

# The IUCN Global Ecosystem Typology

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# Outline

- What are ecosystems – how they differ from LULC units
- What is the Global Ecosystem Typology (GET)?
- Properties of the GET
- Scientific rigour & extensive consultation
- IUCN governance, support & updates
- Wide adoption & use
- Filling a significant gap and need in the International Family of Classifications

# What are ecosystems?

“a **dynamic** complex of **plant, animal and micro-organism** communities and their **non-living** environment **interacting** as a functional unit”

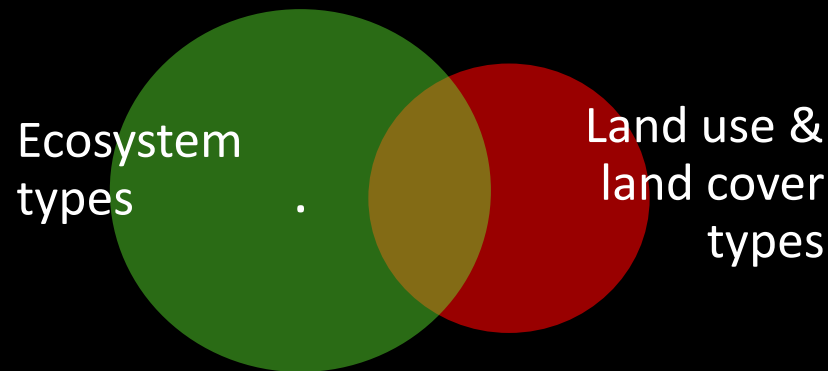
*CBD 1992 (after Tansley 1935)*

Not to be confused with **Land use/land cover**:

Land cover - the physical material at the surface of Earth, including grass, asphalt, trees, bare ground, water, etc.

Land use - purpose to which the land cover is committed

*LULCs & ecosystems are related but not the same!*



*To inform evidence-based action, our information infrastructure must align with the ecosystem concept*

Ecosystem properties

- Functional
- Structural
- Compositional

Ecosystem scales

- Thematic
- Spatial
- Temporal

# IUCN Global Ecosystem Typology

- what is it?

## 1. Hierarchical classification

- Defines the ecosystem types & their relationships based on shared functional & compositional traits

