



Development of a global ecosystem map by the Atlas initiative

Madeeha Bajwa, Chief of Programmes, GEO Secretariat

June 12, 2024



GLOBAL
ECOSYSTEMS
ATLAS

Our story ■ ■ ■

GEO draws upon the expertise of an extensive **global network**, comprising 116 governments, 162 IOs, private sector and CSOs.

This diverse network includes the world's leading space agencies, renowned research institutes and UN agencies.

By convening relevant stakeholders across sectors GEO has the unique ability to **forge international consensus** and drive **evidence based decisions** to promote systems change.




The Global Ecosystems Atlas in a nutshell

A **trusted** comprehensive map of the world's ecosystems

Open, accurate and up-to-date information

Harmonized to the **IUCN Global Ecosystem Typology** as
international standard

Support for **country engagement** to develop detailed national
ecosystem maps

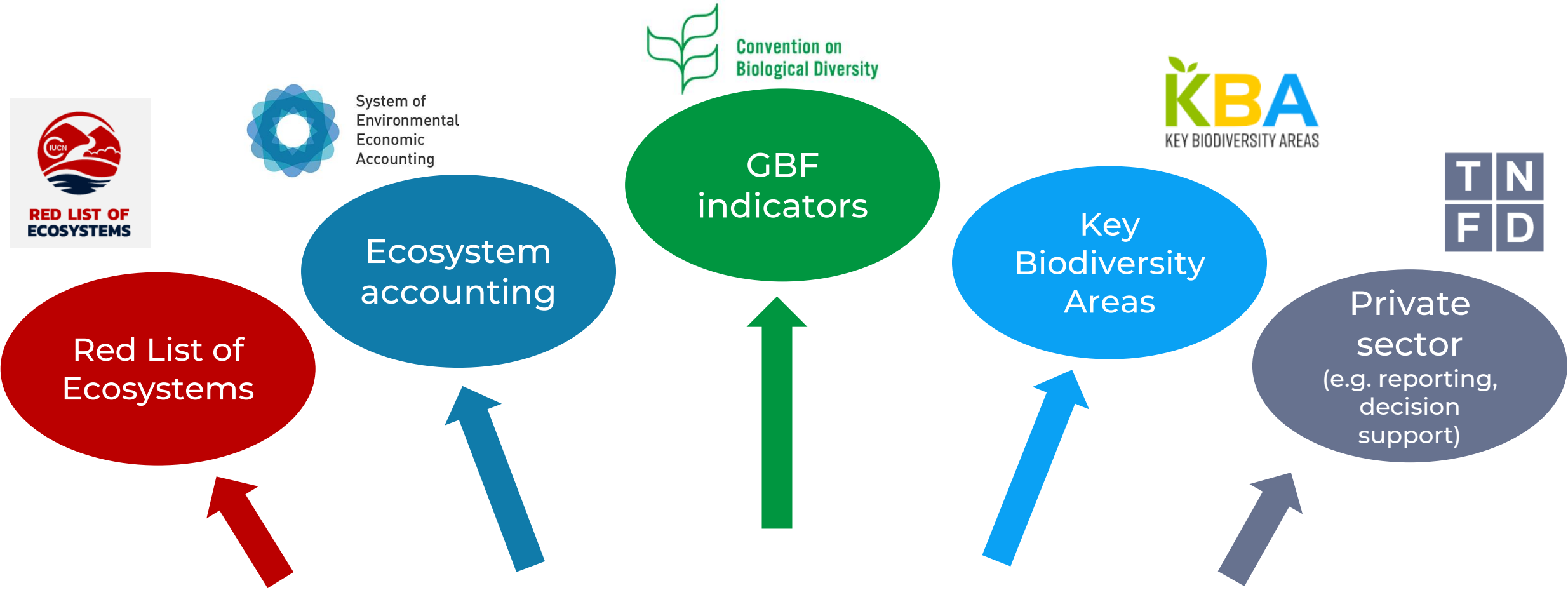


Why are maps of ecosystem types useful?



