



Biodiversity Policy: Assessing Progress Towards Policy Goals

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UN Convention on Biological Diversity

- ❑ In force since 1993
- ❑ 196 states (Holy See, USA are not parties)
- ❑ “The variety of life on Earth at all its levels, from genes to ecosystems”
- ❑ Focus: Conservation and sustainable use of biological diversity
- ❑ Strategic Plan 2011-2020
 - Includes Aichi Targets

CBD Aichi Targets (2011-2020)

	Understand values		Reduce pollution		Enhance resilience
	Mainstream biodiversity		Reduce invasive spp.		Implement Nagoya Prot.
	Address incentives		Minimize reef loss		Revise NBSAPs
	Sustainable production		Protected areas		Respect and conserve TK
	Halve rate of loss		Prevent extinctions		Improve knowledge
	Sustainable fisheries		Conserve gene pool		Mobilize resources
	Manage within limits		Restore ecosystems		

<https://www.cbd.int/sp/targets/>

Ramsar Convention on Wetlands

- ❑ In force since 1975
- ❑ 170 contracting parties
- ❑ 2300 sites
- ❑ “Conservation and wise use of wetlands”
- ❑ Broad definition
 - “Traditional” wetlands
 - Rivers & lakes
 - Marine areas up to 6m...
 - Human sites including rice paddies...

Ramsar Strategic Goals

☐ Key Goals

- Address drivers of loss and degradation
- Conserve and manage the site network
- Wise use of all wetlands

☐ 17 specific targets

UN Sustainable Development Goals

- ❑ In force since January 2016
- ❑ 193 states



Sustainable Development Goals

- ❑ **Goal 6: Ensure access to water and sanitation for all**
 - **6.6 Protect and restore water-related ecosystems...**



Sustainable Development Goals

- ❑ **Goal 14. Conserve and sustainably use the oceans, seas and marine resources**
 - **14.2 Sustainably manage marine and coastal ecosystems...**
 - **14.4 Regulate harvesting, end overfishing...**
 - **14.c Enhance...sustainable use of oceans**

Sustainable Development Goals

- ❑ **Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**
 - **15.1 Freshwater**
 - **15.2 Forests**
 - **15.3 Land Degradation Neutrality**
 - **15.4 Mountains**
 - **15.5 Biodiversity loss**
 - **15.8 Invasive alien species**

Assessing Progress



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Indicators

- ❑ Variable providing information on condition
- ❑ Policy
 - Indicators are formalized, standardized, & approved
 - Mandatory for reporting
- ❑ Every Target has indicators
 - SDGs have 169 Targets, ~250 indicators

