

Continuous learning through knowledge management: Transforming biodiversity management institutions into learning organizations.

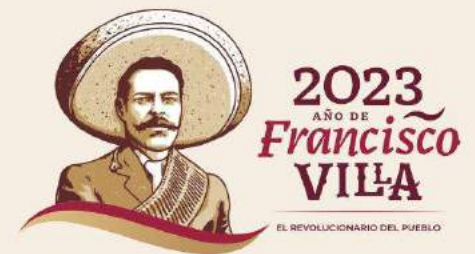
Webinar: First Knowledge Management for Biodiversity (KM4B)

Hesiquio Benitez, Mexico

31 October 2023



**Convention on
Biological Diversity**



Mexico

A Megadiverse Country



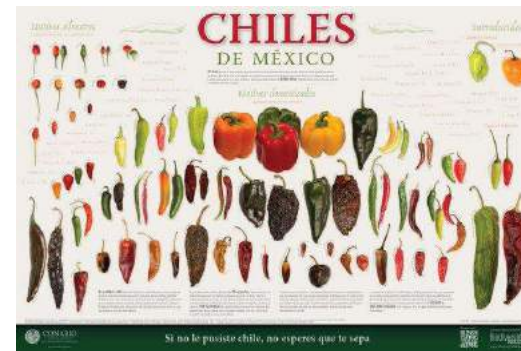
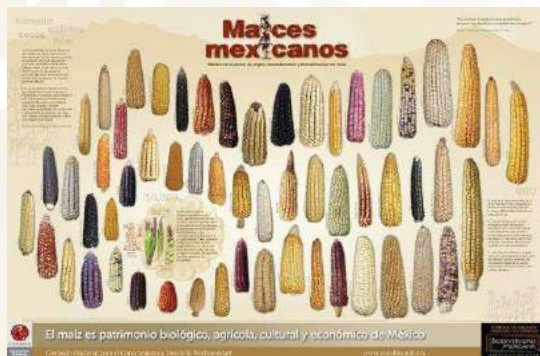
Diverse ecosystems with a myriad species, many of them endemic



More than 300 languages still spoken



Center of domestication of many plants cultivated worldwide



National Commission for the Knowledge and Use of Biodiversity, CONABIO

Created
in
1992

It is an
Inter-Ministerial
Commission



What does
CONABIO do?
Gathers, generates,
integrates and
synthesizes
information on
Mexico's biodiversity

How does it do it?

With the support of scientists in the country to gather the latest and most reliable information on many topics and from diverse regions.



Why does it do it?

For society to know, value and conserve the natural wealth of Mexico and for decision makers to develop policies based on reliable knowledge to improve the quality of life of all society.



It is a bridge between



National Commission for the Knowledge and Use of Biodiversity, CONABIO



CONABIO develops **intelligence** for decision making regarding Mexico's biological and cultural diversity



Conservation Priorities

- Terrestrial
- Marine
- Fresh water



Subnational Strategies

- Biodiversity Studies and Strategies
- Existing biodiversity and how to conserve, restore and sustainably manage it.

National Strategies

- Biodiversity, EMCV, IAS

International Cooperation

- CBD – Convention on Biological Diversity
- CITES – Convention on International Trade of Endangered Species
- IPBES – Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

Monitoring

- Wild Fires
 - Land use
- Biodiversity
 - Oceans
 - Mangroves



What is the generated information used for?

- 1 To value, sustainably use and conserve Mexico's natural wealth.
- 2 To know the distribution of endangered species, alien invasive species and species for commercial use, among others.
- 3 To determine Priority Areas for Conservation and Restoration of Mexico's biodiversity.



National System of Biodiversity Information (SNIB)

550 K satellite images

National System of Biodiversity Information (SNIB)
13.8 million records of 110 K species of plants, animals, fungi and microorganisms.

Medicinal, ornamental, spiritual, cultural species, dyes and textiles.

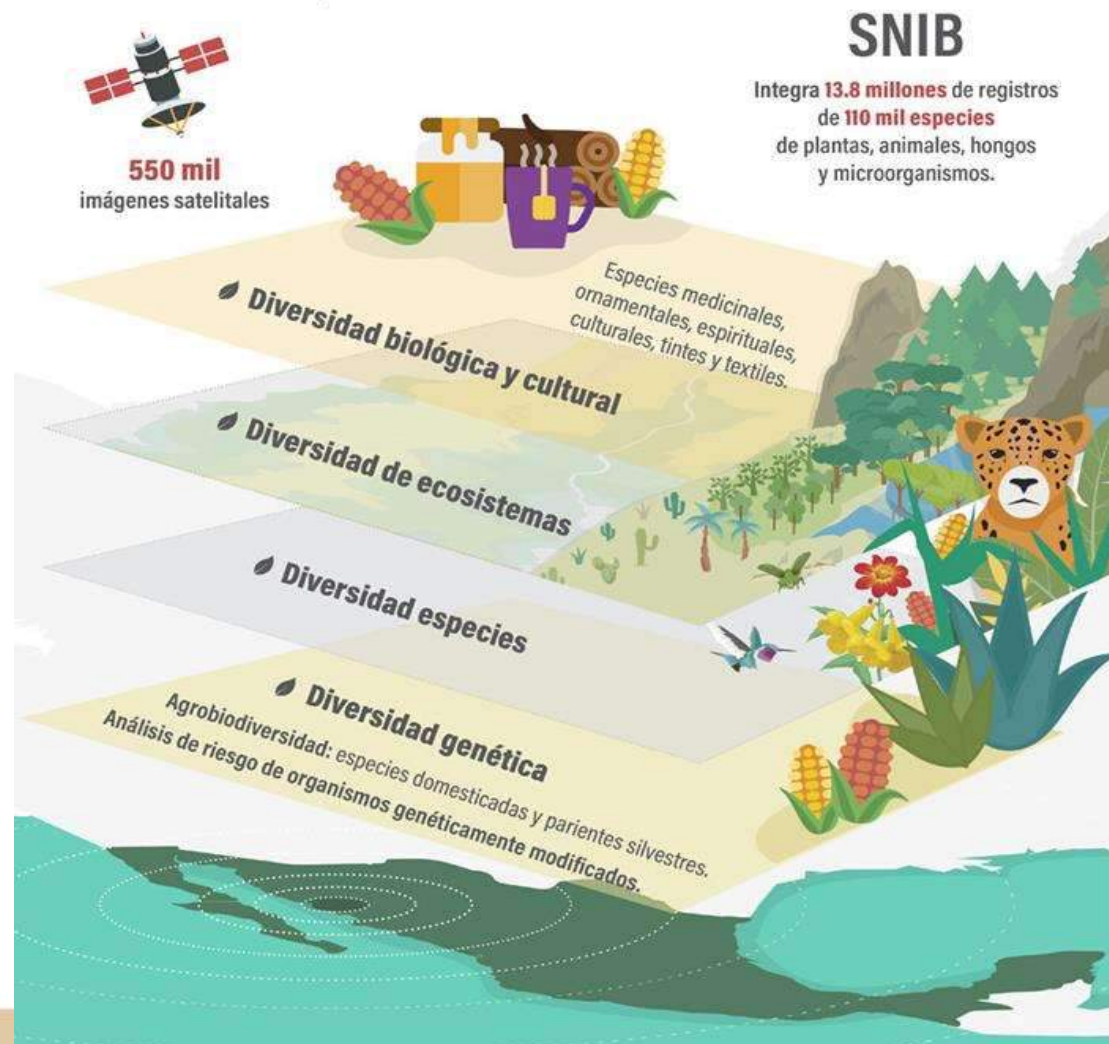
Biological and cultural diversity

Ecosystem diversity

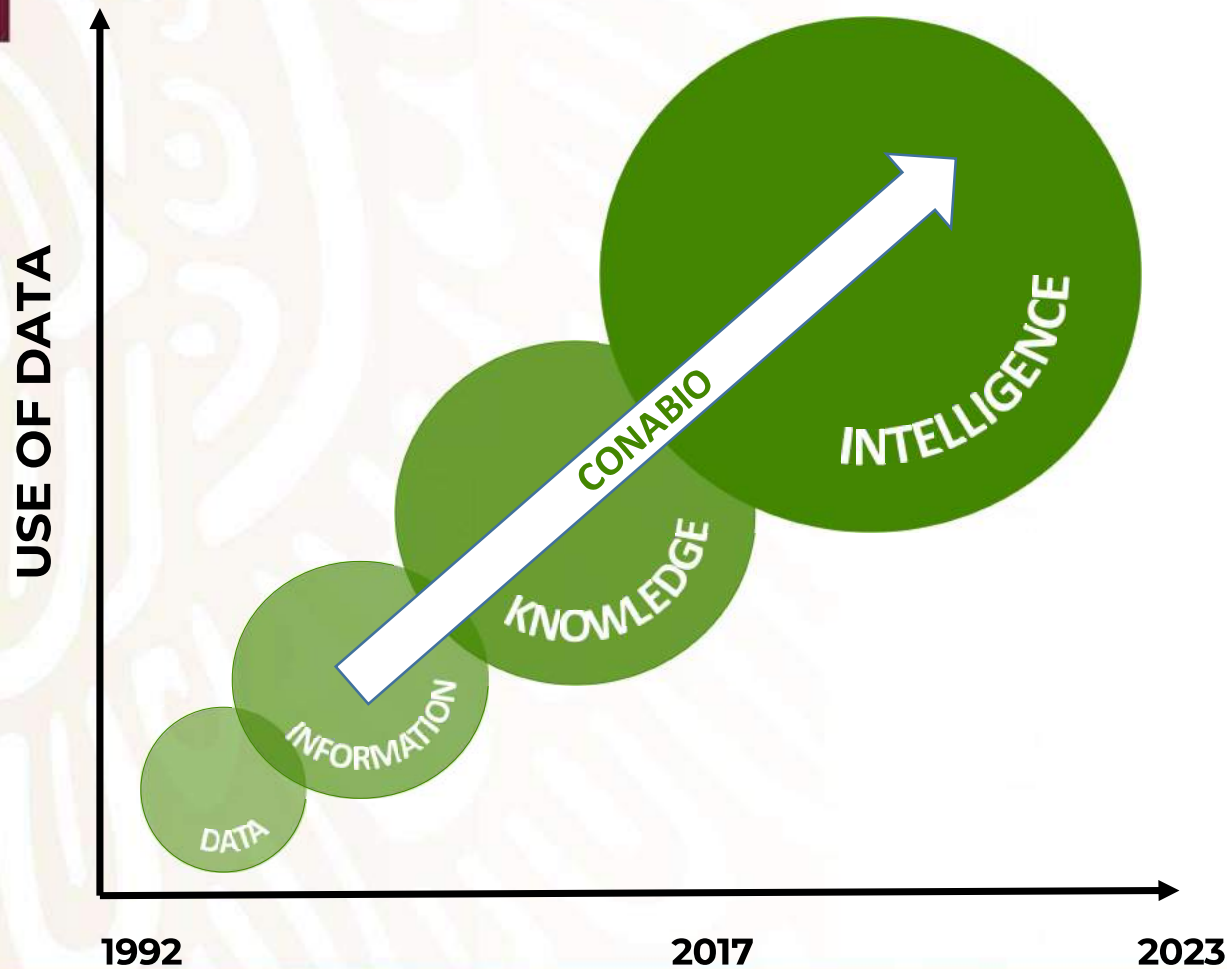
Species diversity

Genetic diversity

Agrobiodiversity: domesticated species and wild relatives
Risk analysis of GMOs



Stages of information management at CONABIO



- Conservation
- Sustainable use of biodiversity
- Restoration
- Biodiversity Awareness
- Reduce threats to biodiversity