GLOBAL
ECOSYSTEMS
ATLAS

A map of ecosystem types has many applications



Foundational data on ecosystems
Including maps of ecosystem types & spatial data on ecosystem condition

National ecosystem maps are especially important

→ Spatial information to inform implementation of NBSAPs, for example:

An essential input for biodiversity-inclusive spatial planning (GBF Target 1)



Underpinning restoration planning and monitoring (GBF Target 2)

Ensuring an ecologically representative network of protected areas and OECMs (GBF Target 3)

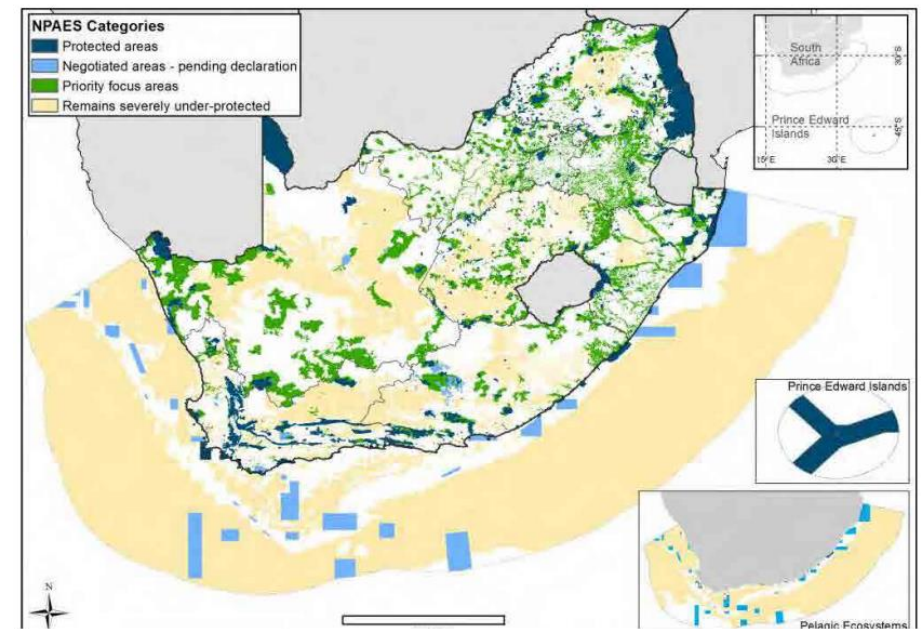


Figure 2: Priority areas for protected area expansion in South Africa.

In addition:
many national
and regional
efforts

- Reef Threats**
 - Coral Reef Bleaching (Beta)
 - NOAA Coral Reef Watch
 - Ocean Water Turbidity **New!**
- Reef Habitat**
 - Benthic Map
 - Geomorphic Map
 - Reef Extent **New!**
 - Reef Satellite Imagery
- Reference Layers**
 - Labels
 - Marine Protected Areas
 - Maritime Boundaries

GLOBAL FOREST WATCH

Menu Settings Place

World Terrestrial

LAND COVER

LAND USE

CLIMATE

BIODIVERSITY

EXPLORE

SEARCH


MY GFW

The ecocoinit

Scale: 1:73.957.191 | Lat/Lon: 57.163, -114.135

However, there is currently no
trusted common reference on world's
ecosystems.

This is a major need for **measuring** and
monitoring ecosystem **extent** and **change**.



Building a basemap of all ecosystem types



GLOBAL
ECOSYSTEMS
ATLAS

The Atlas basemap product

A single data layer representing the
known distribution of ecosystems,

synthesizing best available data from existing
national, regional and global maps