Sample SDG Indicators

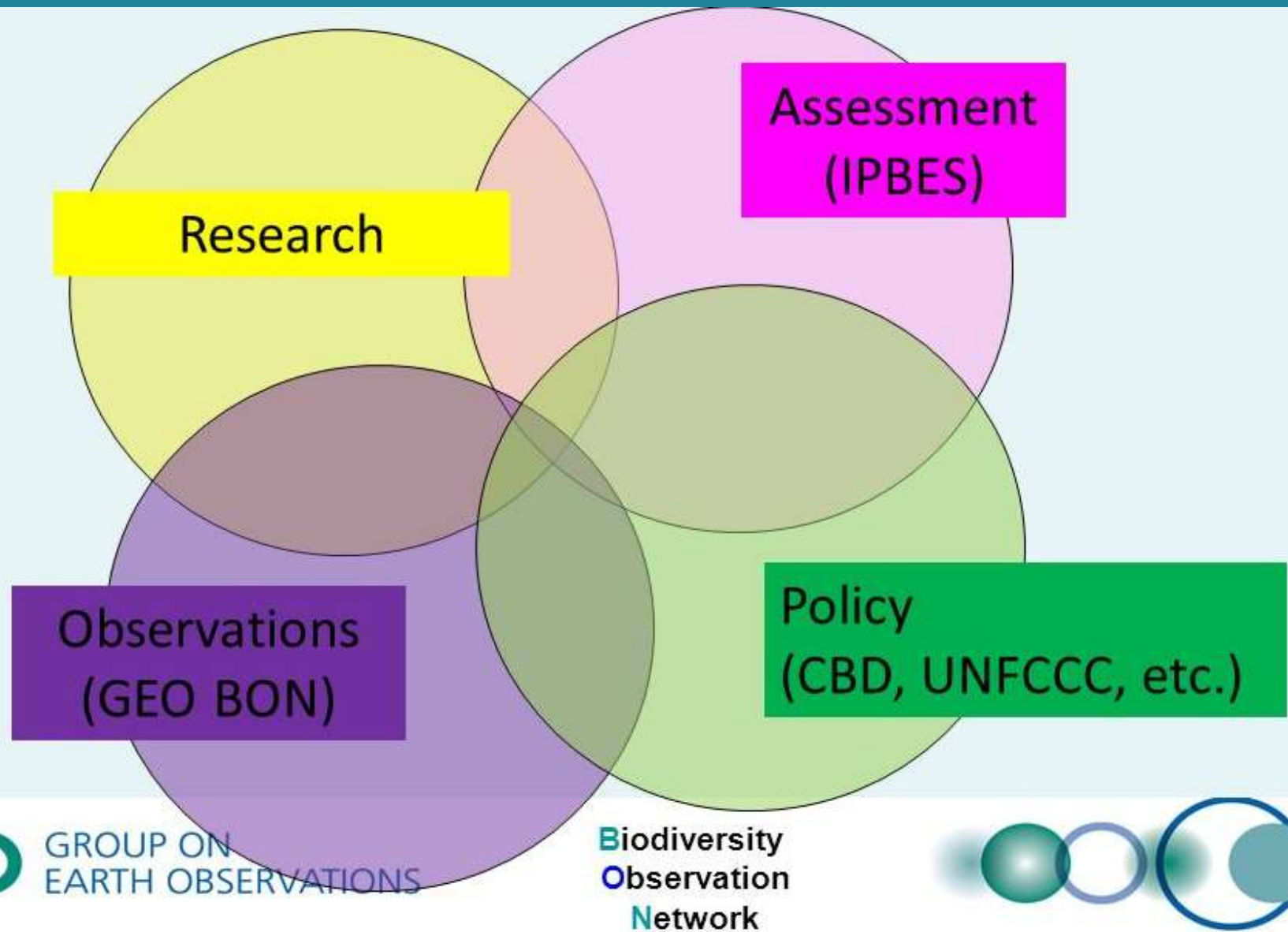
- ☐ Forest area as a proportion of total land area
- ☐ Red List Index
- ☐ Progress towards sustainable forest management