## 2. Metadata

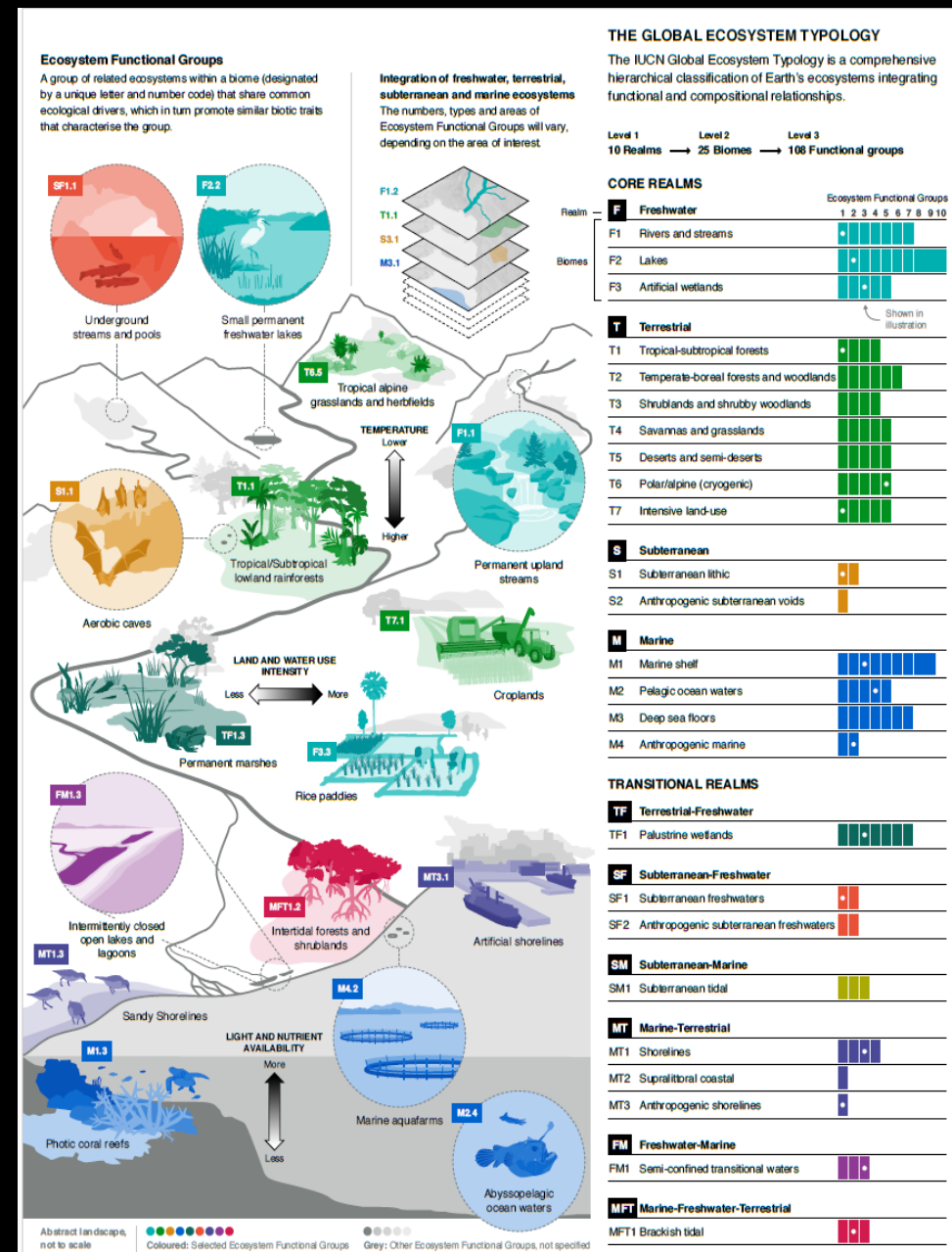
- Detailed descriptions & indicative global maps

## 3. Spatial data & information system

- Global distributions of the ecosystem types

## 4. Framework for integrating national ecosystems classifications & data

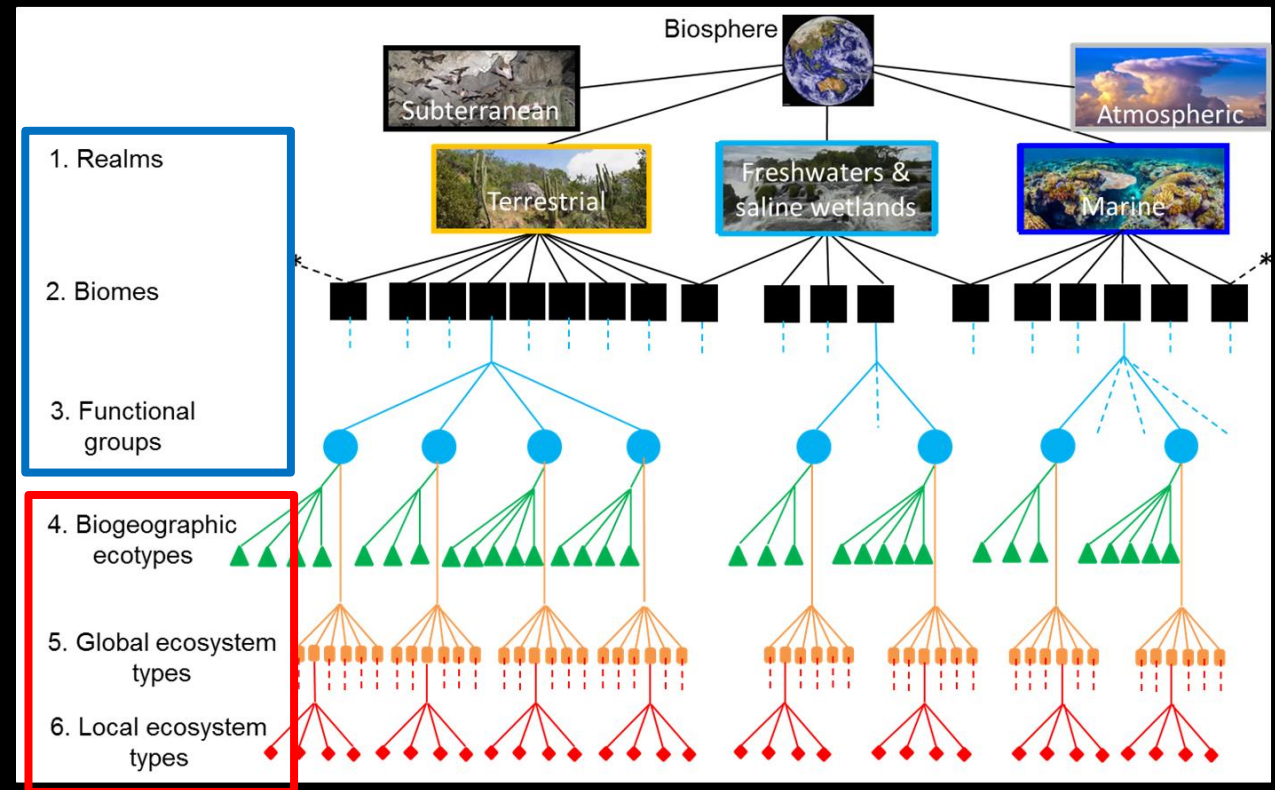
*A framework for global analysis, synthesis & generalisation about ecosystem change*