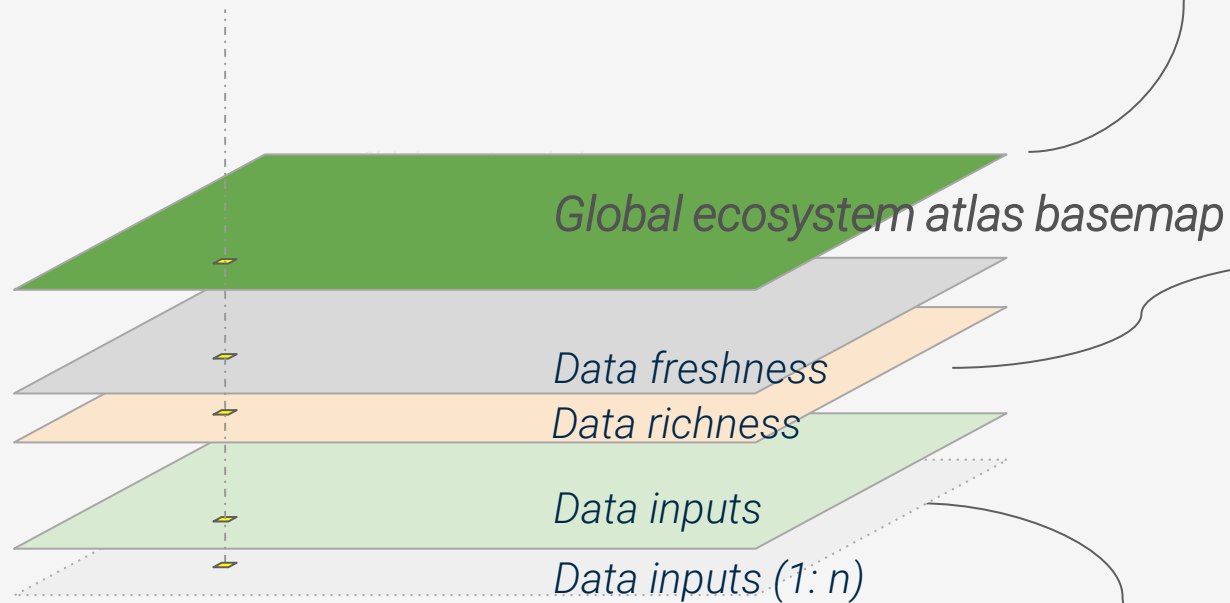


The basemap will represent the **current** distribution of
ecosystems, updated regularly

Basemap will also highlight data gaps on Earth where
there are no spatial data on ecosystem distributions

Structuring the basemap product

Each basemap pixel will be allocated to one or more **ecosystem functional groups (EFG)** (Level 3 of the Global Ecosystem Typology)



Main data layer – the basemap

- Single data layer representing ecosystem functional groups
- Single time-step
- Best available data in terms of ‘freshness’, alignment to GET, resolution and accuracy

Contextual layers

- Multiple ‘hidden’ layers
- Data freshness - when was the data produced?
- Data richness - when multiple ecosystem types are mapped for a location
- Change layers / monitoring products and ecosystem condition products (potential future work)

Input data (e.g. national ecosystem maps)

- Links to input data (if possible)
- Identify original name of ecosystem type
- Carry through metadata such as original developer, acknowledgement and accuracy

Atlas proof-of-concept will demonstrate this using a limited number of national and global ecosystem maps

The Atlas basemap product



The basemap will represent the **current distribution of ecosystem functional groups**, updated regularly

Provides essential spatial data for:

- Current global extent of each ecosystem functional group (GBF Indicator A.2 based on ecosystem accounts)
- Coverage of each ecosystem functional group by protected areas (GBF Indicator 3.1)
- Area or proportion of each ecosystem functional group degraded
- Input to Red List of Ecosystem assessments (GBF Indicator A.1)
- Baseline for tracking change in extent of different ecosystem functional groups over time