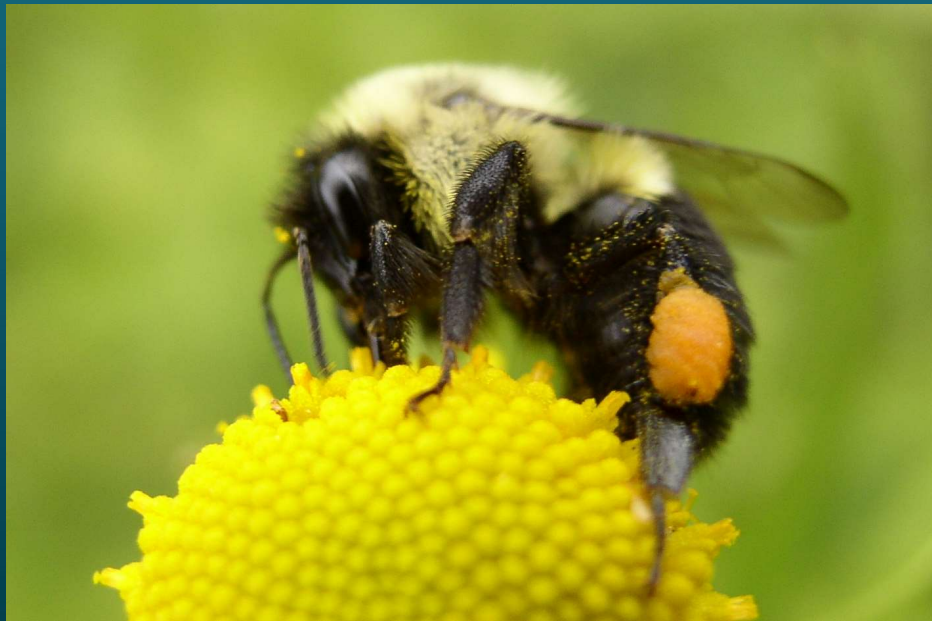
IPBES

- ❑ Established 2012
- ❑ “Better policy through science”
- ❑ Provide policymakers with assessments
- ❑ Assessments (current situation on...)
 - Pollinators
 - Land Degradation
 - Global assessment on biodiversity and ecosystem services (in process)

