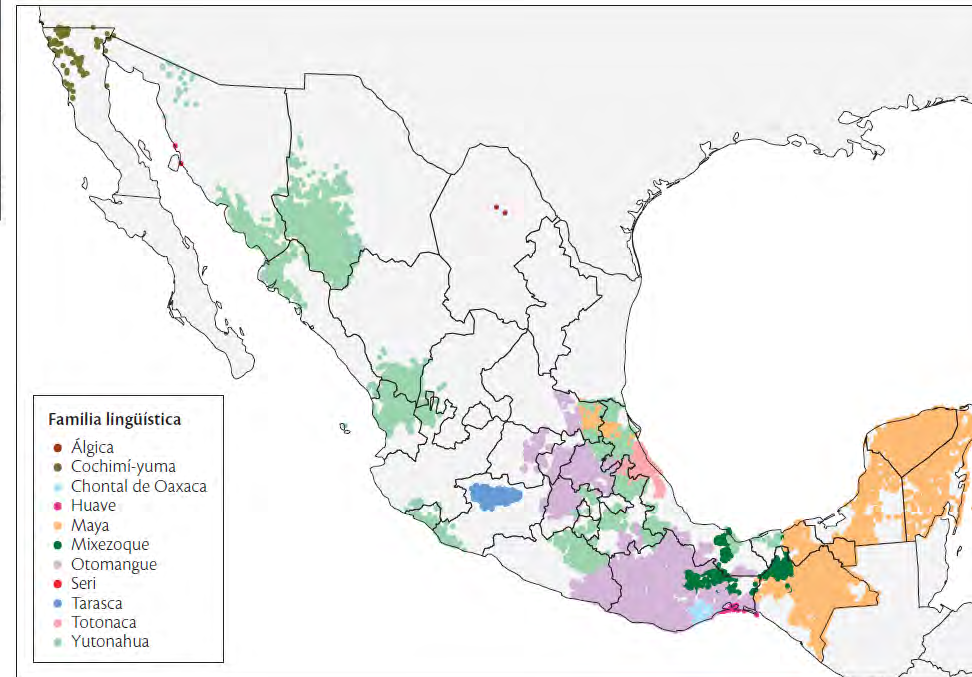
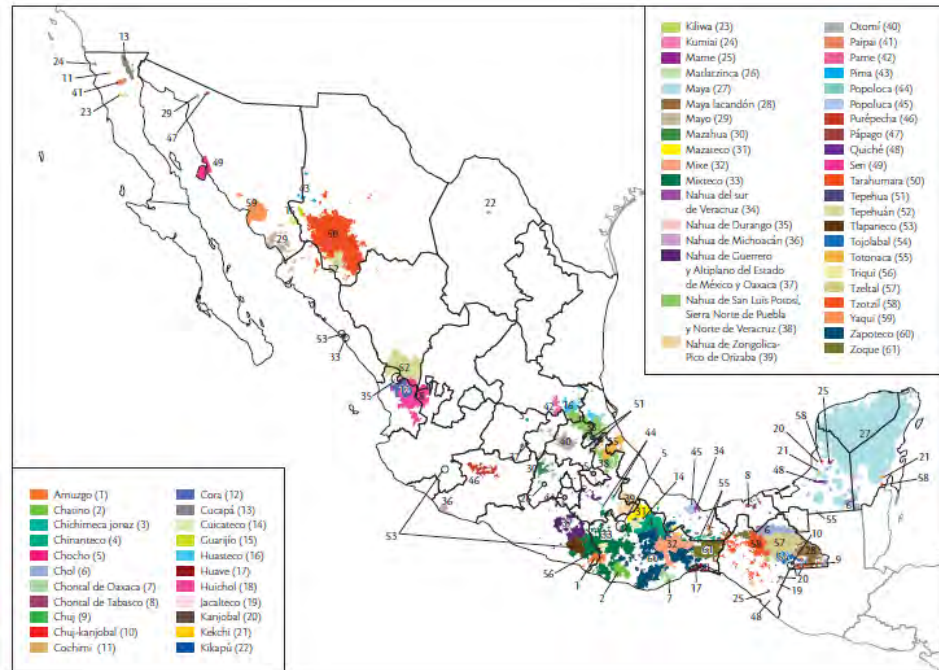


The study of the genetic diversity has been promoted, particularly for corns, pumpkins, and crops of great agricultural importance for Mexico.





# Indigenous communities own a large proportion of ecosystems with high biodiversity that provide key ecosystem services.



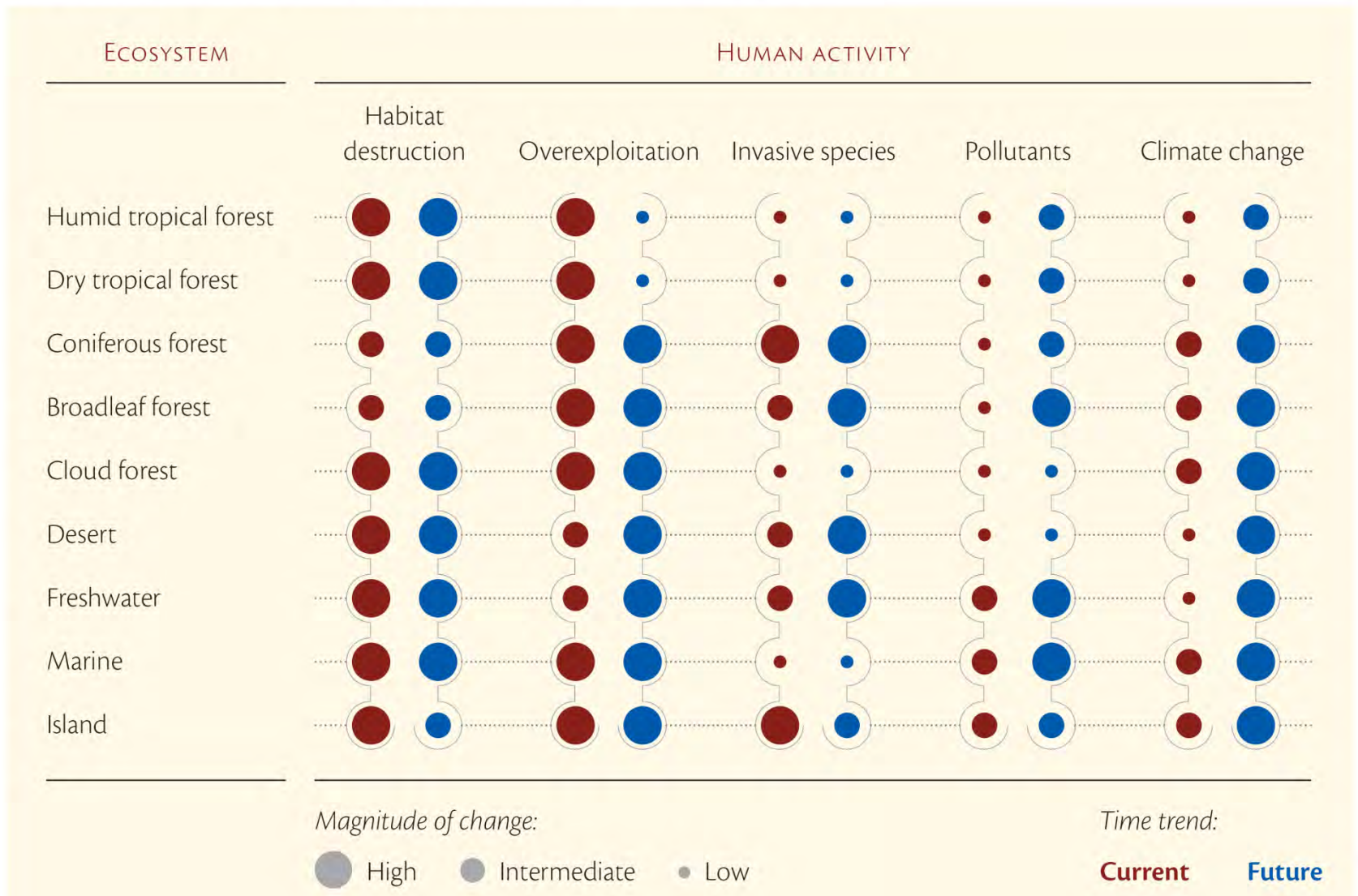
## II. State of conservation and trends of change



- In which condition are the ecosystems in Mexico?
- How are the changing trends in the last decades and what are the factors that have played a central role in them?
- Which, have been the measurable social costs or benefits of these changes ?
- Has there been progress and limitations in the conservation of natural capital?
- Which aspects will require close attention in the future?
- What is the rate of loss of populations, cultivars, species and ecosystems considering anthropogenic degradation of ecosystem functionality?
- Does such biological deterioration translates into the loss of environmental services?

