

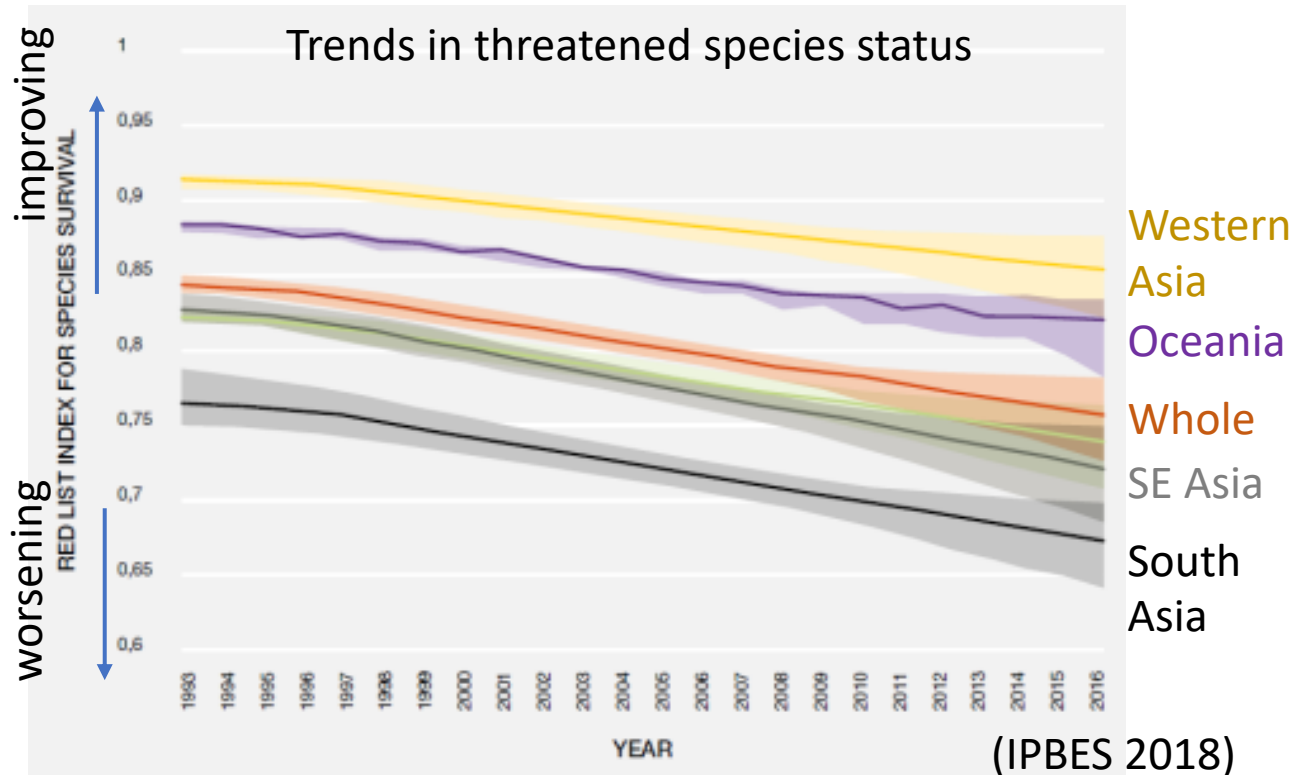
# Linking biodiversity observation to social demand