Science-Policy Landscape



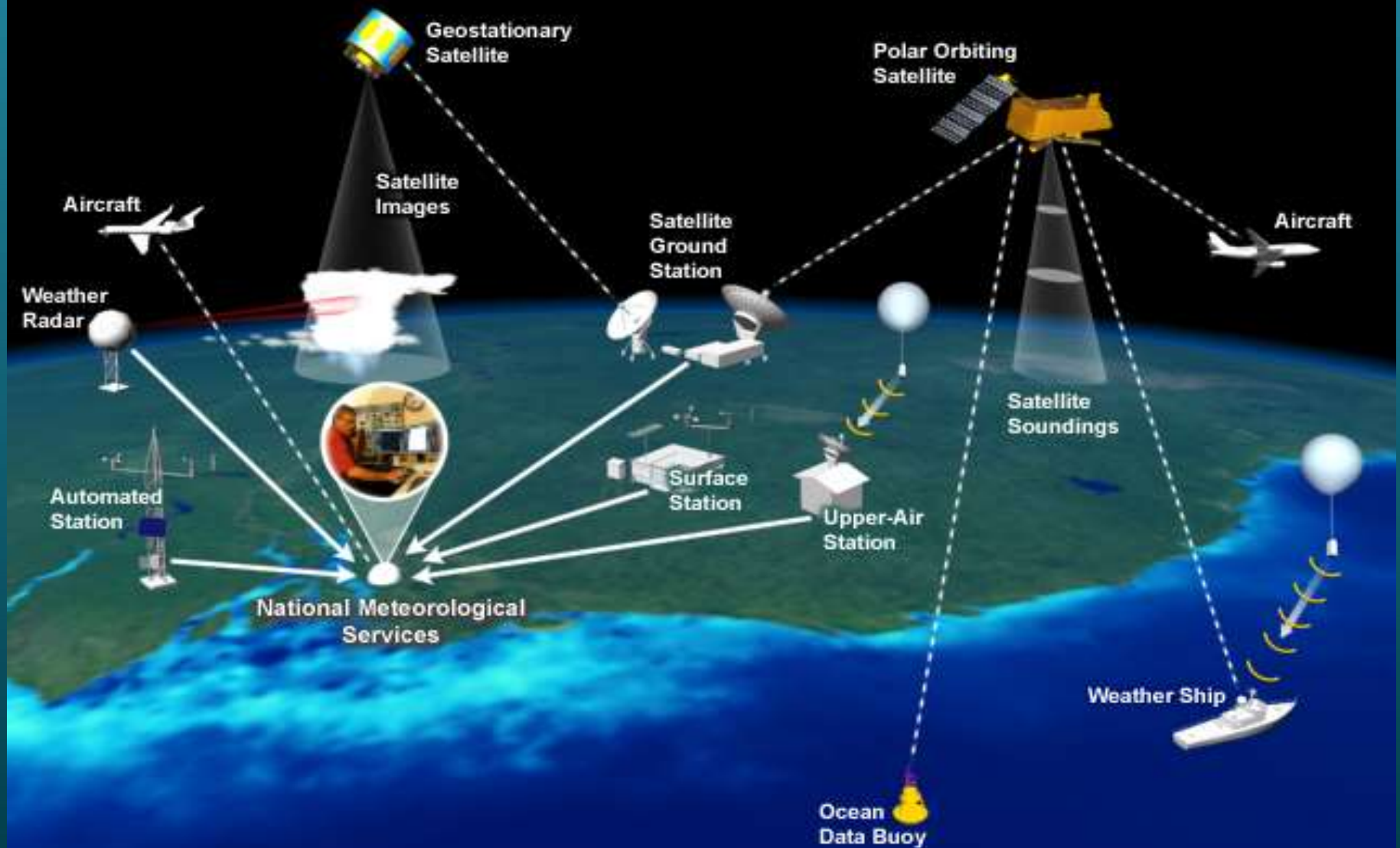
Monitoring, GEO BON, and EBVs



Wikimedia Beatriz Moisset

Weather Monitoring System

WMO Global Observing System



Biodiversity Monitoring System



Panek, Wikimedia Commons

GEO BON

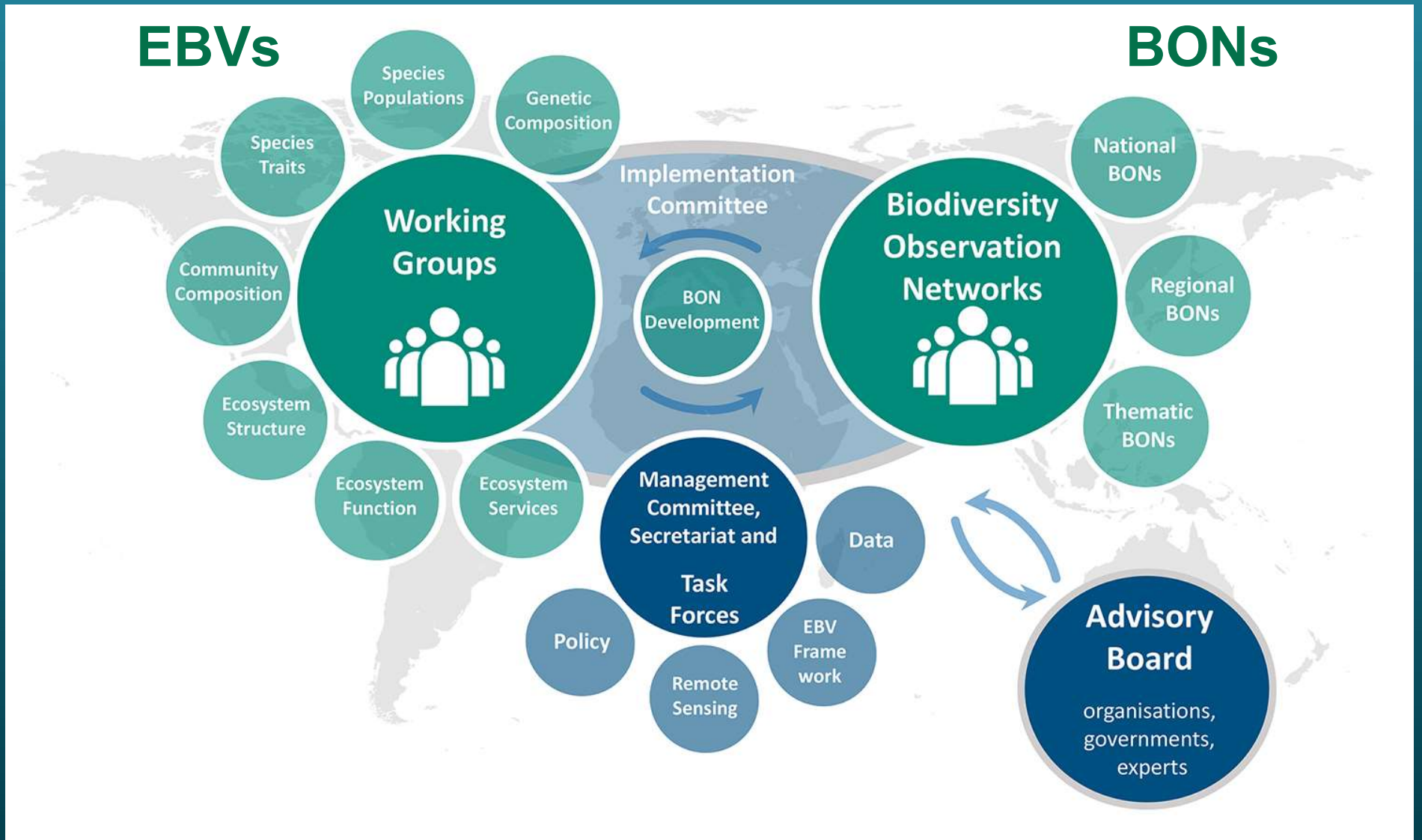
- ❑ **Group on Earth Observations Biodiversity Observation Network**
- ❑ **Formed 2008**
- ❑ **Mission:**