# IUCN Global Ecosystem Typology

## 1. Classification component - Hierarchical

- Represents functional similarities among ecosystems (**upper levels**)
  - *A key innovation of the GET aimed at policy & management applications*
- Recognises different compositional expressions of functionally similar ecosystems (**lower levels**)
- Incorporates subnational & national classifications (Level 6)
- 110 Ecosystem Functional Groups (Level 3)



# IUCN Global Ecosystem Typology

## 2. Metadata

supporting information to interpret ecosystem units

Full illustrated descriptive profiles of all classification units (Levels 1-3):

- Key ecosystem components & processes
- Key drivers of ecosystem sustainability & change (diagrammatic models)
  - Susceptibility to different threats
  - Management approaches
- Gateway to scientific literature
- Nomenclature & alphanumeric codes reflect the hierarchical context of units

### T4.1 Trophic savannas

**Biome:** T4 Savannas & grasslands

**Realm:** Terrestrial

**Ecological traits:** These grassy woodlands and grasslands are dominated by C<sub>4</sub> grasses with stoloniferous, rhizomatous and tussock growth forms that are kept short by vertebrate grazers. Trophic savannas (relative to pyric savannas, T4.2) have unique plant and animal diversity within a complex trophic structure dominated by abundant mammalian herbivores and predators. These animals are functionally differentiated in body size, mouth morphology, diet, and behaviour. They promote fine-scale vegetation heterogeneity and dominance of short grass species, sustaining the system through positive feedbacks and limiting fire fuels. Trees and grasses possess functional traits that promote tolerance to chronic herbivory as well as seasonal drought. Seasonal high productivity coincides with summer rains. The dry season induces grass curing and leaf fall in deciduous and semi-deciduous woody plants. Trees are shade-intolerant during their establishment and most develop



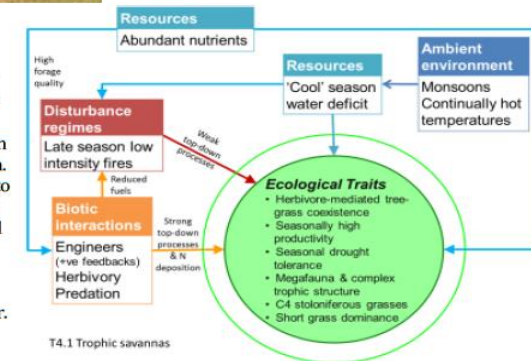
Trophic savanna, Masai Mara, Kenya.