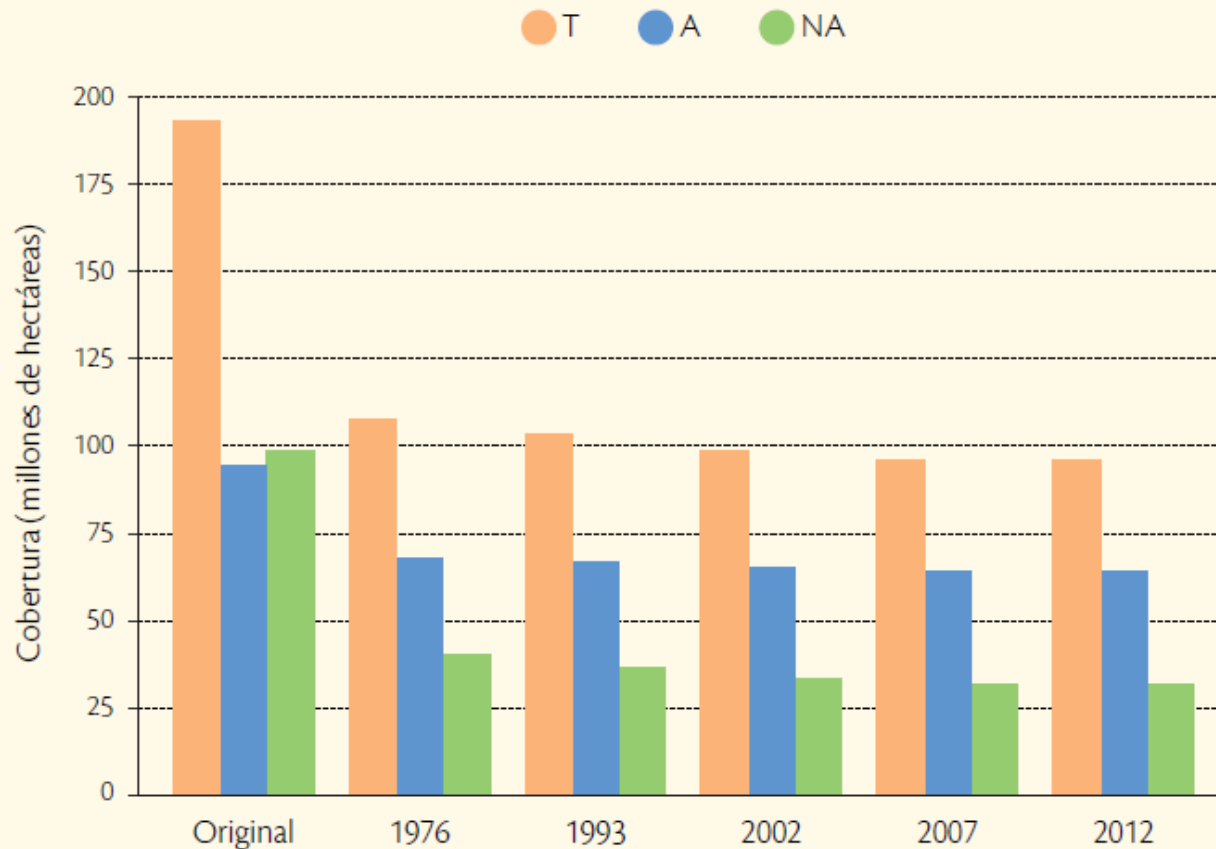


Impact of human activity on biodiversity in Mexico: Magnitude of change denoted by circles of different sizes, and temporal trend of ecosystem change (CONABIO 2006; chapter 1, vol. II).



# Trends of change in vegetation cover

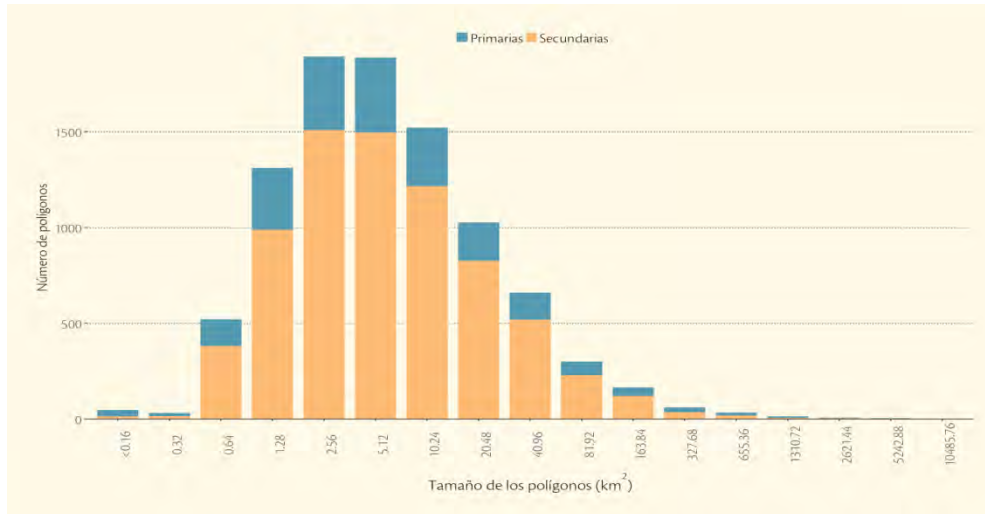
Trends of change in vegetation cover, including total coverage (T), forest (F) and non-forest vegetation (NF) in each year (Chapter 1, vol. II).