Improve the acquisition, coordination and delivery of biodiversity observations...

Building a Global Monitoring System

- ☐ Agree on what to measure
- ☐ Build networks to measure it
- ☐ Develop capacity, and tools
- ☐ Build delivery system

Focus Areas and Structure



Biodiversity Monitoring System

❑ *In situ*

- “real” and “direct”
- Sparse, patchy in space and time
- Hard & expensive

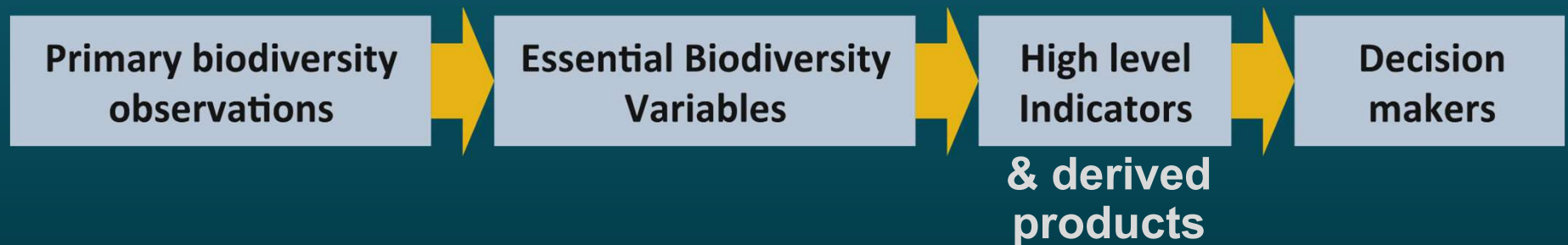


❑ Satellite Remote Sensing

- Global
- Periodic
- Someone else already paid for it
- Indirect, by inference
- Need *in situ* data