USERS:

- Academy
- Decision makers
- Society

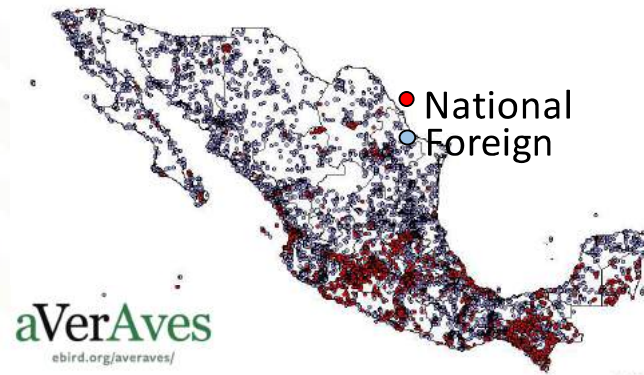
Knowledge systematization

Museum and herbaria



Mexico has a tradition of herbaria and museum collections.

Information repatriation from museums



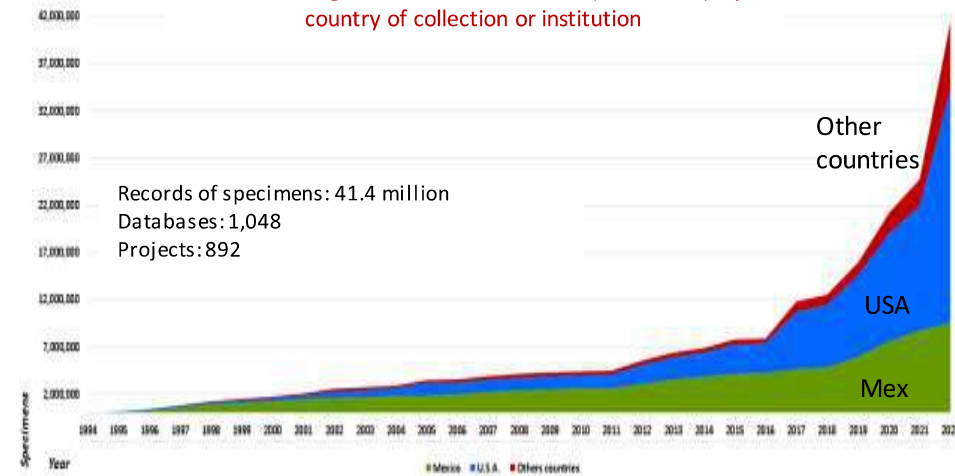
Birds of Mexico



Field project financing



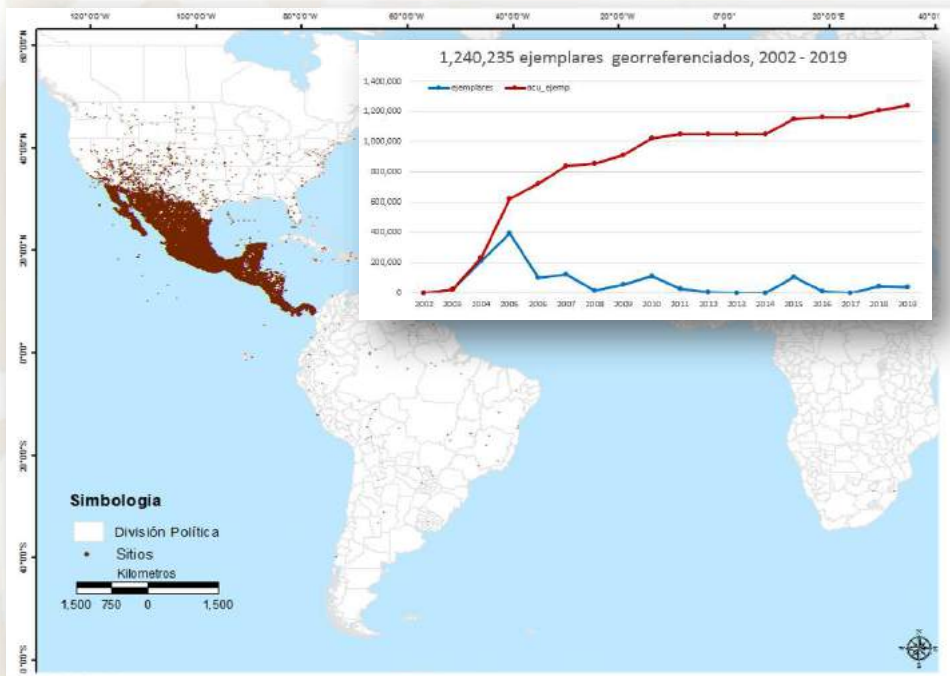
Trend in the growth of SNIB databases (1994-2022) by country of collection or institution



Geospatial management systems

Georeferencing process

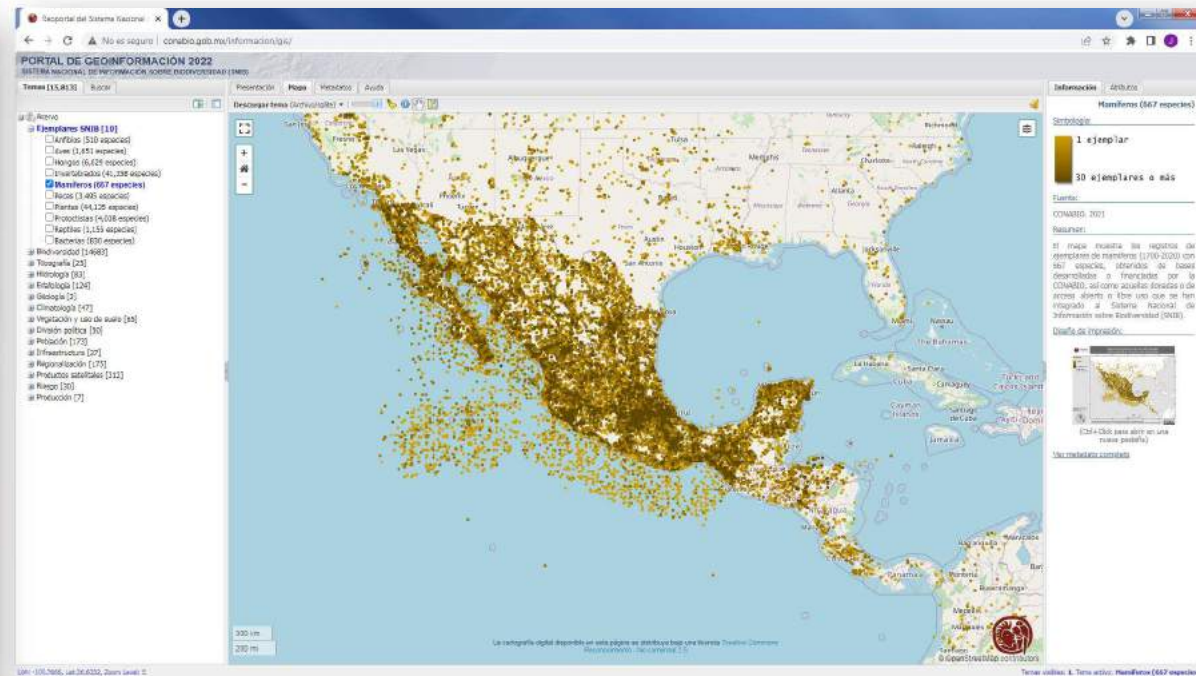
More than 1 million georeferenced collection sites.



Geoportal

More than 40 million SNIB records and 16,559 maps for consultation and download.