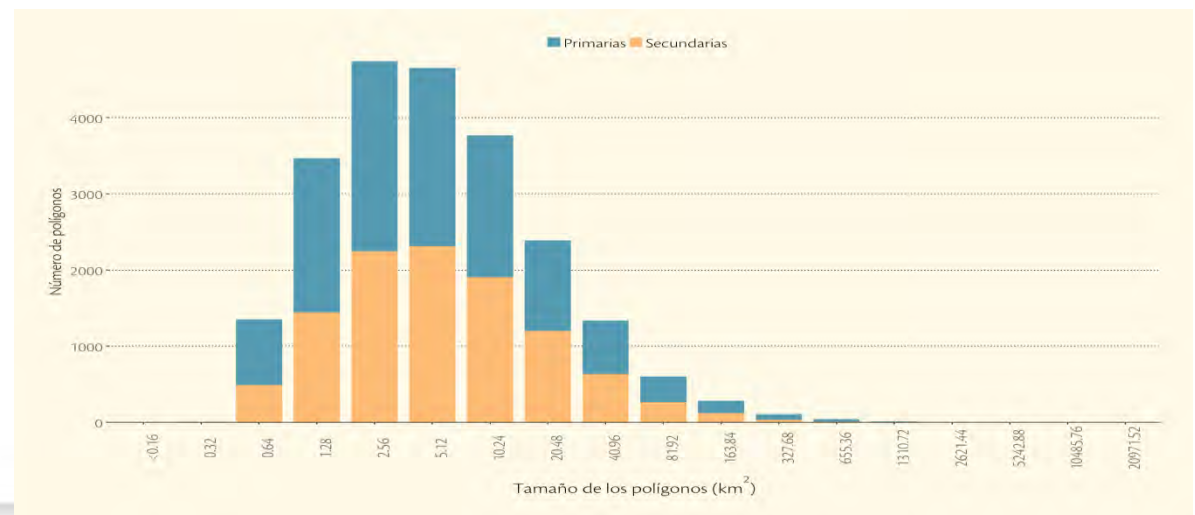


# Analysis of fragmentation

## Tropical dry forest



## Temperate forest



## CROSS-CUTTING STRATEGIC ACTIONS

## STRATEGIC OBJECTIVE

**CBD - 8.h)** Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species

**1. Review, adapt and develop the legal and normative framework**

1. Prevent, detect and reduce the risk of introduction, establishment and dispersal of invasive species.

**2. Build scientific, technical, human and institutional capacities**

2. Establish control and eradication programs for invasive species populations, which minimize or eliminate their negative impacts and favor ecosystem restoration and conservation.

**3. Enhance coordination between the different government branches, sectors, institutions and the general public**

**4. Boost communication, education and awareness of Mexican society**

3. Inform the public in an appropriate and efficient way to achieve a broad civil support and participation within their reach in actions to prevent, control and eradicate invasive species.

**5. Increase knowledge to support decision making.**

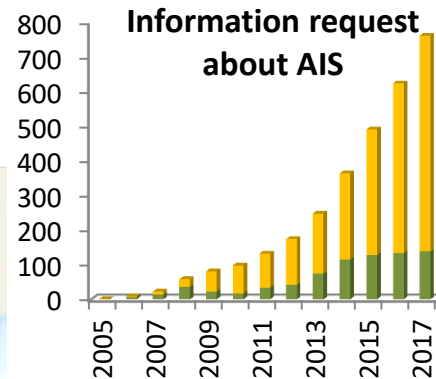


### GEF\_ IAS Project

**“Enhancing National Capacities to Manage Invasive Alien Species (IAS) by Implementing the National Strategy on IAS”**



- 
- The map displays the distribution of 1000 randomly selected species in Mexico for the year 2013. The species are color-coded: green for widespread, yellow for common, and red for rare. The inset bar chart shows the number of species in each category for the years 2005, 2007, 2009, 2011, and 2013. The chart shows a clear trend of increasing common and widespread species over time.
- | Year | Widespread (Green) | Common (Yellow) | Rare (Red) |
|------|--------------------|-----------------|------------|
| 2005 | ~10                | ~10             | ~10        |
| 2007 | ~20                | ~20             | ~20        |
| 2009 | ~40                | ~40             | ~40        |
| 2011 | ~60                | ~60             | ~60        |
| 2013 | ~80                | ~80             | ~80        |



**GOBIERNO  
FEDERAL**

**CONABIO**

Comisión Nacional para  
el Conocimiento y Uso de  
la Biodiversidad

SISTEMA DE PONDERACIÓN DE INVASIVIDAD DE ESPECIES

GRUPO

Invertebrados acuáticos

Invertebrados terrestres

Peces

Vertebrados

Plantas

Hongos

Bacterias y virus

OPCIONES GENERALES

Registrar responsable

Ponderar especies

Catálogo de especies

Resumen especies evaluadas

Especies no evaluadas

CATÁLOGO GENERAL DE ESPECIES

RESUMEN GENERAL ESPECIES  
EVALUADAS

RESUMEN GENERAL ESPECIES NO  
EVALUADAS

SALIR

CERRAR BASE DE DATOS

Plantas en sustrato en Jiguan, Finales de Siglo en México.  
**Planta volutaria**, 1788 (Coville), 1981

**Planta volutaria** Linnaeus, 1758




Foto: Alberto Paz, Fuenle Valverde

Planta volutaria es una especie herbácea que tiene el potencial de degradar a especies comensalmente importantes, reducir el reclutamiento de plántulas juveniles y alterar procesos de los sucesos matorrales. Ha invadido el Caribe en una de las invasoras de mayor rapidez de la historia (Global Invasive Species Database 2012).

Antes de 1997, esta especie de plantas Acetabularia perteneciente al filo: Celado; a este grupo se refiere de manera extensiva al medio marino de la zona intermareal y submareal, donde las algas celadas que invaden y colonizan dentro de las rocas en las rocas porciones que cubren gran parte de la extensión de la zona intermareal, y las especies de celado CDB 2012. También es una especie y presenta crecimiento cuando crece en laboratorio (CDB 2012).

**Información taxonómica**

Reino:	Animalia
Filum:	Cnidaria
Clase:	Acroporogli
Orden:	Scleractinia
Familia:	Platystrophia
Género:	Platystrophia
Especie:	Platystrophia volutaria

Nombre científico: **Platystrophia volutaria**, 1758

**Información taxonómica**

Reino:	Animalia
Filum:	Mollusca
Clase:	Bivalvia
Orden:	Mytilida
Familia:	Mytilidae
Género:	Mytilus
Especie:	Mytilus edulis (Linnaeus, 1758)

Nombre común: **Mejillón vulgar**

**Resultado:** 0/1515  
**Categoría de riesgo:** Muy alto

**Resultado:** 0/912175  
**Categoría de riesgo:** Muy alto





Target 9: invasive alien species and pathways are identified and prioritized, and controlled or eradicated accordingly; measures to control introduction pathways are in place.

	Non-native			Native	
	Present	To be confirmed	Absence	Present	
Virus / bacteria	1				
Algae / protoctist	3	1			
Fungi	1		2		
Plants	106	5	17	6	
Moluscs	11	1	7		
Insects	26	1	34	1	
Arachnida	1		2		
Crustacean	2		1		
Other invertebrates	20	6	3		
Fish	2			7	
Amphibians	1			1	
Reptiles	43			6	
Birds	14	1	1		
Mammals	15		1		
<b>Subtotal</b>	<b>246</b>	<b>15</b>	<b>68</b>	<b>21</b>	
<b>Total</b>			<b>329</b>	<b>21</b>	<b>350</b>