Source:

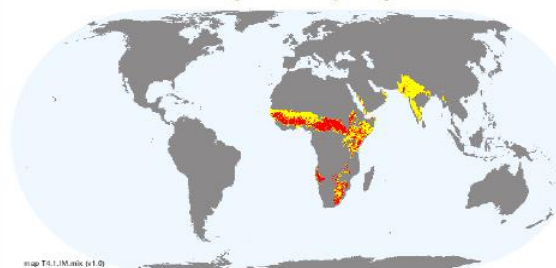
[http://english.cntv.cn/special/great\\_migration/homepage/](http://english.cntv.cn/special/great_migration/homepage/)

**Key ecological drivers:** Trophic savannas like pyric savannas are driven by seasonal climates but generally occupy environmental niches with lower rainfall and higher soil fertility. High annual rainfall deficit of 400 mm to >1,800 mm. Annual rainfall generally varies from 300 mm to 700 mm, always with strong seasonal (winter) drought, but these savanna types are restricted to landscapes with sufficient water bodies (rivers and lakes) to sustain high densities of large mammals. Temperatures are warm-hot with low-moderate variability through the year. Low intensity fires have return intervals of 5–50 years, depending on animal densities and inter-annual rainfall variation, usually after the growing season, removing much of the remaining biomass not consumed by herbivores. Soils are moderately fertile and often have a significant clay component.

chemical (e.g. phenolics) or physical (e.g. spinescence) herbivory defence traits and an ability to re-sprout as they enter the juvenile phase. Their soft microphyll-notophyll foliage has relatively high SLA and low C:N ratios, as do grasses. Robust root systems and stolons/rhizomes enable characteristic grasses to survive and spread under heavy grazing. As well as vertebrate herbivores and predators, vertebrate scavengers and invertebrate detritivores are key components of the trophic network and carbon cycle. Nitrogen fixation, recycling, and deposition by animals exceeds volatilisation.



T4.1 Trophic savannas



map T4.1.M.1 (x1.0)

**Distribution:** Seasonal tropics and subtropics of Africa and Asia.

#### References:

Archibald S, Hempson GP (2016) Competing consumers: Contrasting the patterns and impacts of fire and mammalian herbivory in Africa. *Philosophical Transactions of the Royal Society B* 371, 20150309

Hempson GP, Archibald S, Bond WJ, Ellis RP, Grant CC, Kruger FJ, Kruger LM, Moxley C, Owen-Smith N, Peel MJ, Smit IP (2015) Ecology of grazing lawns in Africa. *Biological Reviews* 90, 979–994

# IUCN Global Ecosystem Typology

## 3. Spatial data & information system

Web-based map app (establ. 2020)

<https://global-ecosystems.org/>

- Peer-reviewed published maps for all 110 Level 3 units (high-med quality)
  - Map evaluation criteria (consumer guide)
- Basic search & reporting functionality
- Open access data archive (& spatial metadata)
- Ongoing development:
  - Collaboration with UN Group on Earth Observations (GEO) “Global Ecosystem Atlas”