**Yayoi Takeuchi**  
**National Institute for Environmental Studies**



# Biodiversity issues in Asia-Pacific Region

## Declining species diversity



**Redlist index is decreasing =**  
**Number of threatened species is increasing**

**Main drivers: Landuse change**

Threatened species  
status assessment by  
experts



### Bornean Orangutan



<https://www.iucnredlist.org/species/17975/123809220>

**IUCN Redlist category**

**1996 – Vulnerable (VU)**

↓ **worsen**

**2008 – Endangered (EN)**

↓ **worsen**

**2016 – Critically endangered (CR)**

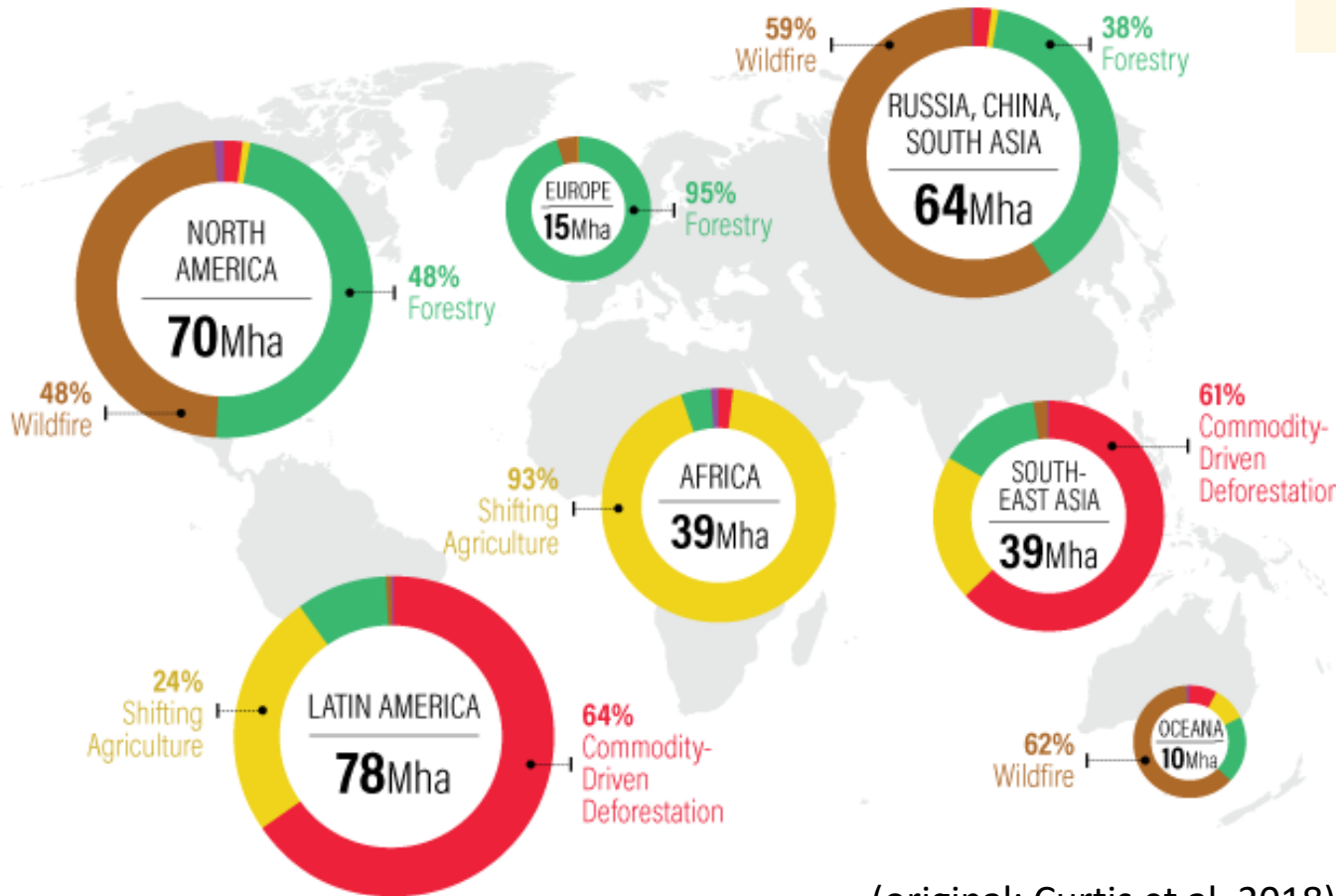


# Deforestation and its drivers

Regional Tree Cover Loss by Driver for the Period 2001–2015



Landsat satellite  
data analysis



## Deforestation Drivers



Commodity



Forestry



Shifting  
agriculture



Wildfire



Urbanization

(original: Curtis et al. 2018)





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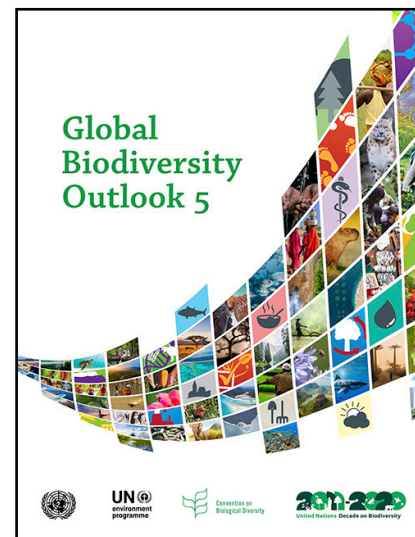
<https://news.mongabay.com/2018/09/whats-causing-deforestation-new-study-reveals-global-drivers/>