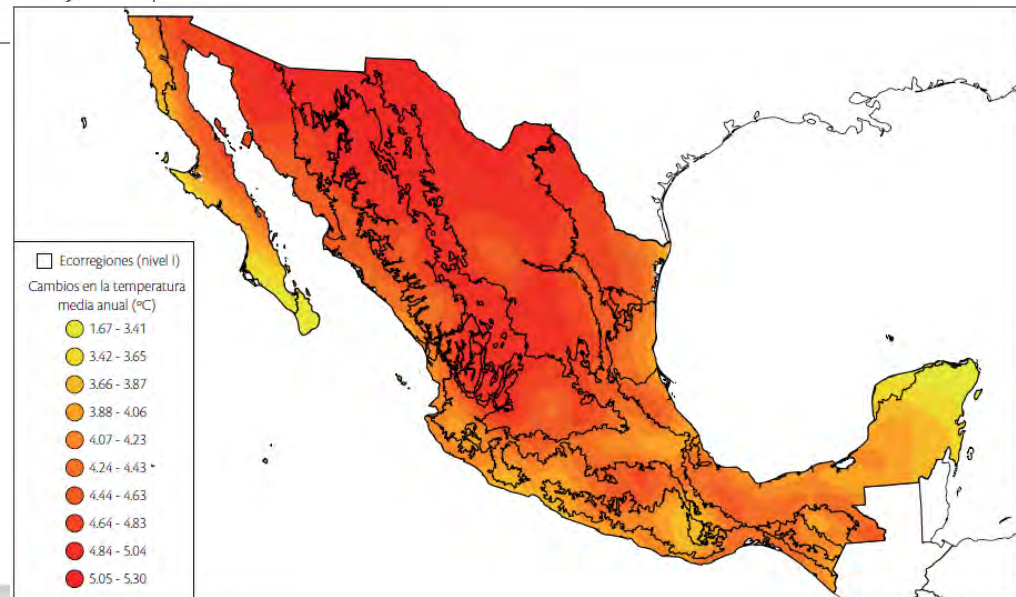
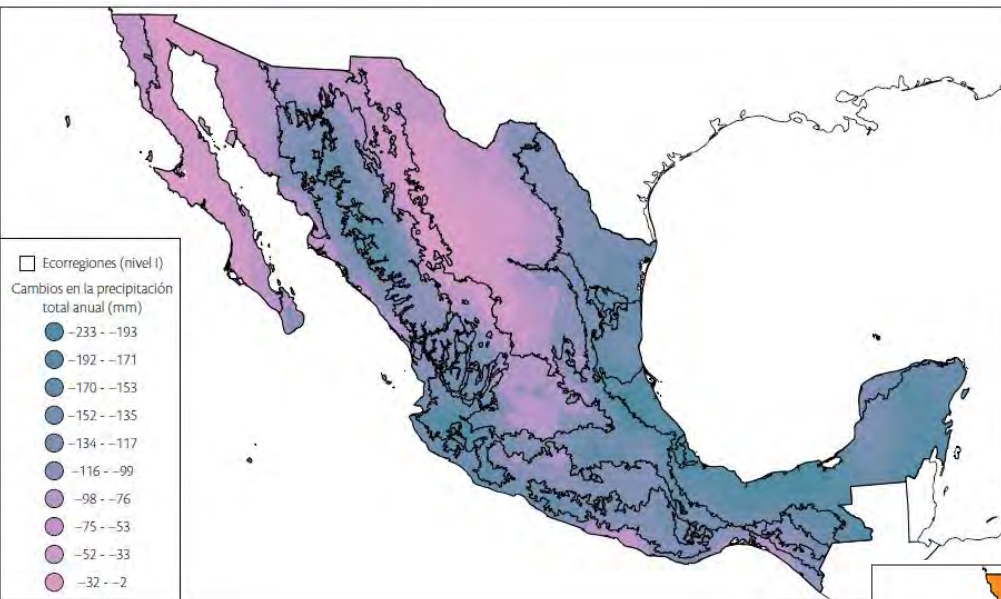
## First List con AIS published

**SEMARNAT**  
SECRETARÍA DE  
MEDIO AMBIENTE  
Y RECURSOS NATURALES





# Climate change projections

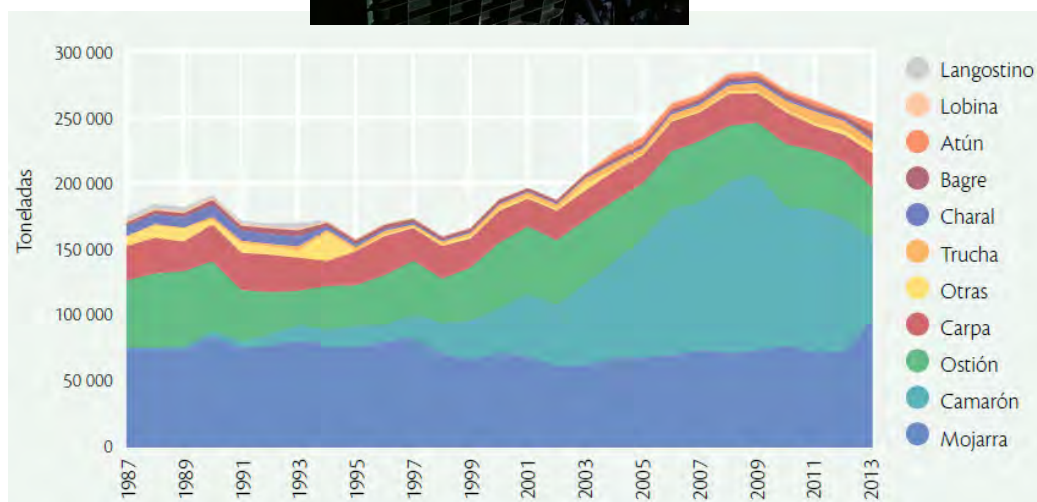


# Ecosystem services



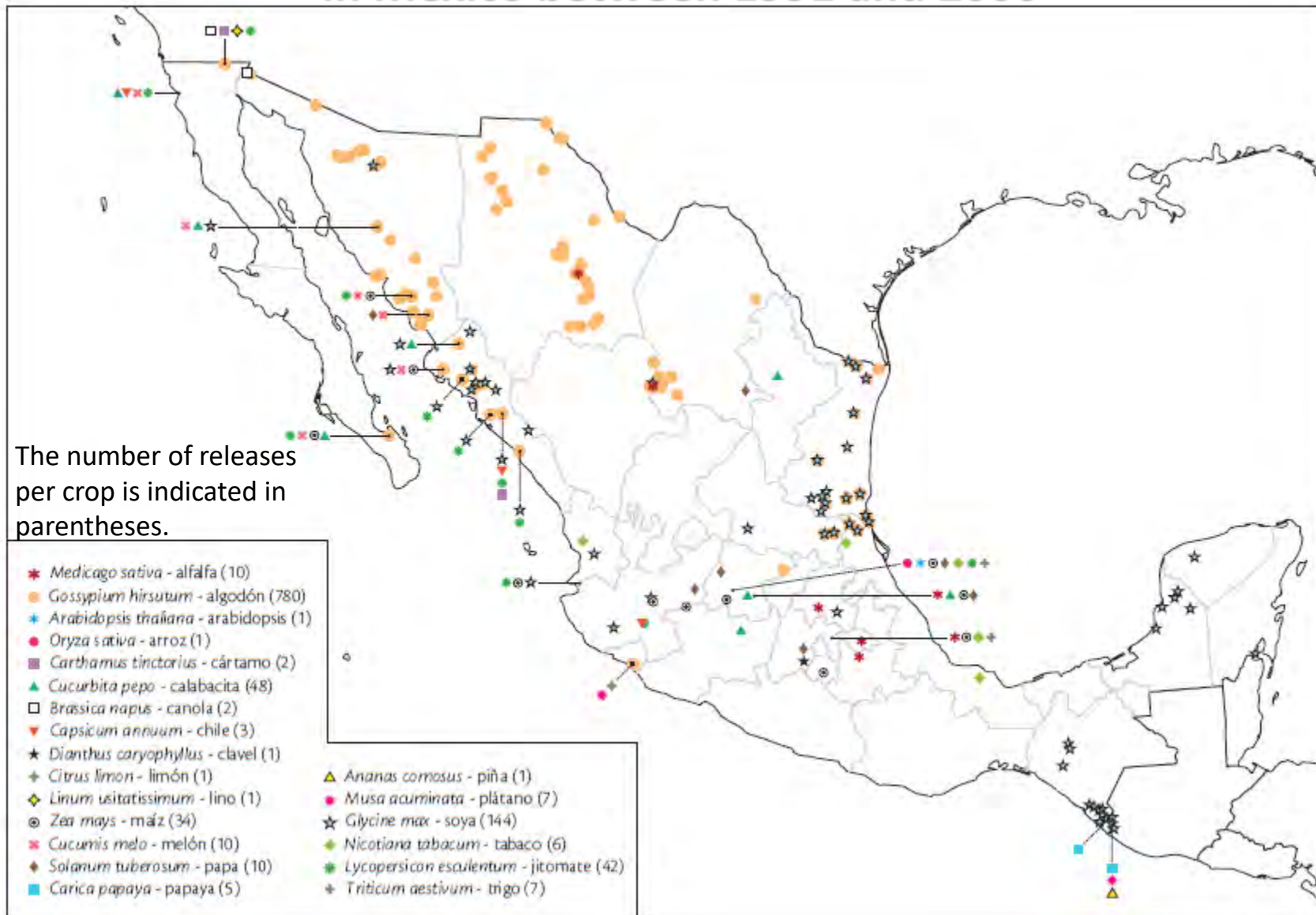
Example: Mangrooves represent a very important source of income for many families that live in coastal zones.