Essential Biodiversity Variables

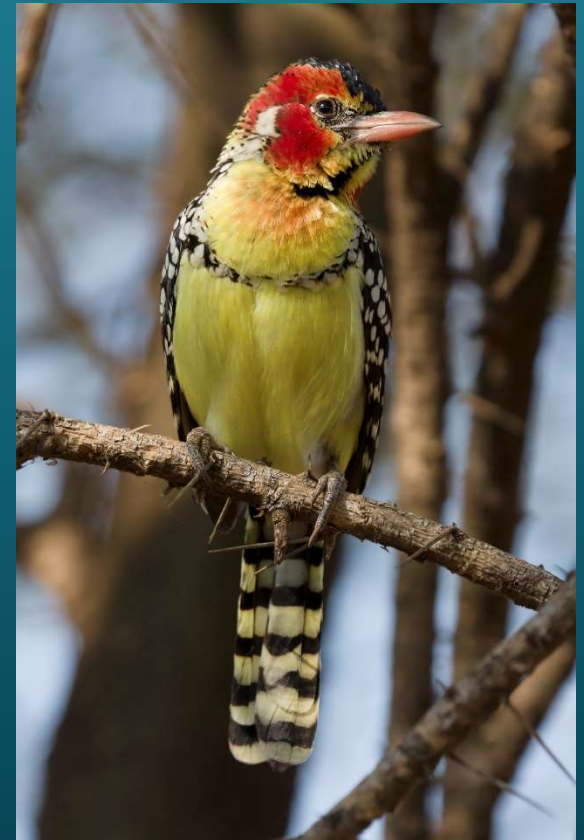
- ❑ Measurements required to study, report, and manage biodiversity change
- ❑ Work in progress
- ❑ Prioritize observations and resources
- ❑ Facilitate systematic observation
- ❑ Feed data to indicators & derived products



EBV Criteria

- ☐ Biological
- ☐ Sensitive to change
- ☐ Important (useful)
- ☐ Practical
- ☐ Ecosystem agnostic
- ☐ Focus on “state”

- ☐ Updated every ~5 years
- ☐ Not all-encompassing



Wikipedia Ikiwaner.

EBV Examples (Candidates)

Class	Examples
Genetic composition	Allelic diversity
Species populations	Distribution, abundance
Species traits	Body mass
Community composition	Taxonomic diversity
Ecosystem function	Net Primary Productivity
Ecosystem structure	Extent, vertical structure

EBV Next Steps

- ❑ Converge on set of variables
- ❑ Refine definitions
- ❑ Plan implementation
 - Observations
 - Processing
 - Delivery