<http://www.conabio.gob.mx/informacion/gis/>



Kunming-Montreal Global Biodiversity Framework



Conserve

- 1 Biodiversity-inclusive **spatial planning**, near 0 loss
- 2 Effectively **restore** 30% of degraded nature
- 3 Effectively **conserve** 30% of lands and seas
- 4 Halt human-induced **extinctions**



Convention on
Biological Diversity

Kunming-Montreal Global Biodiversity Framework Targets



Four 2050 GOALS

- A. Halt loss, restore nature
- B. Use lands and seas sustainably
- C. Share benefits
- D. Mobilize necessary resources



Saveguard

- 9 Sustainably manage and use **wild species**
- 10 Sustainable **agri/aquaculture, fisheries and forestries**
- 11 **Restore and enhance nature's goods, services**
- 12 Increase area and quality of **urban green/blue spaces**
- 13 Fair sharing of benefits from **genetic resources**



Avoid

- 5 Stop unsustainable **use, harvest, trade** of species
- 6 Reduce **alien species** by at least 50%
- 7 Reduce **pollution risks, impacts** by at least 50%
- 8 Reduce **climate change** impacts
- 17 **Biosafety measures** in biotechnology



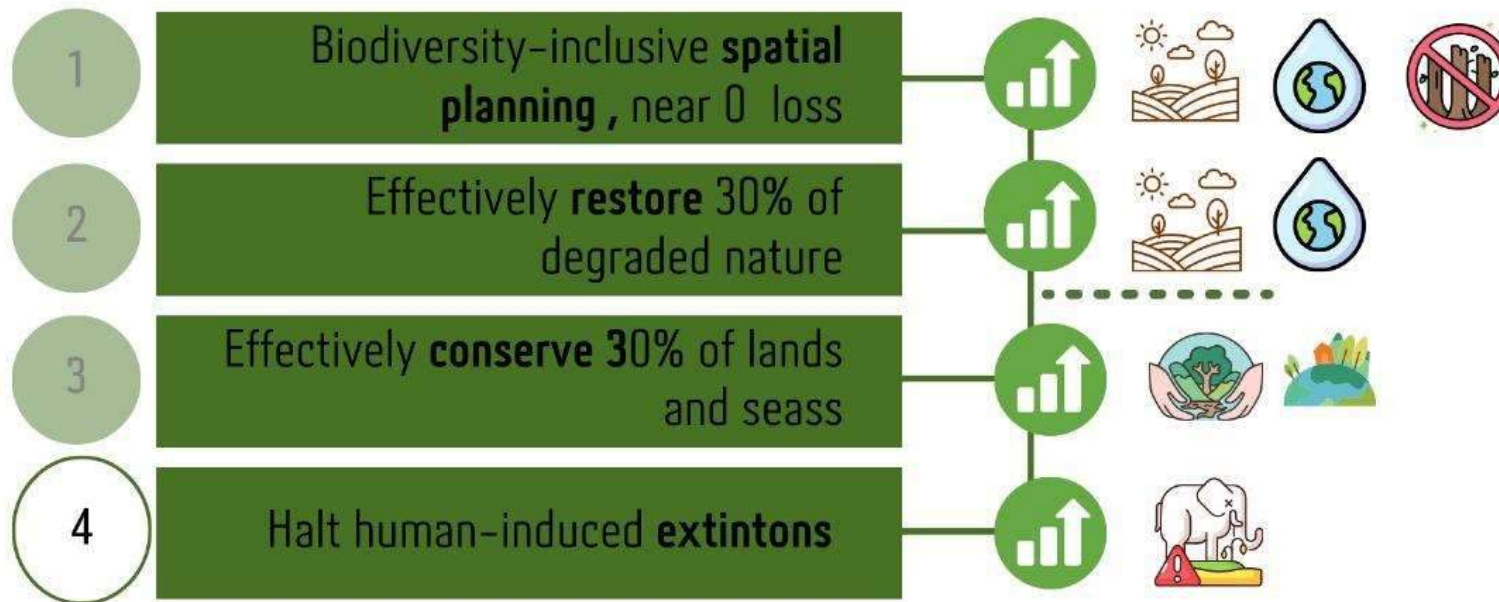
Act

- 14 **Mainstream** biodiversity into all policies
- 15 **Bussiness** monitor, disclose impacts
- 16 Sustainable **consumption**, half food waste
- 18 Phase out perverse **subsidies**, increase positive incentives
- 20 **Stregthen capacities, participation, IPLC, Women**
- 23

Conserve: Targets 1-4



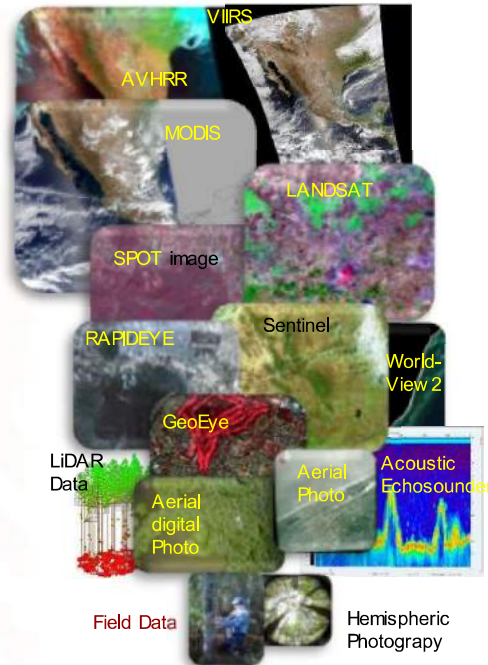
Conserve



Target 1. Integral spatial planning to avoid land and sea surface change

Remote Sensing Data for the Knowledge of Biodiversity

- Need to know the megadiverse territory.
- Availability of data from remote sensors.
- Monitoring ecosystems.
- Provide information in emergency situations.
- CONABIO started activities with remote sensing in February, 1998.
- Integration of an **interdisciplinary-working team**.



The data initially used was low spatial resolution such as AVHRR, currently a wide range of remote sensing data is used, from those transported by satellite to drones.

Field data is always necessary

Ecosystem Monitoring Program

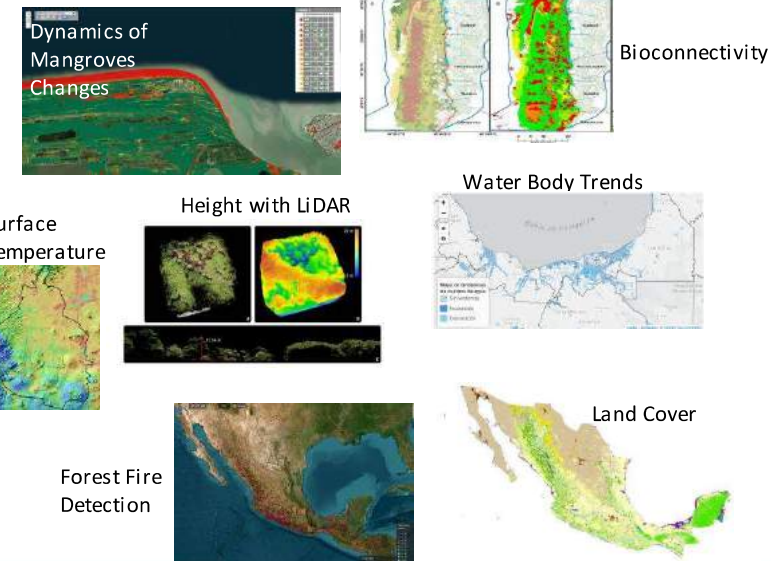
- Mexican Mangrove Monitoring System (2005).
- Mexican Wetlands Monitoring System (2015).
- Land Cover and Vegetation Monitoring System (2000).
- Cloud Forest Monitoring
- Bioconnectivity (mangroves and seagrasses) (2019)
- Time Series Analysis (2016)

Early Warning Program

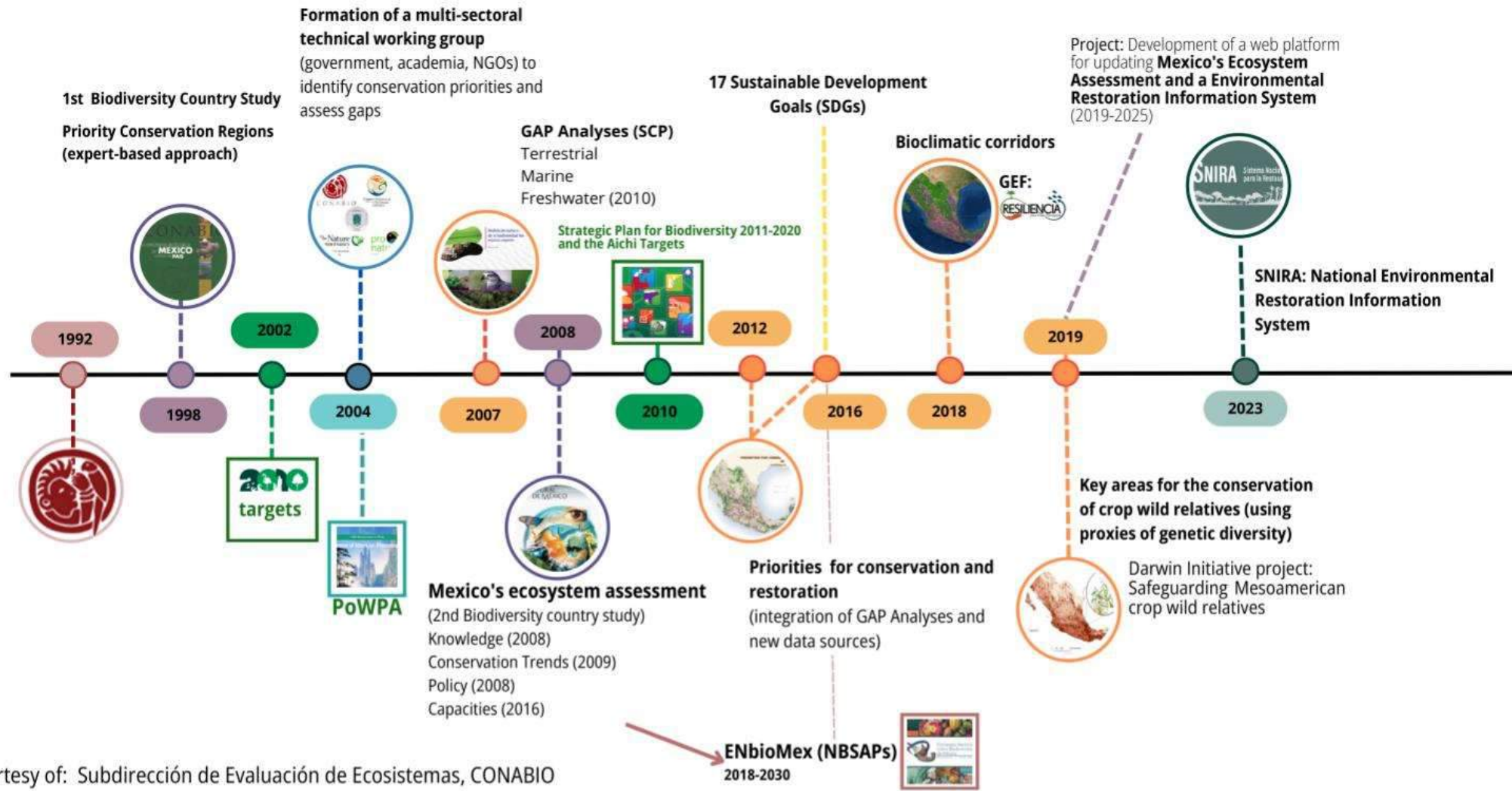
- Forest Fire Early Warning System (1999)
- Satellite Image Reception System (2000)
- Identification of Heat Islands (2023)