In Mexacaltitán, Nayarit, 2 % of the town's income originates from the direct use of mangrooves, while 56% of the income originates from ecosystem services provided by mangrooves (e.g. fisheries).



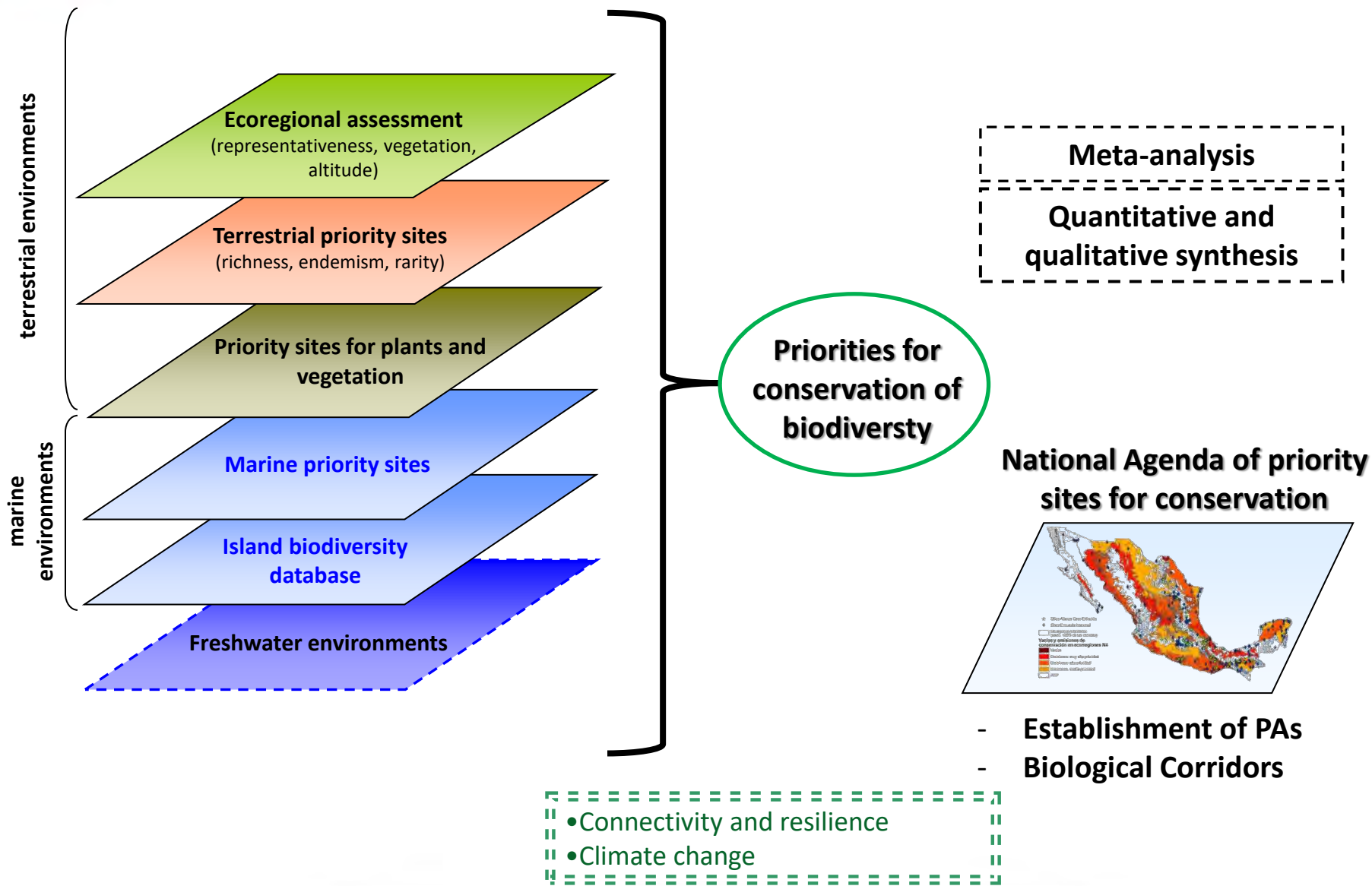
The ability of the marine ecosystems of Mexico to provide food through fishing is declining due to overexploitation, deterioration of marine ecosystems essential to complete the life cycles of commercial species and by introduction of exotic species.