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Challenges to Monitoring



USFWS

Some Challenges

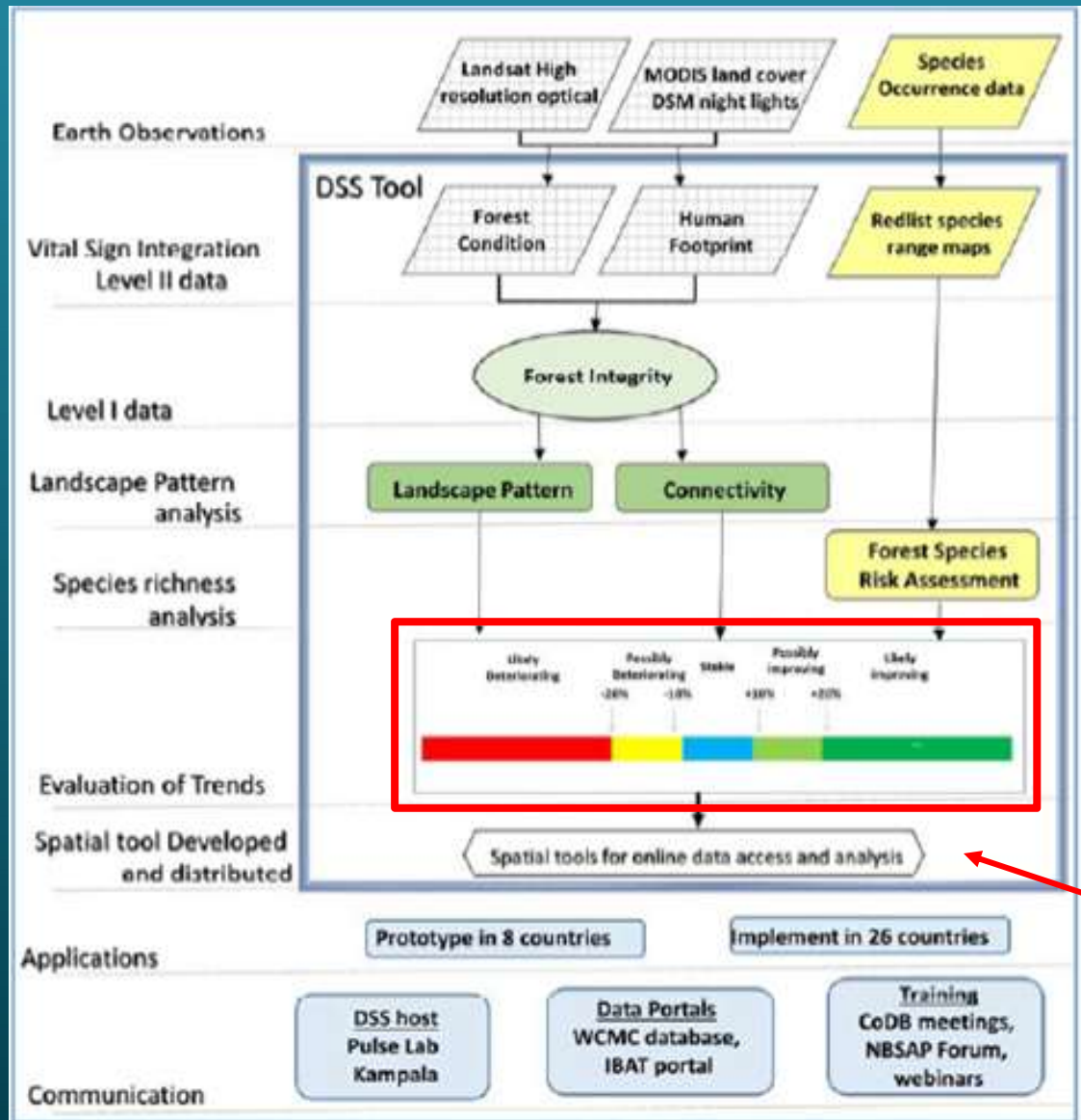
- ❑ Sustained funding
 - ❑ Agreement on who the target users are
 - ❑ Prioritization
 - ❑ Capacity
 - ❑ Derived products
 - ❑ Delivery and utilization
- } Application

Closing Thoughts

- ☐ Focus on user needs
- ☐ What are the limiting factors to good monitoring?
- ☐ How can advancing technologies address them?