Filling in the gaps in knowledge of ecosystem distributions

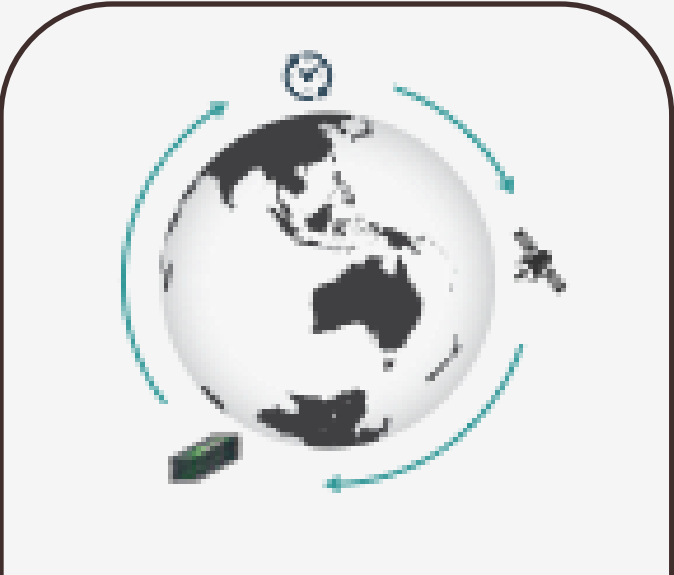
Technology



AI-powered models

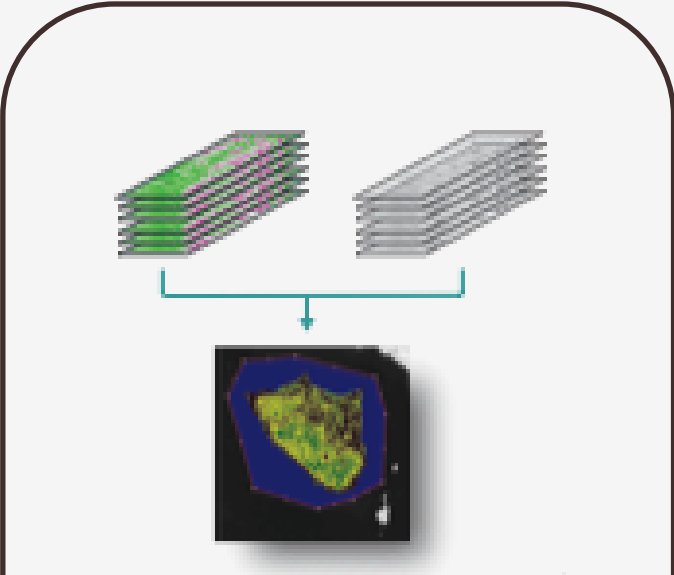


Training datasets



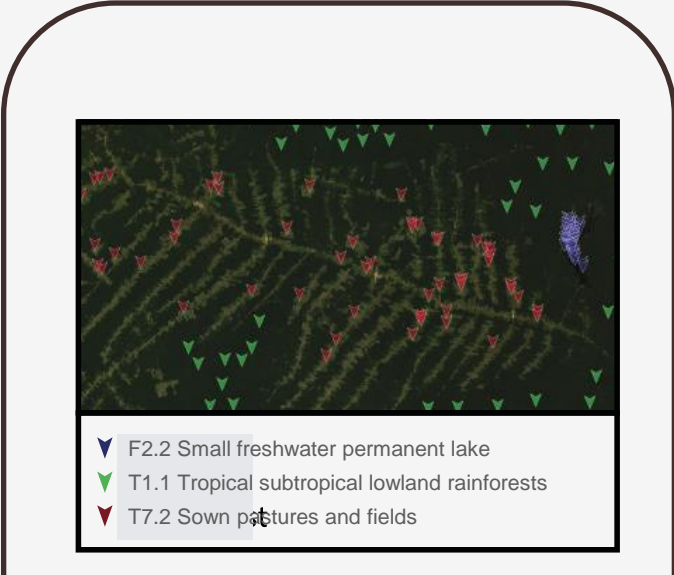
Using cutting edge technology

- Capitalising on earth observations for advancing knowledge of ecosystem distributions