Biodiverse Mexico

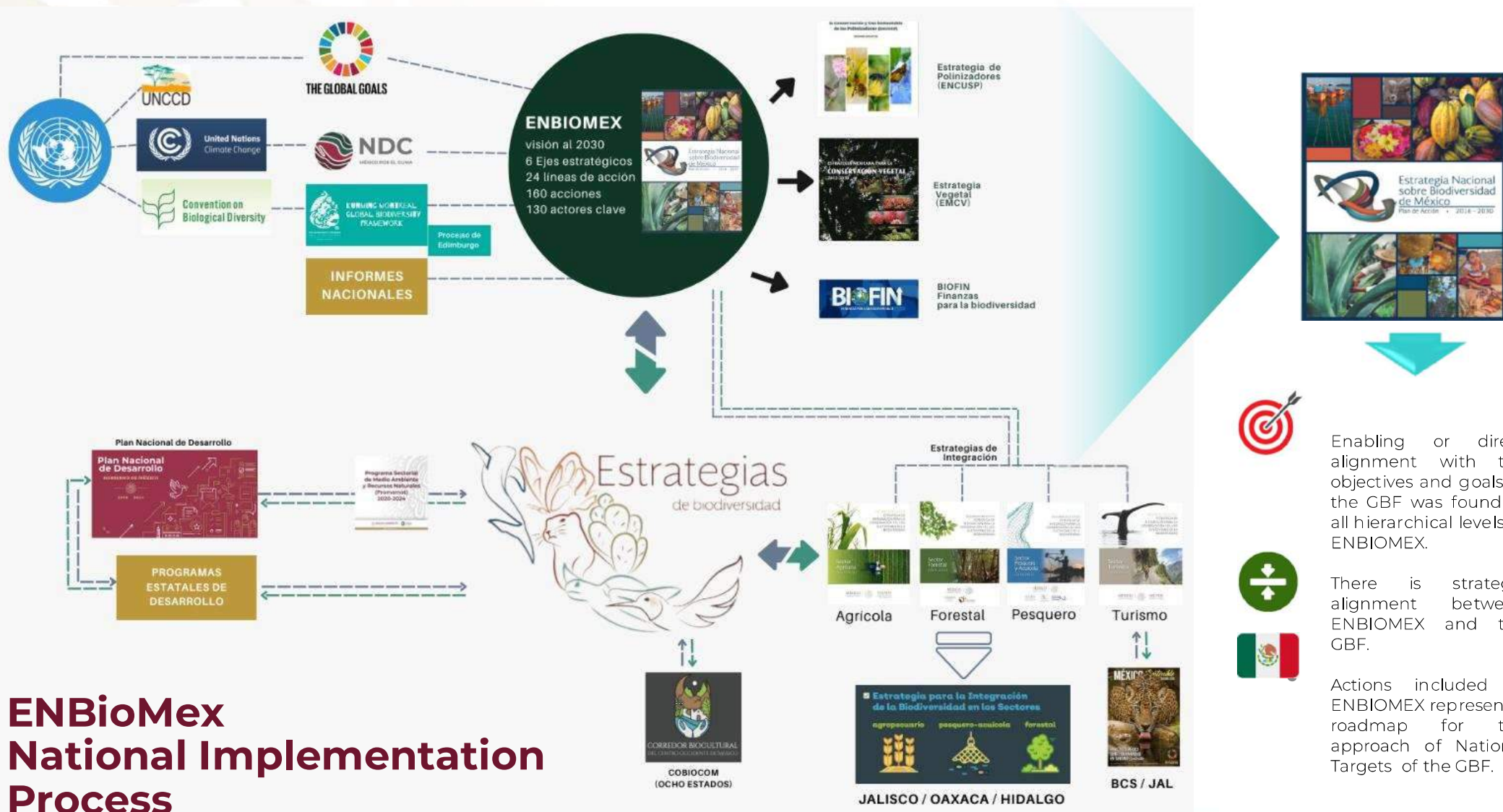


Target 1. Integral spatial planning to avoid land and sea surface change



Courtesy of: Subdirección de Evaluación de Ecosistemas, CONABIO

Target 1. Integral spatial planning to avoid land and sea surface change



ENBioMex National Implementation Process



Enabling or direct alignment with the objectives and goals of the GBF was found at all hierarchical levels of ENBIOMEX.



There is strategic alignment between ENBIOMEX and the GBF.



Actions included in ENBIOMEX represent a roadmap for the approach of National Targets of the GBF.

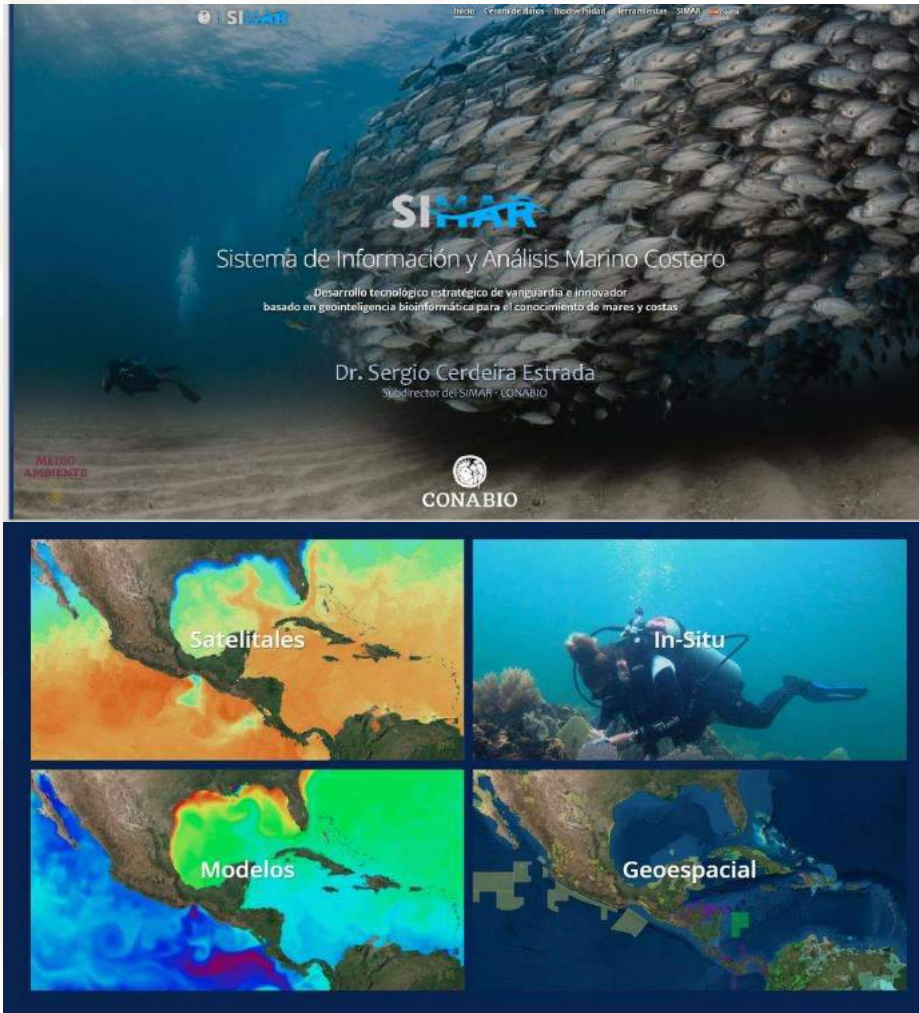
Target 1. Integral spatial planning to avoid land and sea surface change

Generating information
Working with 30-32
States



<https://www.biodiversidad.gob.mx/region/FFB/estudios>
<https://www.biodiversidad.gob.mx/region/FFB/estrategias>

Target 1. Integral spatial planning to avoid land and sea surface change



Technological development based on bioinformatics and geointelligence for the knowledge of oceans and coasts;

- It constitutes an **open access tool** for decision-making for the conservation and sustainable use of marine and coastal biodiversity in a context of climate change and variability;
- Promotes capacity building and knowledge generation to contribute to human well-being and health.
- Covers the coasts of 44 countries within the Wider Caribbean Basin (Caribbean Sea and Gulf of Mexico) and the tropical North Eastern Pacific Ocean; and
- It is part of CONABIO's National Biodiversity Information System of Mexico (SNIB).

Target 2. Effective restoration of ecosystems (biodiversity, functions, services, integrity and connectivity)

- First meeting of the advisory committee
- Online survey development
- Analysis of survey results
- Preparation of dissemination materials
- Collaboration with WePlan-Forests
- Compilation of publications

- Obtaining metadata in reference manager
- Preliminary analysis of metadata
- Online platform development

- **Launch of SNIRA (November 9th, 11-13 pm Mexico, Facebook live CONABIO)**

2019

2020

2021

2022

2023

SNIRA | Sistema Nacional de Información para la Restauración Ambiental

- General conceptualization
- Definition of general objectives
- Preparation of guidance documents
- Establishment of mission and vision
- Formation of the advisory committee
- Website development

- Integration of publications in reference management software
- Preliminary data analysis
- Design of data model design
- Dissemination of survey results (scientific paper)
- Collaboration with Mexican Alliance for Restoration (AMERE)
- Participation in the Mexican Network for Environmental Restoration (REPARA)