Thank You

Derived Products and Utilization



Multiple data sources



Lots of processing



One simple product:
Forest trend

Plus tools to apply it

Figure courtesy of Andrew Hansen

Implementing RS-EBVs

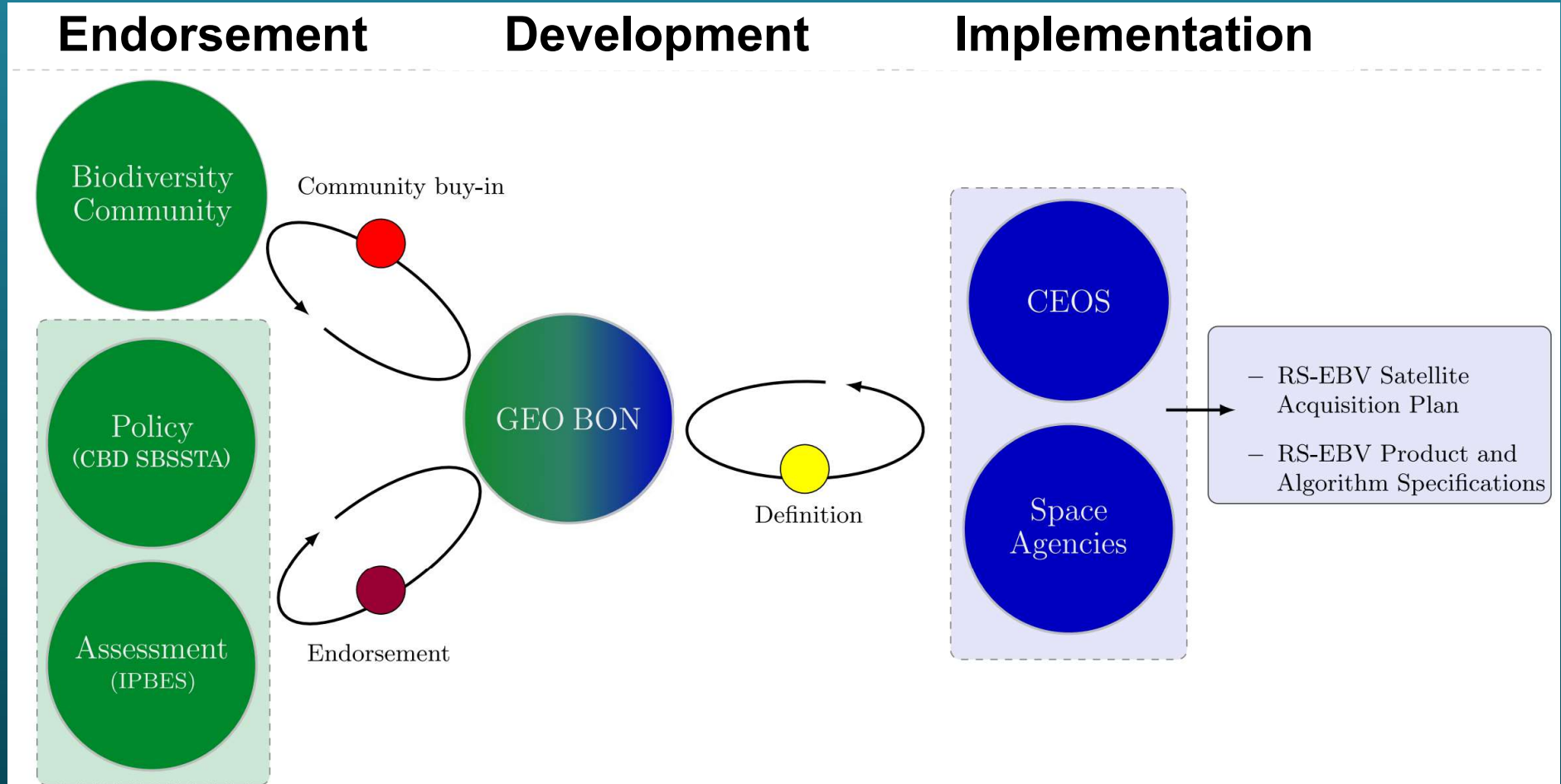


Figure 1. Outline of the overall process by which remotely sensed Essential Biodiversity Variables should be developed and matured.

“SRS-Enabled” EBV Candidates

Class	EBV Candidate
Species populations	Species distribution
	Population abundance
“Species?” traits	Phenology (Land surface...)
	Morphological or physiological traits (e.g., Chl)
Community composition	Taxonomic diversity
	Functional/trait diversity
Ecosystem function	Net primary productivity
	Change in disturbance regime (fire, inundation)
Ecosystem structure	Habitat structure (e.g., height, crown cover)
	Ecosystem extent and fragmentation
	Ecosystem composition by functional type

EBV Candidates

Class	EBV Candidate
Genetic composition	Co-ancestry
	Allelic diversity
	Population genetic differentiation
	Breed and variety diversity
Species populations	Species distribution
	Population abundance
	Population structure by age/size class
Species traits	Phenology
	Body mass
	Natal dispersal distance
	Migratory behavior
	Demographic traits
	Physiological traits
Community composition	Taxonomic diversity
	Species interactions
	Functional/trait diversity
Ecosystem function	Net primary productivity
	Secondary productivity
	Nutrient retention
	Change in disturbance regime (fire, inundation)
Ecosystem structure	Habitat structure
	Ecosystem extent and fragmentation
	Ecosystem composition by functional type