# Release of genetically modified organisms in Mexico between 1991 and 2006





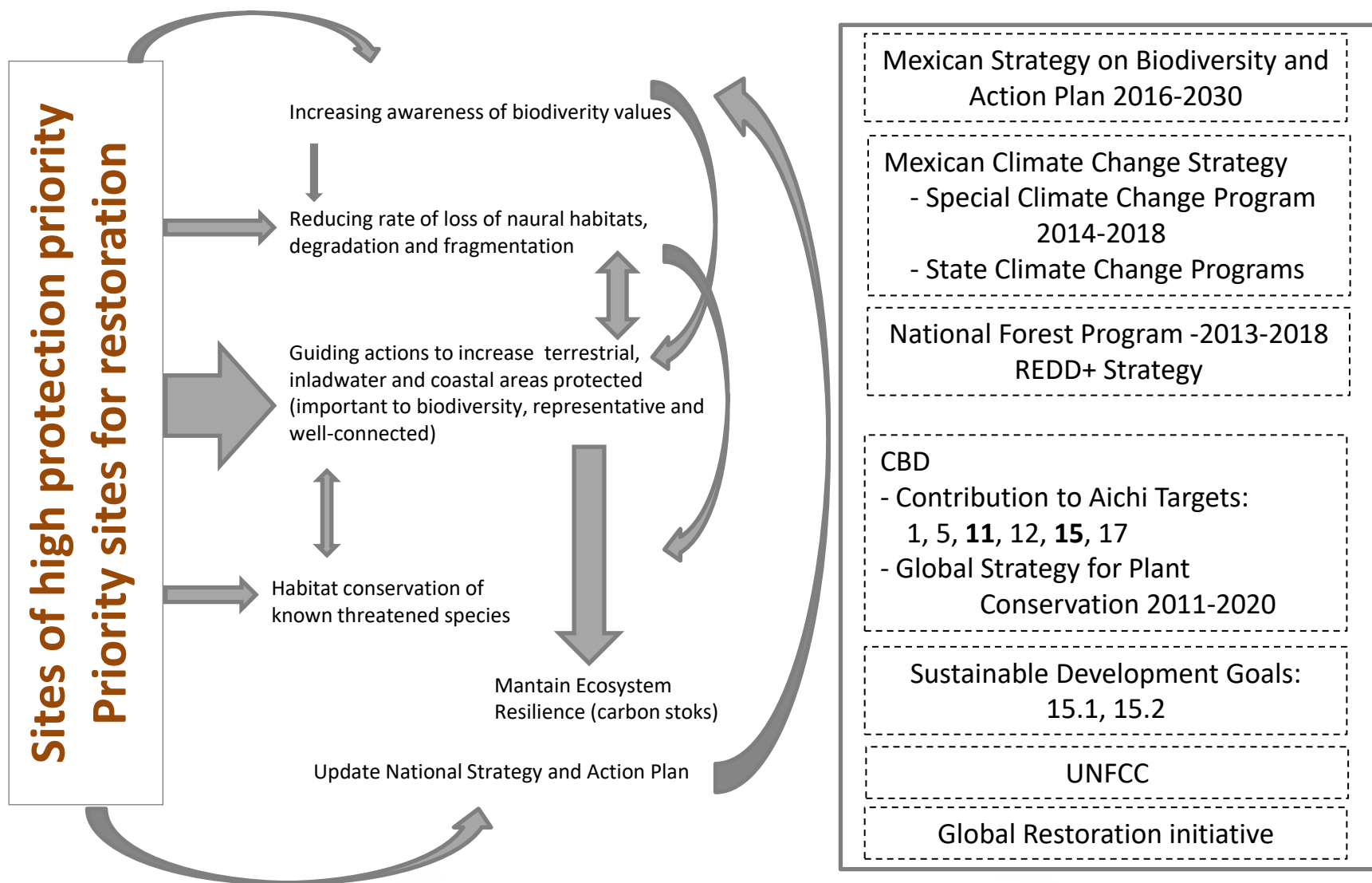
# Summary of national GAP analyses



## Ecorregiones terrestres y cambio climático



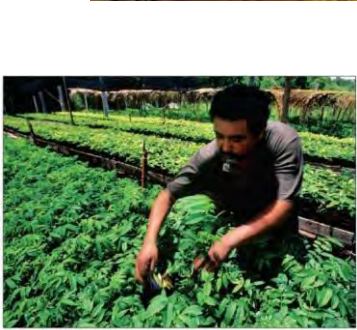
# Conceptual relationships of benefits



**Informed decision-making, effective strategies, and appropriate policy and legislation**

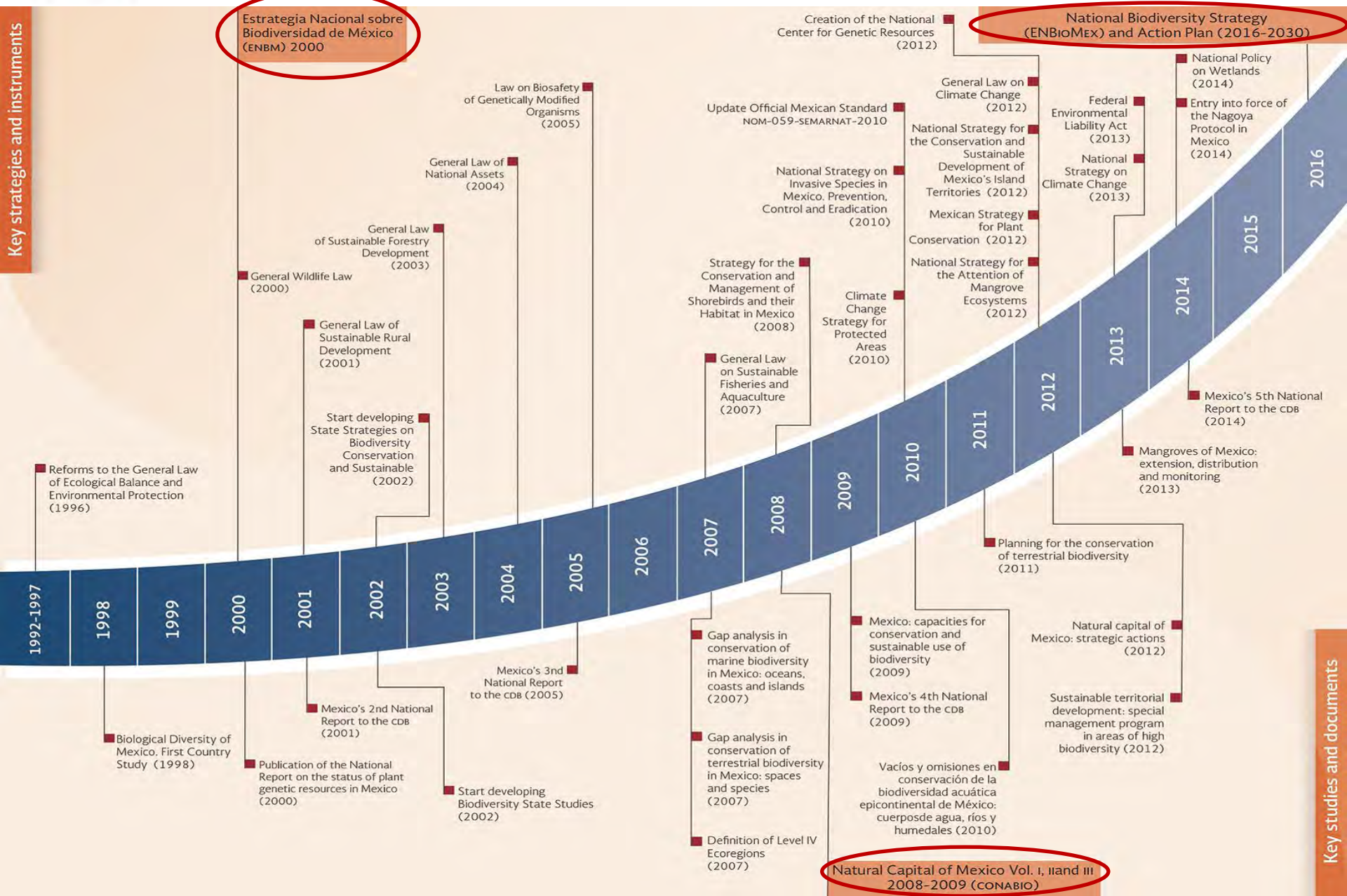


# III. Public policy and perspectives to sustainability



- What are these policies and what have been their positive or negative effects on the rational management and conservation of our natural capital?
- How can we improve the country's ability to conduct evaluations of policies, conservation actions and sustainable management of Mexico's diversity and its benefits to society?
- Which changes should be expanded and consolidated to achieve environmental sustainability in the use of biodiversity?

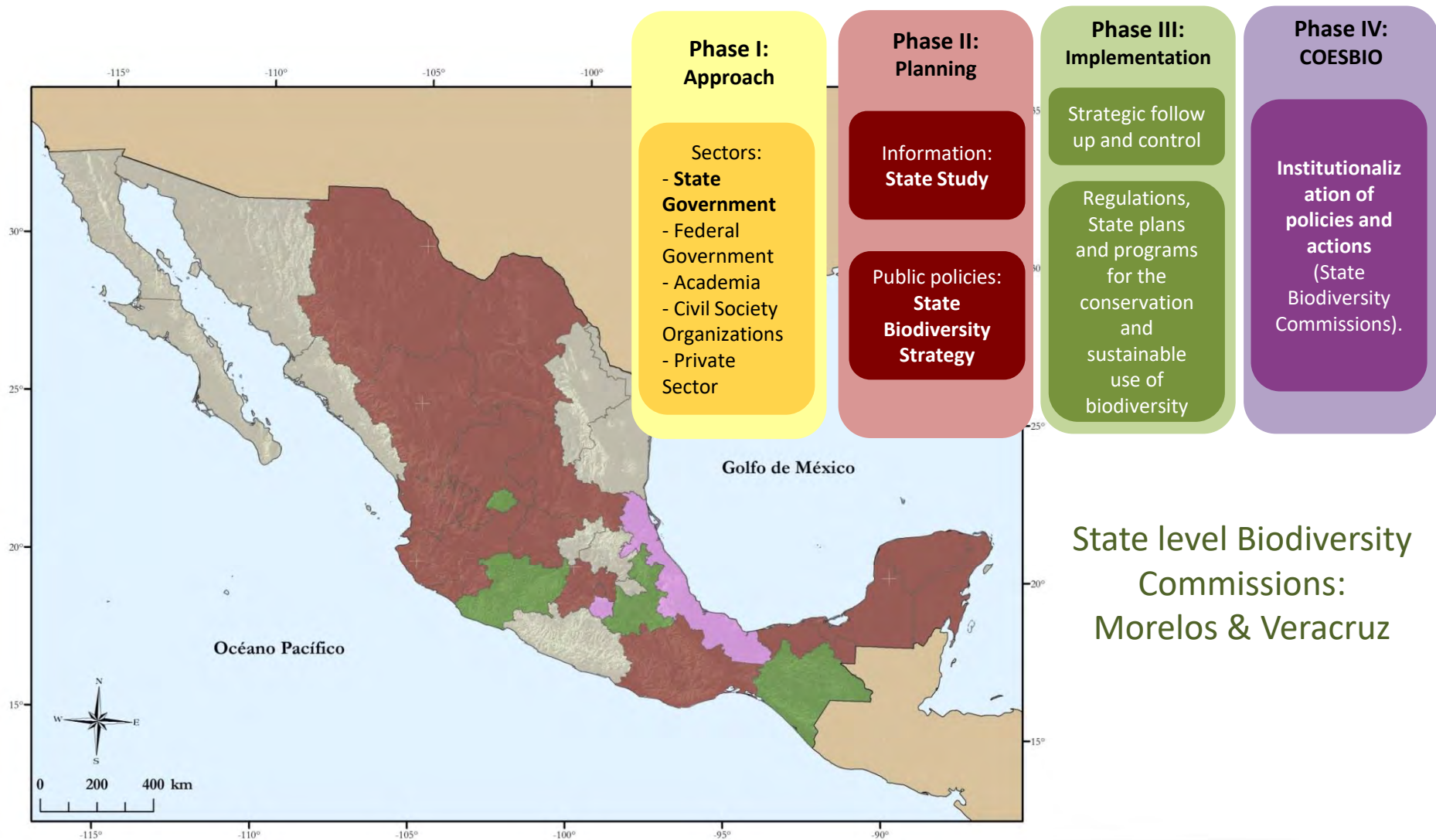
# Key biodiversity strategies and instruments