Subdirección de Evaluación de Ecosistemas, SNIRA, CONABIO

Target 3. Conservation and effective management of the 30 x 30

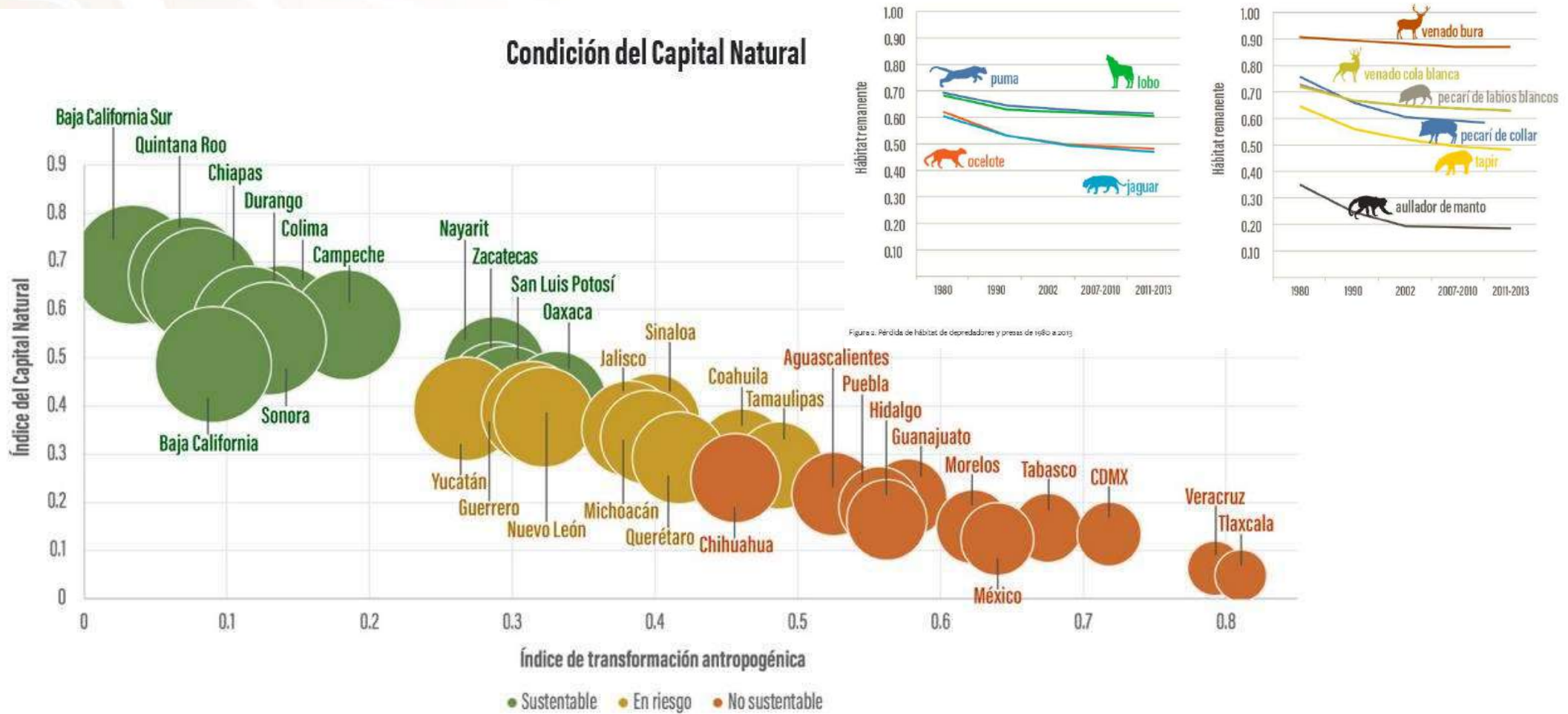


Figura 2. Condición del Capital Natural en los estados. Se presenta la relación promedio entre el índice de Transformación Antropogénica y el índice de Capital Natural. Una visión más detallada revelará la heterogeneidad en cada estado de regiones con las tres condiciones de su capital (Sustentable, en riesgo y no sustentable).

SIESDIB

Application layer

Data

- Spatial
- Massive
- Complex
- Incomplete
- Uncertain
- Heterogeneous

Information

- Information content quality
- Spatially exhaustive
- Accurate

Knowledge

- General
- Exceptional

Decision-making & Scientific knowledge

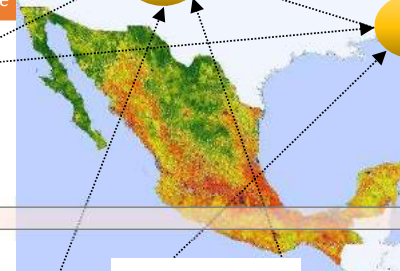
Natural capital & ecosystem services values



Ecosystem diversity
Landscape diversity
Ecological Integrity

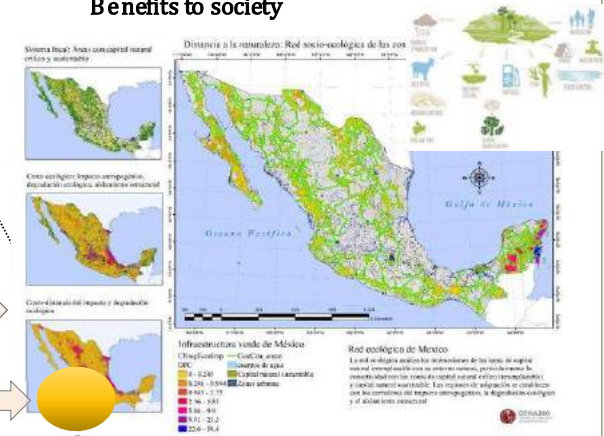
Ecosystem services
Economic values
Traditional indigenous knowledge

Ecosystem & Species Impacts



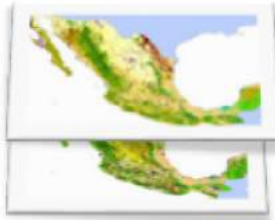
Land cover change
Deforestation
Fragmentation
Human impacts
Invasive species
Climate change

Benefits to society

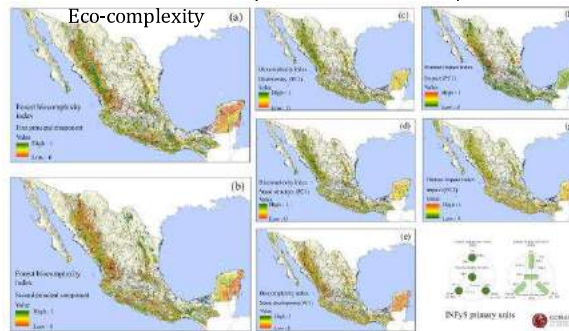


SIESDIB Integration system

- Amphibians
- Reptiles
- Birds of prey
- Mammals
- Plant diversity



Land cover, vegetation types, ecoregions



Eco-complexity



Environmental diversity, climate, soils, landforms



Use and Economic data



Decision-making goals

SNIB

Primary data & Geo-information layer

Target 4. Recovery and conservation of species and their genetic diversity

- Generate
- Compile
- Analyze information at species level



- **Native species knowledge**



- Implement conservation actions
- Inform government stakeholders
- Inform general public
- Share species information



Basic knowledge

- Taxonomy
- Distribution
- Habitat
- Natural history
- Ecology
- Demography
- Genetics
- Uses
- Management
- Conservation
- Threats

Information analysis

- Assessment of extinction risk for wildlife species and populations: Mexican Red List (NOM-059-SEMARNAT-2010)
- Biodiversity monitoring:
 - Pollinators
 - Priority species
 - Threatened species
 - in natural protected areas

Bioinformatic tools

- Information system
- (Includes: native, priority, threatened and pollinator species)
- Based on the Plinian Core Standard



Includes:

- Species Database
- Standardized & structured information
- Allows the creation of species information sheets

Moraceae

***Ficus petiolaris* Kunth,**
Nov. Gen. Sp. 2. 49. 1817.

= *Ficus brandegei* Standl., Contr. U. S. Natl. Herb. 20: 22. 1917.
= *Ficus jaliscana* S. Watson, Proc. Amer. Acad. Arts 26: 150. 1891.
= *Ficus jonesii* Standl., Contr. U.S. Natl. Herb. 20(1): 31. 1917.
= *Ficus palmeri* S. Watson, Proc. Amer. Acad. Arts 24: 77. 1889.

1. Hoja joven y frutos Fruto (Tequila, Jalisco); © G. Cornejo-Tenorio 2007. 2. Ramilla (Tequila, Jalisco); © G. Cornejo-Tenorio 2007. 3. Tronco (Tequila, Jalisco); © G. Cornejo-Tenorio 2007. 4. Fruto (Todos Santos, Baja California Sur); © G. Ibarra-Manríquez 2007. 5. Frutos (Todos Santos, Baja California Sur); © G. Ibarra-Manríquez 2007. 6. Hoja (Mazatlán, Sinaloa); © G. Ibarra-Manríquez 2007. 7. Hoja (Todos Santos, Baja California Sur); © G. Ibarra-Manríquez 2007.

Descripción de la especie:
Árboles rupícolas, de 8-30 m de alto, perennifolios a subcaducifolios, monoicos,