*Spatial query*

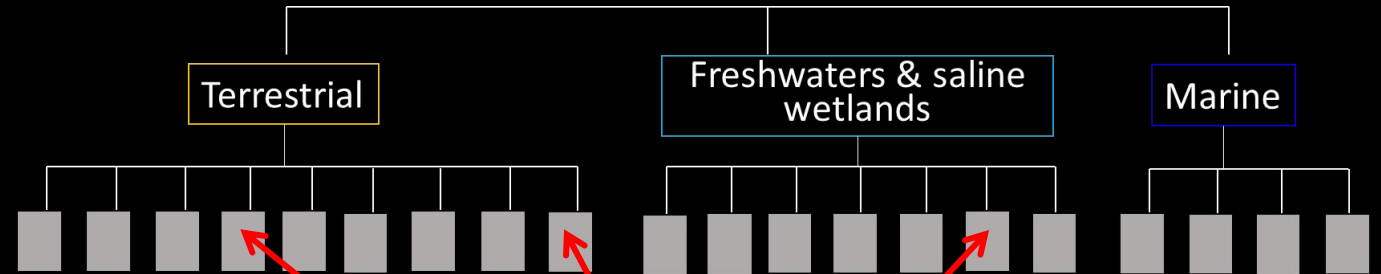


*Display*



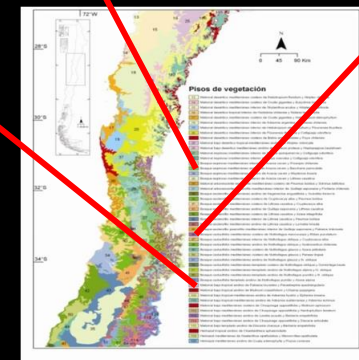
# IUCN Global Ecosystem Typology

## 4. Framework for global synthesis of national maps



### Reduces cross-national incompatibilities

- Attribution of national units to common global groups (Level 3)
- Multiple trials
- Resource materials in prep (guidelines, structured elicitation protocol, spreadsheet)



National map of ecosystems Chile

Level 3  
Functional  
groups



# IUCN Global ecosystem typology

1. Aligned with ecosystem concept

2. Comprehensive & complete coverage of all types of ecosystems on Earth

- Terrestrial, Freshwater, Marine, Subterranean
- Natural & anthropogenic ecosystems

3. Mutually exclusive classification units

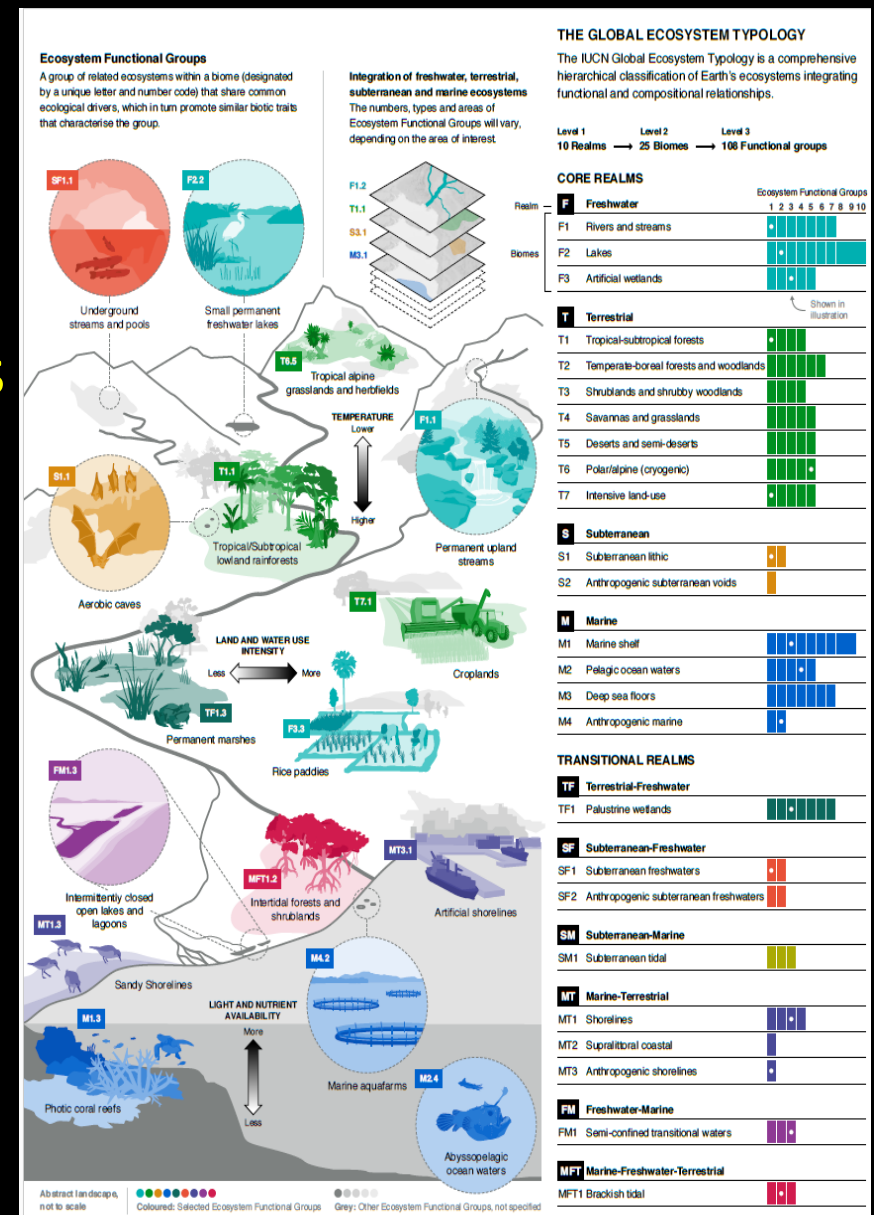
- Ongoing development of spatial representation