New ecosystem distribution models

- New generation approaches for putting ecosystems on the map

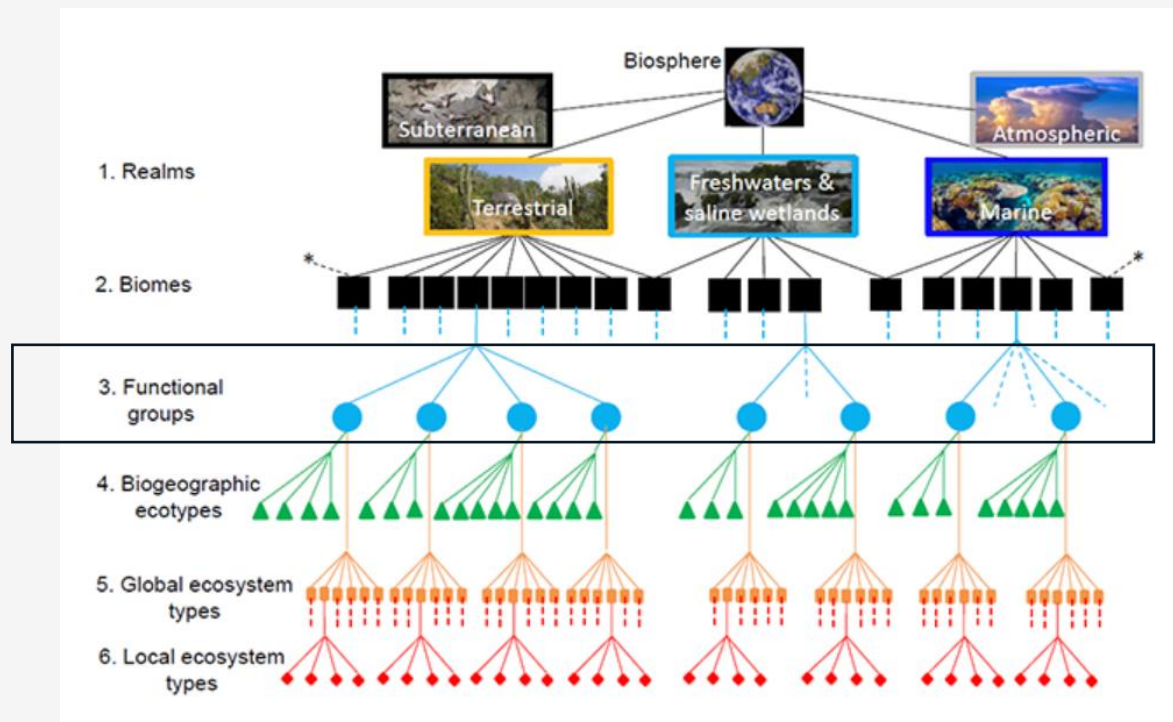


Training and validating EO and AI based models

- Providing the foundations to support ecosystem mapping efforts into the future

Role of the IUCN Global Ecosystem Typology:

Enables synthesis, coherence and consistency



Ecosystem functional groups

- Allow for harmonised global reporting and comparison that is manageable...
- ...while still providing enough detail to be meaningful from a biodiversity perspective

- EFGs should *not* replace more detailed national ecosystem types
- Typically, many national ecosystem types will fall within one EFG



Important to emphasise

- The Atlas will retain information from national ecosystem maps
- Countries should retain their national ecosystem classification/typology
- Cross-walking national ecosystem types to the ecosystem functional groups (Level 3) of the Global Ecosystem Typology requires an initial investment, with many benefits nationally and globally



**The Atlas is more
than just a map**



The Atlas is more than just a map

Data products

- **Basemap** of ecosystem functional groups
- **Catalogue** of maps of ecosystem types
- To come: Time series of ecosystem extent, ecosystem condition

Web presence/interface

- **Explore** basemap online
- **Download** basemap map
- **Link** to underlying national & global maps
- **Apply** analytical tools

Analytical tools

- **Extent** of ecosystem functional groups
- **Protection level** of ecosystem functional groups
- Reporting on **Red List of Ecosystem** status
- **More** to come

Resources for countries

Including:

- **Guidelines** for developing a national map of ecosystem types
- **Tools for cross-walking** to the Global Ecosystem Typology
- **Training datasets** for ecosystem functional groups

Support to countries

- Partnership approach
- Embedded in national institutions
- Facilitating access to new data and technologies
- **Starting with the Maldives in 2024/5**

Possible role for regional centres

- Context-specific support for low- & medium capacity countries to create national ecosystem maps

Network of ecosystem mapping practitioners

- Facilitating learning and sharing of approaches

Consortium of partners

Community of users

Connecting with people!



What lies ahead



Convened by...



GROUP ON EARTH
OBSERVATIONS

Supported by...



Resilience Frontiers



Convention on
Biological Diversity



Convention
on Wetlands



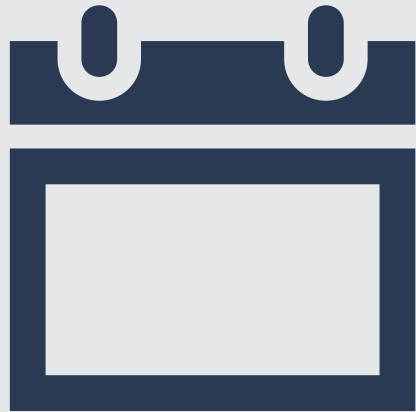
United Nations
Convention to Combat
Desertification



United Nations
Framework Convention on
Climate Change

In partnership with...





UN Convention on Biological Diversity COP16

Cali, 21-1 November 2024



GLOBAL
ECOSYSTEMS
ATLAS



**GLOBAL
ECOSYSTEMS
ATLAS**



**GROUP ON
EARTH OBSERVATIONS**