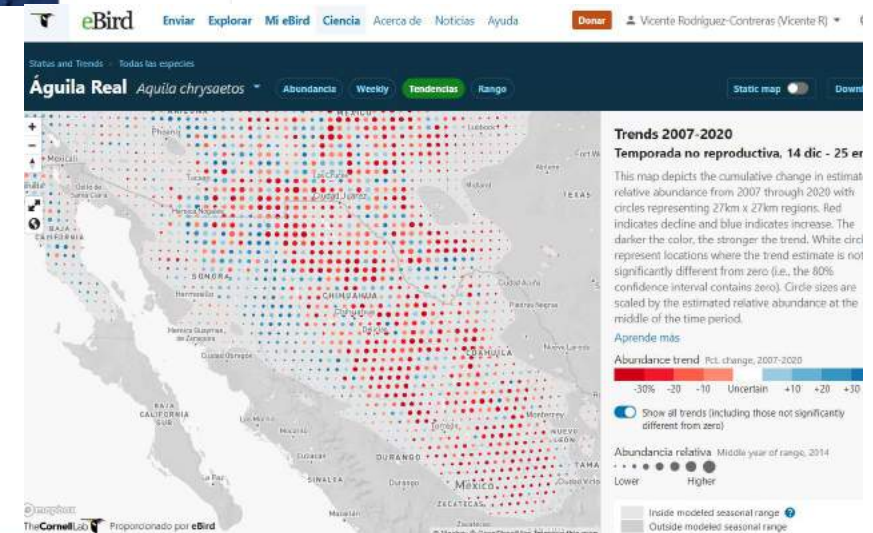
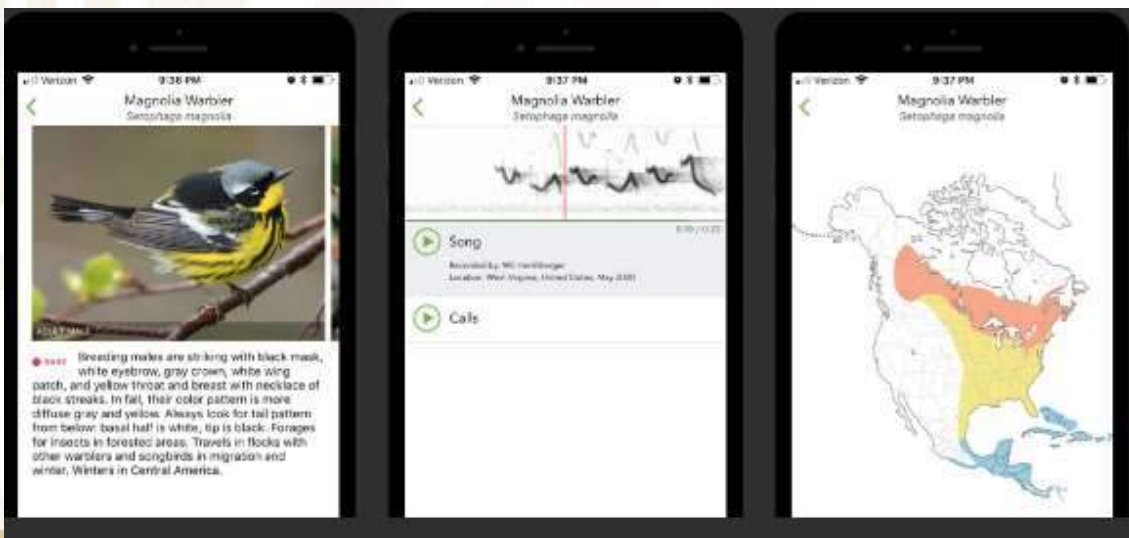
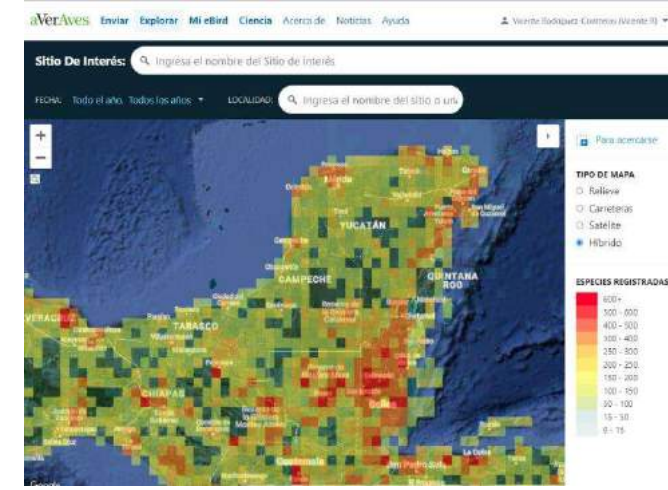
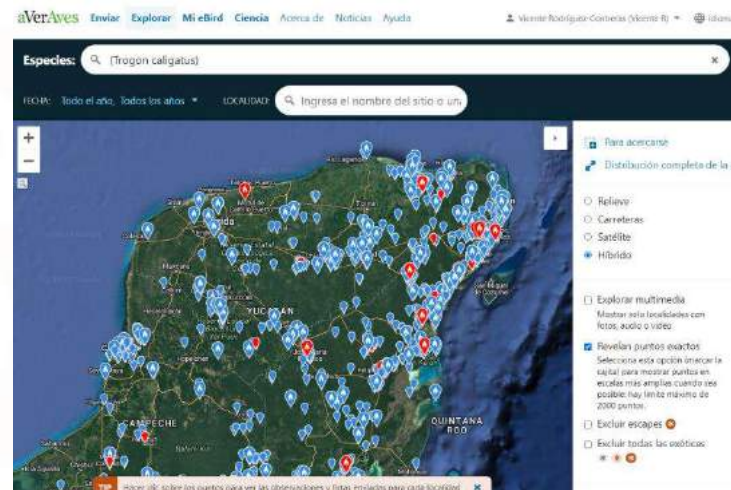
Nombres comunes: amacó, amate, amate amarillo, amab



Target 4. Recovery and conservation of species and their genetic diversity

Cooperation and Information Management for the Knowledge and Conservation of Birds

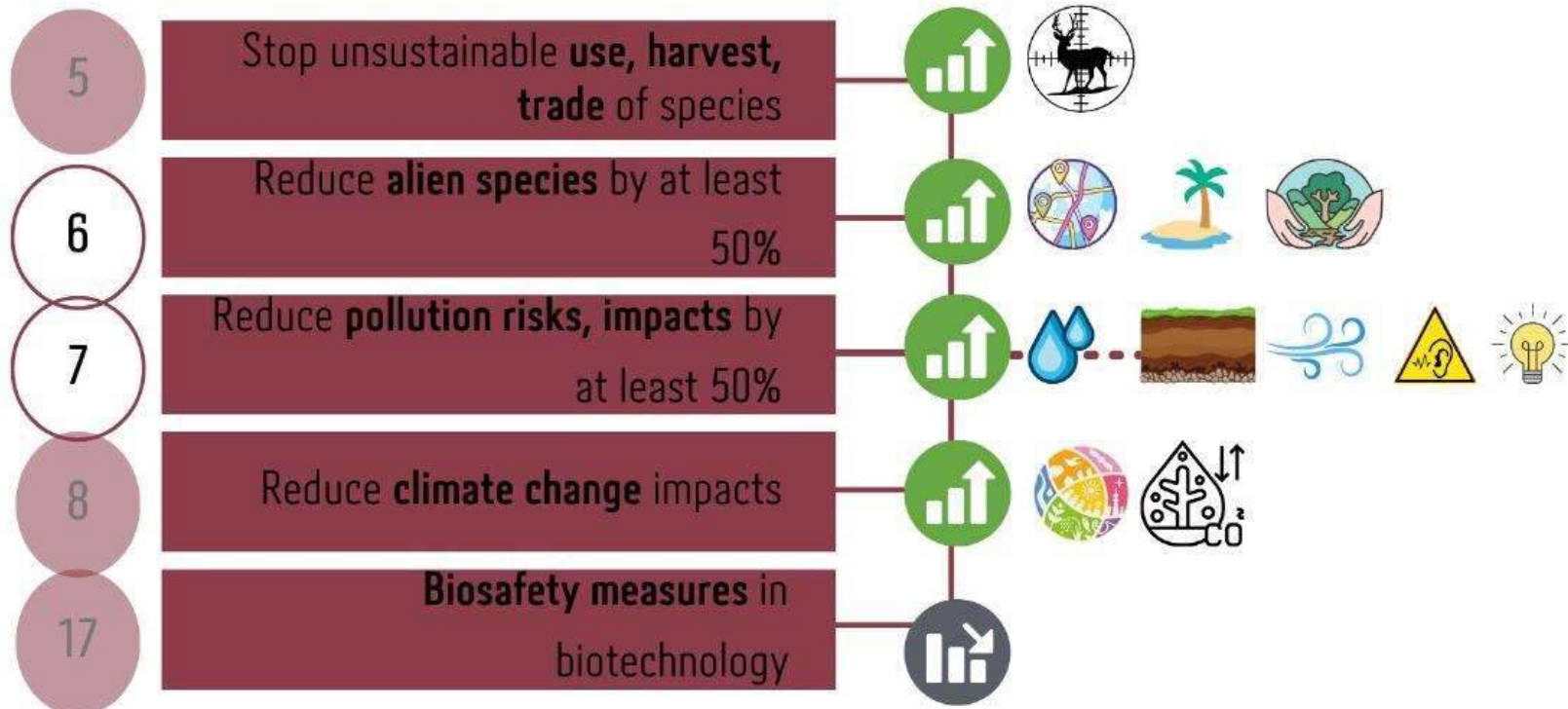
- Generating data with citizen science:
- eBird Mexico /aVerAves
- >28000 users
- 12000000 records (main data source of SNIB)
- Now developing abundance trends



Avoid: Targets 5-8, 17



Avoid



Modificado de: [Vigdís Vandvik](#), 2023

Target 5. Sustainable, legal and safe use, harvesting and trade of wildlife

Generating information
SA-CITES

Decision making

Identify priorities/needs



Develop projects
(+110 concluded projects)

Collaboration with key stakeholders:

IPLC, technicians, academics, authorities
(CITES Interministerial Committee, state and
local authorities), civil society, private sector

International Level (since 2000)

- Amendment proposals: 27 amendment proposals (25 adopted)
- Periodic reviews: 17 periodic reviews of species.
- Review of significant trade: 2 species of hammerhead shark.
- Working documents: 51 working documents.
- Notifications: +170 Notifications for which Mexico responded with input from SA-CITES.