4. Rigorous conceptual basis

- Reviewed by >60 international experts, publ. in *Nature*

5. Perennial custodian & governance

- IUCN, world's largest & oldest conservation network

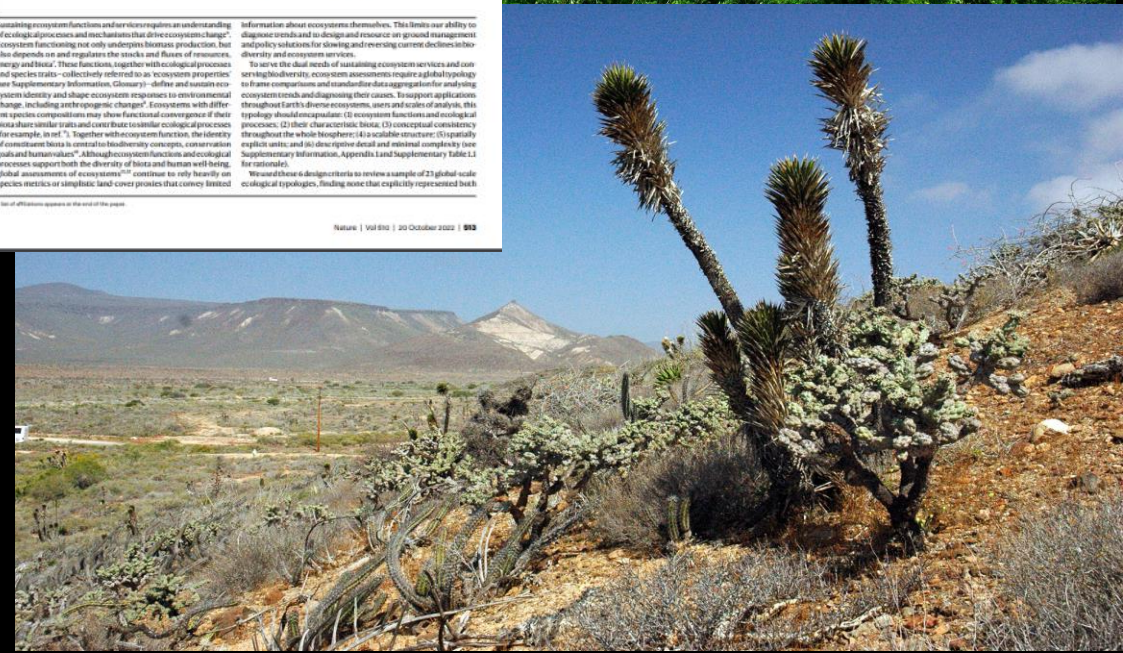


GET Level 3 functional groups

# The GET framework – active uses

- Extensive consultation & collaboration
  - 18 international meetings
  - 60 specialist reviewers, 4 rounds of review
  - Web of Science highly cited work (>55,000 views)
- Adoption
  - By IUCN as global standard for ecosystem classification, management & restoration
  - By UNSC as reference classification for SEEA-EA
  - In UN CBD GBF as a framework for reporting on targets A1 & A2
  - By UN GEO Global Ecosystem Atlas as core framework

<https://global-ecosystems.org/>



# Global Ecosystem Typology

## - applications

- an analytical classification that provides a common 'language' for ecosystem dialogue & action across multiple domains

Connecting Ecosystem Accounts with other applications



# Conclusion

The Global Ecosystem Typology will fill a significant gap and need within in UN International Family of Classifications, enabling:

- consistent and rigorous Ecosystem Accounts aligned with the UN SEEA-EA standard
- capacity building for countries to measure their progress towards UN Global Biodiversity Framework Goals and Targets

<https://global-ecosystems.org/>