# State Biodiversity Strategies :

## 22 States in process


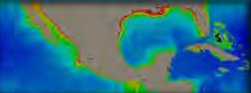





# Monitoring systems

Monitoreo Marino  
Sistema Satelital de Monitoreo Oceánico (SATMO)

Información del SATMO

Metodología Descripción de productos oceánicos MODIS Descarga de productos oceánicos MODIS

**Solicitud** En tiempo casi-real Definitivos Climatología

A partir de imágenes del sensor MODIS (Aqua/Terra de 1-km) recibidos desde la [estación](#) de recepción satelital de la CONABIO. Con datos auxiliares pronosticados. Productos resultantes útiles para análisis cualitativo.

Selecciona la temporalidad

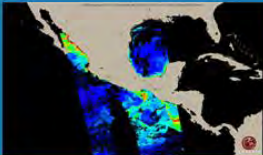

Diarios

**Pasos diarios del MODIS/Aqua-Terra (1-km)**

Seleccione el área deseada, el mes/año, el satélite (Aqua/Terra), y el [producto](#) con el formato deseado para una fecha específica.

Toda el área de estudio

Año	L2_IAC, L2_Mapped y RGB_Mapped											
2014	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC
2015	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC
2016	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP	OCT	NOV	DIC

Semanales Mensuales

## Sistema de Monitoreo de los Manglares de México (SMMM)

Premio Geospatial Application Excellence Award



La estructura, funcionamiento y permanencia de los manglares, por su condición de ambientes costeros y ecosistemas terminales de las cuencas hidrográficas, dependen en buena medida de factores externos de gran escala, como las corrientes oceánicas, la conexión con el mar, el clima y los cambios en la cobertura y usos del terreno a nivel de paisaje (Roman *et al.* 2000). La constante interacción de los manglares con este tipo de factores trae consigo cambios en el ecosistema que llegan a determinar, entre otras características, su distribución espacial y temporal.

Realizar un monitoreo a largo plazo del ecosistema de manglar de México, permitirá determinar el estado y las tendencias de cambio (pérdida, deterioro o recuperación) así como las amenazas existentes y latentes, con el fin de definir acciones para su conservación, por parte de instituciones de investigación, organizaciones gubernamentales y no gubernamentales.

El Sistema de Monitoreo de los Manglares de México (SMMM), que desde 2005 está siendo desarrollado por la CONABIO, se enriquece constantemente con información generada por técnicas de percepción remota, trabajo *in situ* y retroalimentación entre instituciones. Los formatos de captura de información y detalles de las parcelas de monitoreo están disponibles para el público interesado en emplearlos.

# CBM Iniciative

GEF Project, 1997

7 countries: Belice, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panamá y México.



## Main objectives:

Maintain biological diversity.

Fight fragmentation and improve landscape connectivity.

Promote sustainable productive activities that improve the well being of local population (use, manage and conserve biodiversity).





# Exemplar productive activities

> 80% of forested areas in Mexico are under communal property.  
The majority of this owners are within the 20% most impoverished sector of the country.

40 communities are internationally certified as sustainable (772, 166 ha)