National Level

- Non-detriment findings (NDF): 3, 994 (2014-2023)
- Technical opinions: 740 OTs (2014- 2023)
- Publications: 32 publications
- (books, guides, manuals, posters, protocols, infographics, etc.).
- Capacity building: +200 workshops and presentations.
- Consults: +600 information requests from the general public addressed.
- Consolidated groups of experts: crocodiles (GEC-Mexico), sharks (VES), candelilla (Council, guide).
- Plans/programmes/strategies (i.e. UMA)/Value chains

Target 6. Address impacts of invasive alien species

Little information, no specific work on IAS



IAS area created



IAS National Strategy



First official list



GEF Project



1992-2000s

2006

2007

2010

2016

2014-2019

Current information on IAS in Mexico



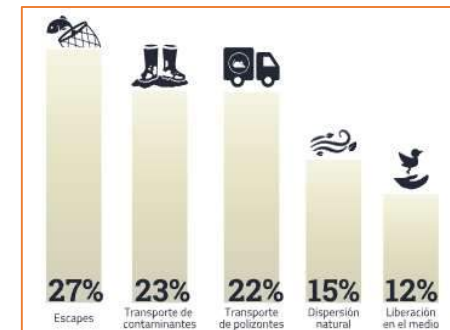
2,600 species



200 potential distribution maps



600,000 IAS records



Introduction routes



Communication materials

Target 8. Adaptation and mitigation of climate change, disaster risk reduction, acidification

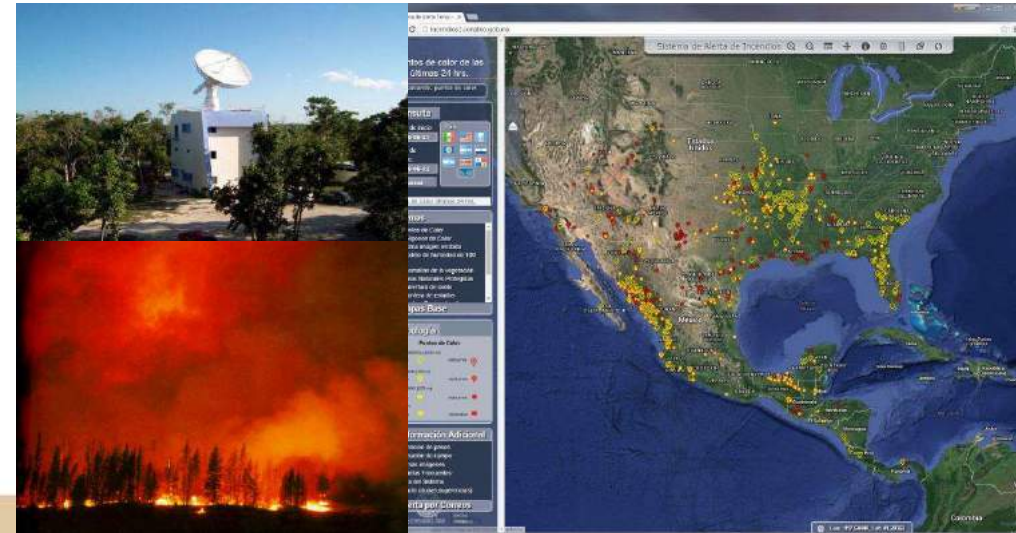
SIMARES, Early warnings on threats to marine-coastal biodiversity



Early warning of forest fires

10 images per day

Automatically processed in 20 minutes, and sent to all states of Mexico and to Central America



Safeguard: Targets 9-13



Saveguard



Target 9. Sustainable use of wildlife with benefits (economic, social and environmental)

- Take advantage of Mexico's potential as a megadiverse country.
- Invest in national biodiversity, diversify and add value.
- Promote sustainable, legal and traceable harvesting as the engine of a new economy and rural development.
- Promote the direct participation of communities in national production.

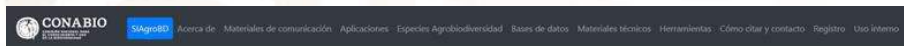


Target 10. Sustainable and biodiversity-friendly agriculture, aquaculture, fisheries and forestry activities

Agrobiodiversity Information System (SIAgroBD) we gather and help generate the following information on agrobiodiversity:

- communications materials
- analysis and visualization applications
- Agrobiodiversity Species
- Databases
- Technical materials

<https://siagro.conabio.gob.mx/>



Sistema de Información sobre Agrobiodiversidad (SIAgroBD)

La agrobiodiversidad engloba por un lado a las especies de plantas, animales, hongos y microorganismos recolectados, cultivados y domesticados para la alimentación y otros usos, así como sus parientes silvestres. Por el otro lado, incluye a los componentes que sostienen a los sistemas de producción agrícola o agroecosistemas (microorganismos del suelo, depredadores, polinizadores, etc.). En ambos casos la agrobiodiversidad incluye la diversidad a nivel ecosistema, especie y genes (Caijas y Vallejo, 2019; Jackson et al., 2007 y FAO, 2004).



En el Sistema de Información sobre Agrobiodiversidad (SIAgroBD) reunimos y ayudamos a generar la siguiente información en torno a la agrobiodiversidad:

Materiales de comunicación



Disfruta los videos, carteles, charlas y publicaciones de la CONABIO en torno a la agrobiodiversidad.

Aplicaciones de análisis y visualización



Explora las visualizaciones dinámicas de datos, mapas interactivos y otras herramientas para analizar y explorar datos de agrobiodiversidad.

Especies de la Agrobiodiversidad



Conoce qué especies conforman la agrobiodiversidad de México y descúbrelas en Enciclovida y Naturalista.

We are severely out of sync with the planet.

- Dominant diets are not nutritionally optimal, contribute to climate change and accelerate biodiversity loss.
- Recovering elements of the Mesoamerican diet can improve nutritional conditions and sustain climate change adaptation processes.



Mexicans do not eat the same throughout the country.



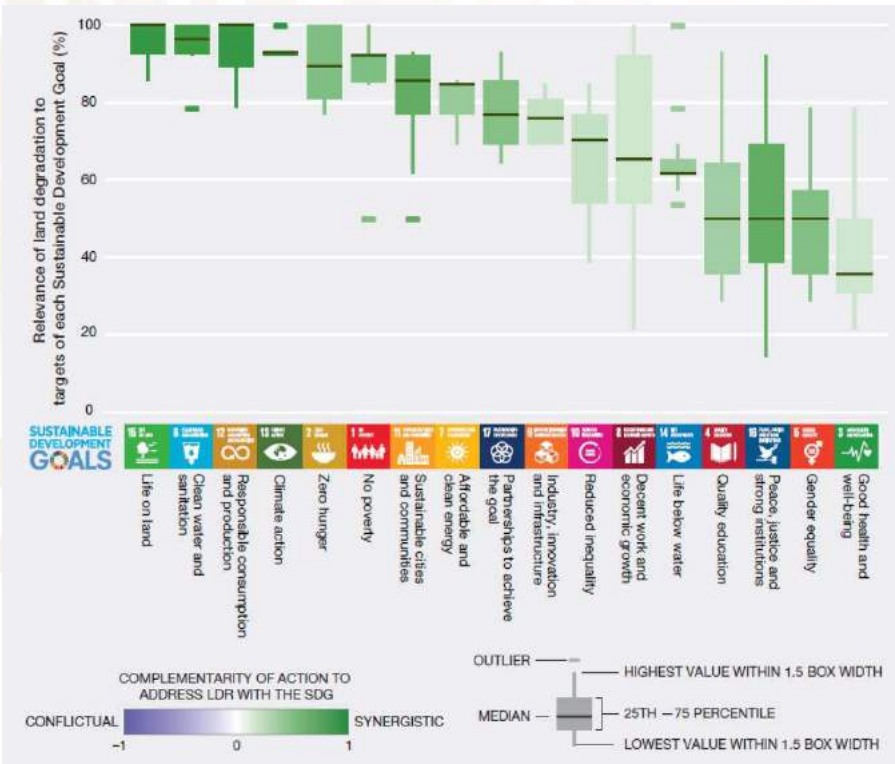
The Regional Food Baskets

Compile information on the diversity of foods, dishes and beverages of daily use, seasonal, festive and even those at risk of loss.

<https://www.biodiversidad.gob.mx/diversidad/alimentos/canastas-regionales>

Target 11. Restore and enhance nature's contributions to people.

“Avoiding, reducing and reversing land degradation is essential for reaching the majority of the SDG and would deliver co-benefits for nearly all of them.” (IPBES 2018)



National Information Systems for Restoration are key

- Data collection and monitoring
- Policy formulation and decision-making
- Accountability and transparency
- Identifying Priorities and Targeting Intervention
- Engagement and Participation
- Long-term Planning and Sustainability
- Resource Allocation and Efficiency

SNIRA Sistema Nacional de Información para la Restauración Ambiental

Mapa <https://snira.conabio.gob.mx/>

MEDIO AMBIENTE CONABIO Copyright © 2022 CONABIO

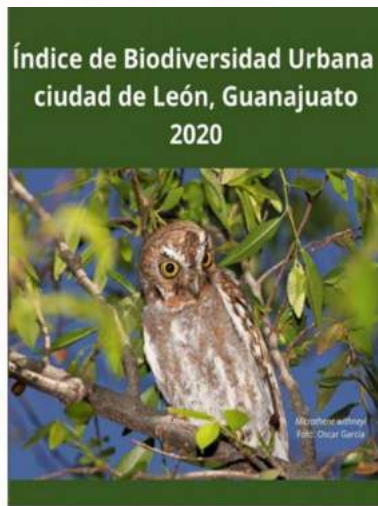
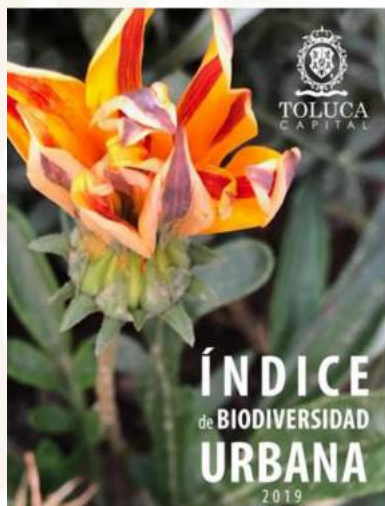
Target 12. Urban green and blue spaces enhanced for human well-being

The [Singapore Index on Cities' Biodiversity](#), published in September 2021, includes wider coverage of the services biodiversity and ecosystems provide to people. It also simplifies measuring and evaluation tools and enhances advice on the application of its expanded series of indicators.