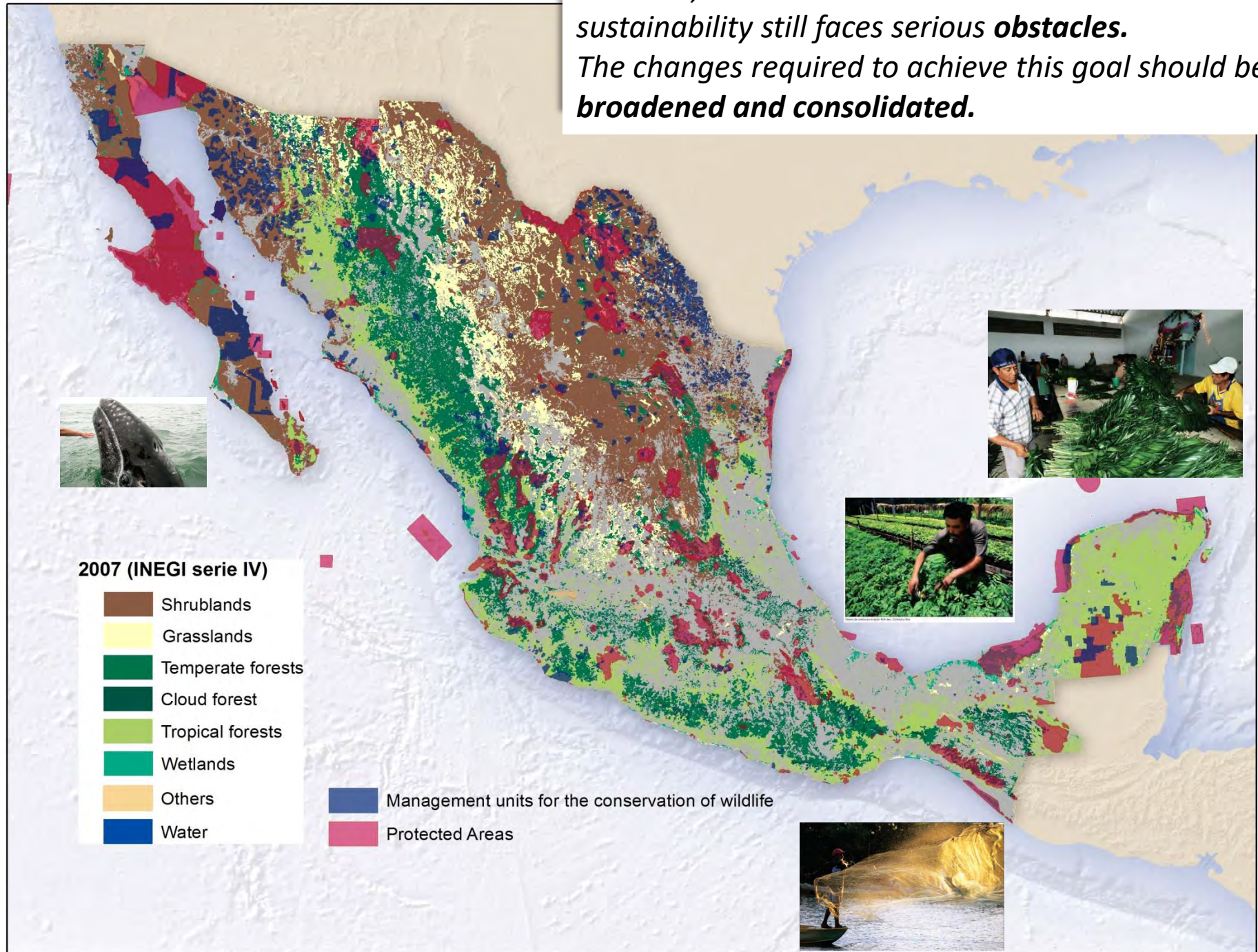


F. Eccardi

**Communally-owned certified furniture factory for export in Q. Roo**



However, the **transition** to environmental sustainability still faces serious **obstacles**. The changes required to achieve this goal should be **broadened and consolidated**.





# Challenges

## Conservation and threat factors

**Actions to maintain biodiversity in territorial planning schemes outside protected areas:**

- Strengthen conservation instruments and sustainable use
- Establish monitoring programs to evaluate its effectiveness
- Promote its use among the inhabitants of ecosystems
- Offer training courses for users
- Create markets for products that are generated in sustainable schemes



# Challenges

## Conservation and threat factors

**Incorporate the dimension of environmental sustainability in macroeconomic and budgetary decisions to internalize the negative impacts that productive activities have on ecosystems**

- Consider the environmental costs of different production and development activities
- Promote cross-cutting policies of the different sectors of government





# Challenges

## Knowledge

**We require multidisciplinary research that:**

- Provide intelligence on a national scale, particularly relevant at the local level and for landowners
- Combine conservation through sustainable management and tangible benefits to the owners of the country's natural capital
- Transform the owners of natural capital into actors of conservation planning and sustainable management of that capital

**It is essential that decision making for environmental management take into account the best available scientific and technological information.**



# Challenges

**The legal and regulatory framework for environmental issues has made notable progress in the country, constituting a solid base for the development of national capacities.**

- Address key aspects to achieve the sustainable management of our natural capital:
  - Clarity in what is sought to protect when talking about the environment
  - Synchronization between government bodies and between environmental and sectoral legislation
  - Revision and reform laws with clear policies
  - New policies and greater social participation to strengthen the recognition of collective rights
  - Strengthen state and municipal capacities
  - Institutional development for the application of laws
- Increase the training of human resources in environmental law



- **Responsibility** for environmental consequences.
- Build environmental responsible behavior **to change consumption patterns.**
- Sustainable productive activities with tangible **benefits for the owners** of the natural capital of the country.
- **Investment in science** and technology
- Strengthening of :
  - **Institutional capacities**
  - **Communication between the science and policy domain**
  - **Communication across government sectors at all levels**





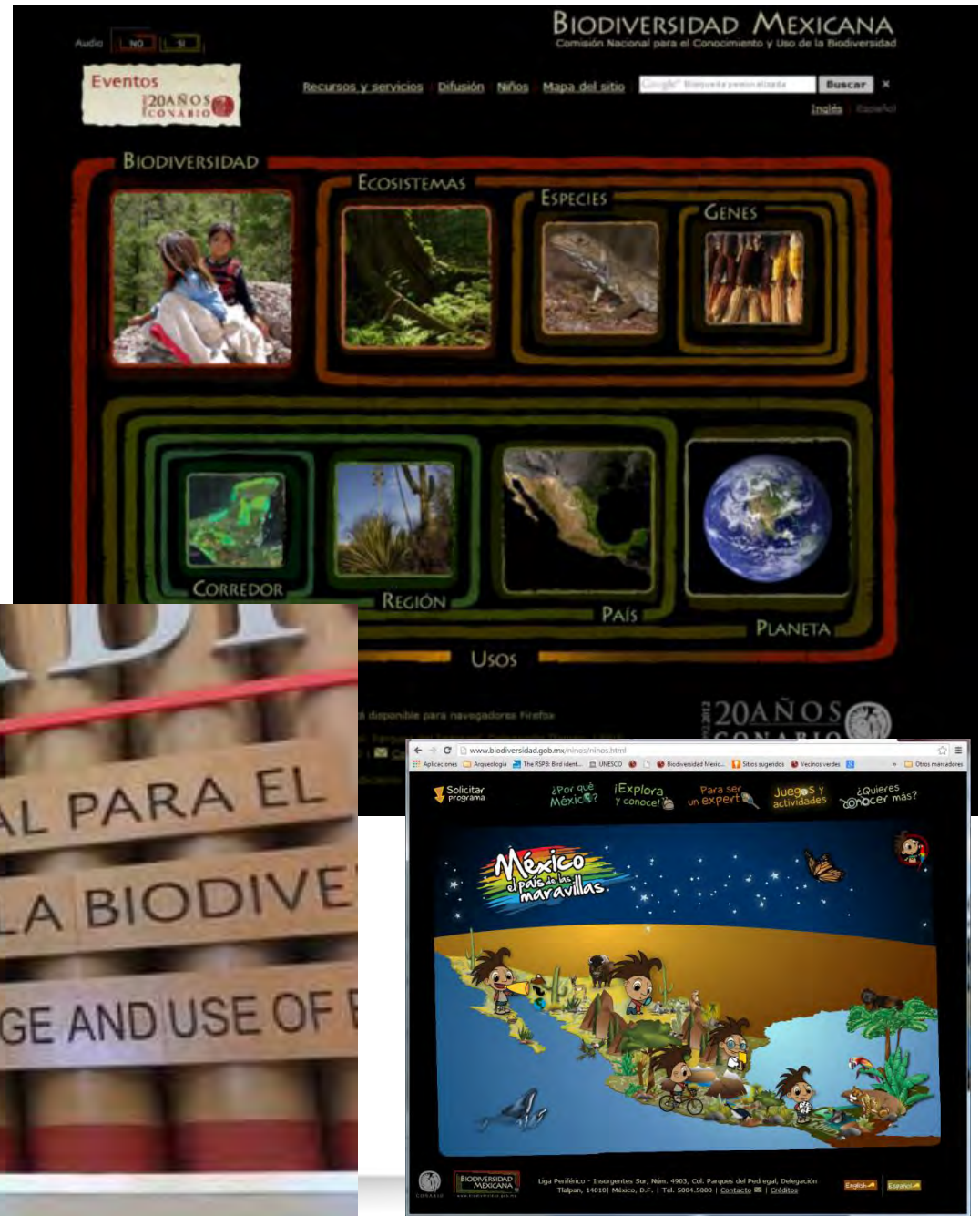
- **Consolidate the National Biodiversity Information System (SNIB)**
  - “SNIB without frontiers”
  - New fields for more information
  - Analyses and models
- **Operational systems**
- **Information for everyone**



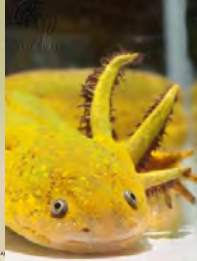


October 2010 “Mentes Quo+Discovery” award

December 2016, “Gold Award to a National Existing Clearing House Mechanism (CHM)”







# Thank you!

## ¡Gracias !

[dgap@conabio.gob.mx](mailto:dgap@conabio.gob.mx)

For more information:

[www.biodiversidad.gob.mx](http://www.biodiversidad.gob.mx)

[servext@conabio.gob.mx](mailto:servext@conabio.gob.mx)