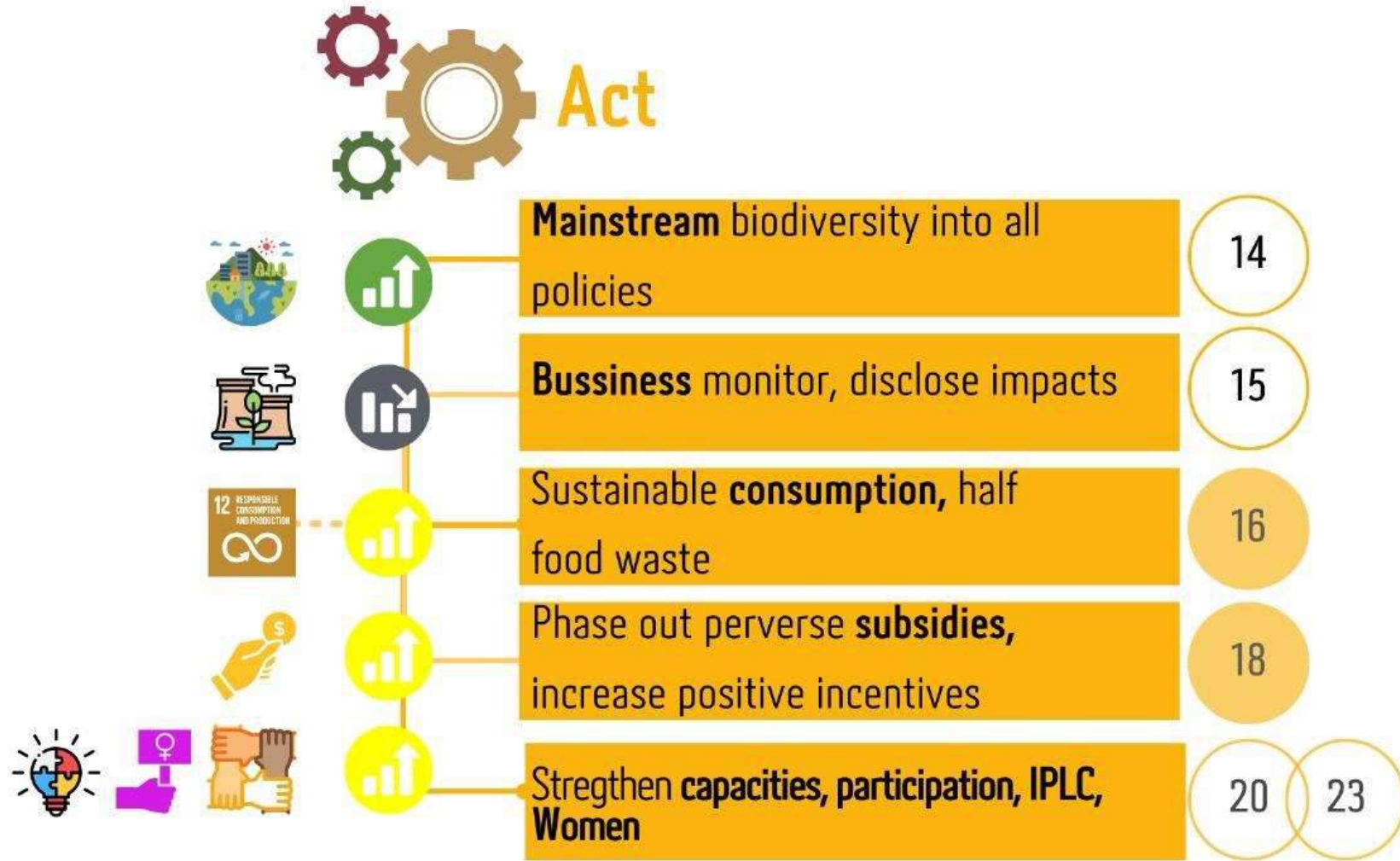
CONABIO supports the development and dissemination of the Index, and provides information to generate information for the indicators of the sections: native biodiversity and ecosystem services.

Corredor Biocultural del Centro Occidente de México (COBIOCOM):

Nayarit, Zacatecas, Aguascalientes, San Luis Potosí, Guanajuato, Michoacán, Colima y Jalisco.



Act: Targets 14-23



Target 14. Biodiversity mainstreaming

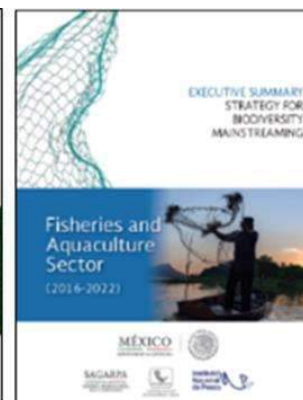


Theme proposed by Mexico as host of the United Nations Conference on Biodiversity, Cancun, 2016



It implies that biodiversity should be an integral part of the functioning of the productive sectors, seeking to reduce, avoid and mitigate its negative impacts, and enhance the positive ones so that healthy and resilient ecosystems ensure the provision of essential services for human well-being.

CONABIO promoted the connection in value chains with the participation of: Indigenous Peoples and Local Communities, Academia, Civil Society, Youth, Private Sector, and national and subnational governments.



Target 18. Phase out perverse subsidies increase positive incentives.

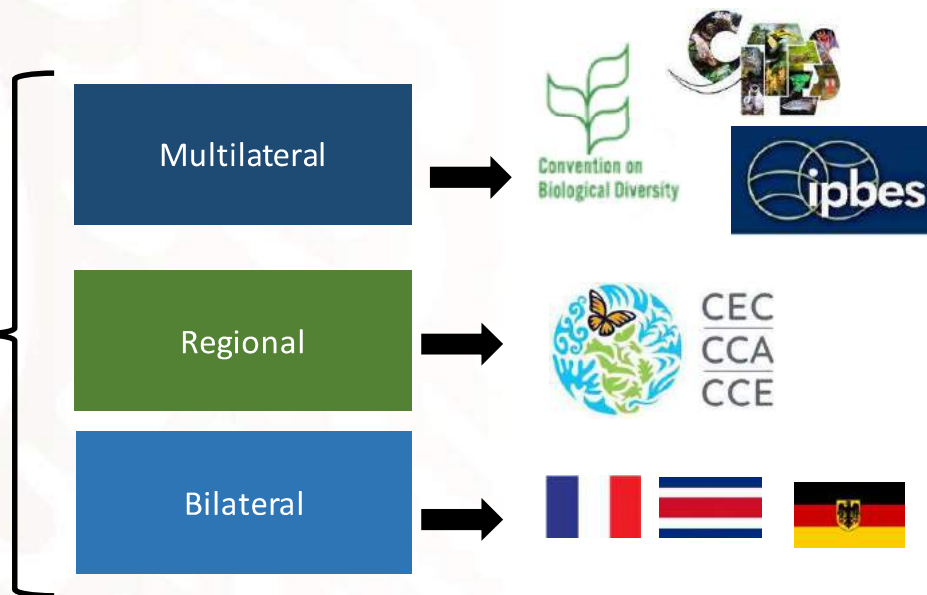
National Concurrent Incentive System (Sistema Nacional de Incentivos Concurrentes - SINACIC)

Geographic platform for analysis and support of environmental decision making.



Target 20. Strengthen capacities, transfer technology, and promote technical and scientific cooperation


CONABIO
 Expert networks



Translators and interpreters: Science-policy interface for implementation of international commitments

IPLC

Government

Academy

NGOs

Private Sector

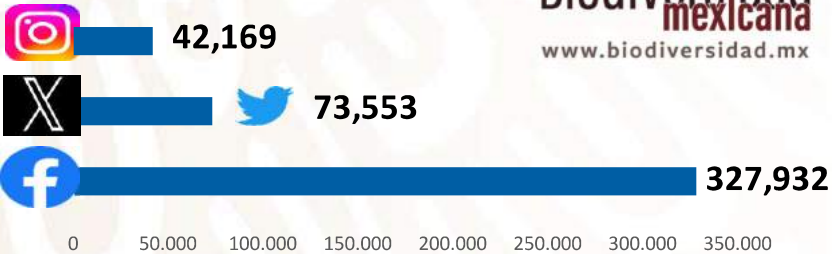
Target 21. Education, generation, sharing and use of biodiversity knowledge



2nd place: Best biodiversity websites in the world for providing reliable, concrete, clear and accurate information on Mexico's biodiversity:

www.biodiversidad.gob.mx

Followers



Biodiversidad mexicana
www.biodiversidad.mx

enciclo vida
www.enciclovida.mx

114,000 species listed

aVerAves
ebird.org/averaves/

naturalista
www.naturalista.mx

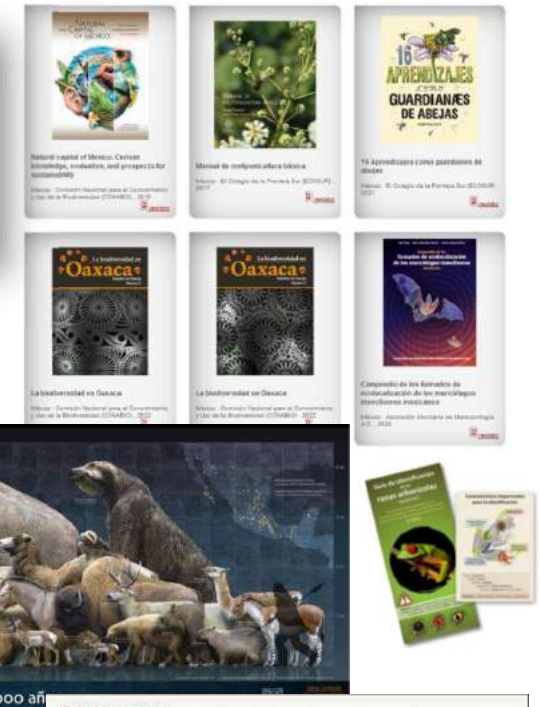


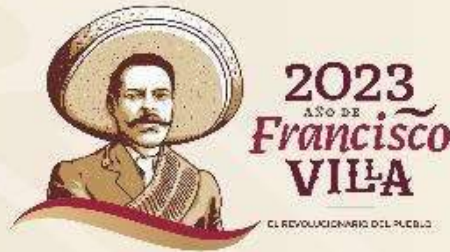
DISPONIBLE EN:
Google Play

DISPONIBLE EN:
App Store

52,038 users per month
318,000 views per month
And it has a mobile application

Target 21. Education, generation, sharing and use of biodiversity knowledge





Thank you



CONABIO

COMISIÓN NACIONAL PARA
EL CONOCIMIENTO Y USO
DE LA BIODIVERSIDAD

- <https://www.gob.mx/conabio>
- <https://www.biodiversidad.gob.mx/>
- <https://www.biodiversidad.gob.mx/especies/>
- <https://enciclovida.mx/>
- <https://enciclovida.mx/exoticas-invasoras>
- <https://siagro.conabio.gob.mx/>
- <http://www.conabio.gob.mx/informacion/gis/>
- <http://www.conabio.gob.mx/informacion/gis/>