# Aichi Biodiversity targets 2011-2020 & results



Target 5		Target 12	
			
By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.		By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	
Habitat loss: <b>No change</b> Forest fragmentation: <b>Moving away</b>		Threatened species: <b>No change</b> Conservation status: <b>Moving away</b>	

A set of 20 targets -- at the global level, **none of the targets have been fully achieved** (GBO5, 2020)



(CBD 2020)

For next step, to achieve the **2050 Vision for Biodiversity** we need...

- ✓ a significant **shift away from 'business as usual'**
- ✓ **'transformative change'** in sectors such as Land and Forests, Food Systems, Climate Action, and so on.

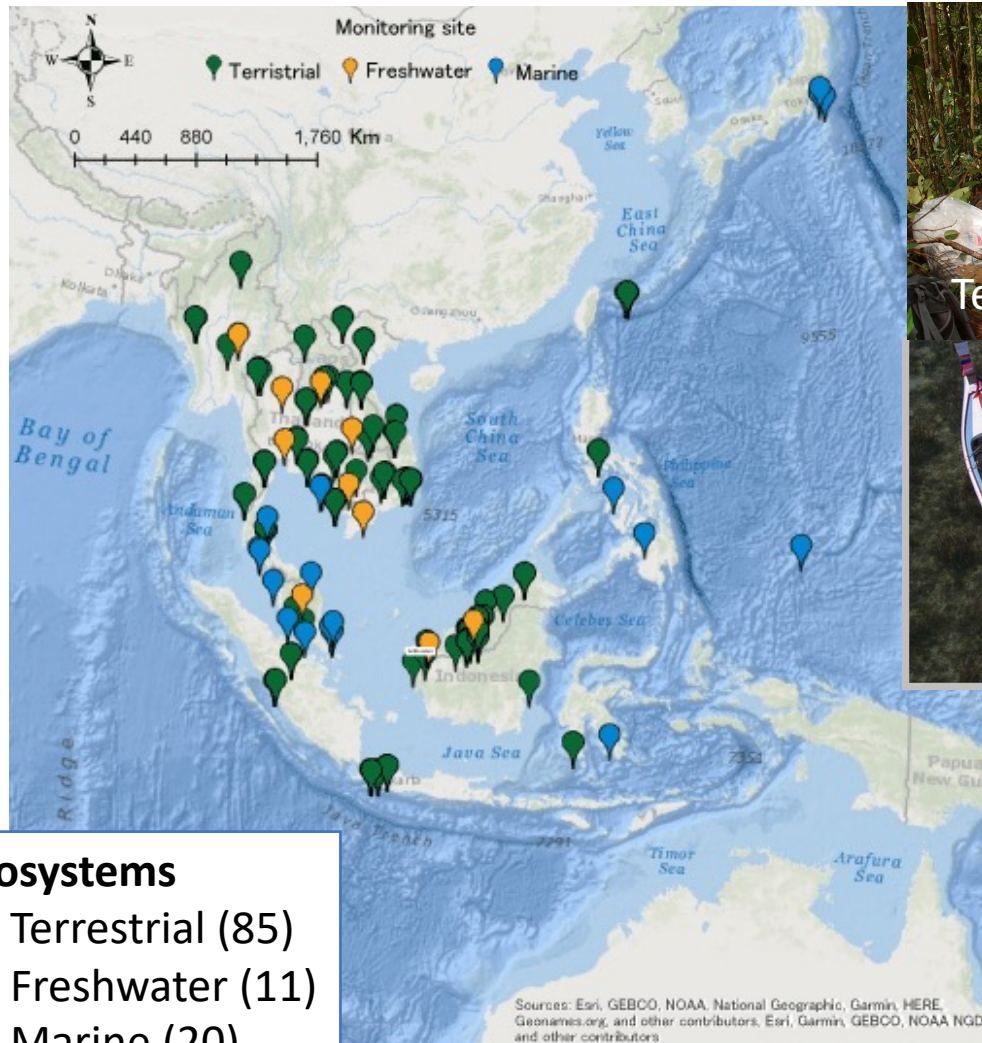


# For transformative change ( $\hat{=}$ TNFD), what kind of “biodiversity data” will be needed?

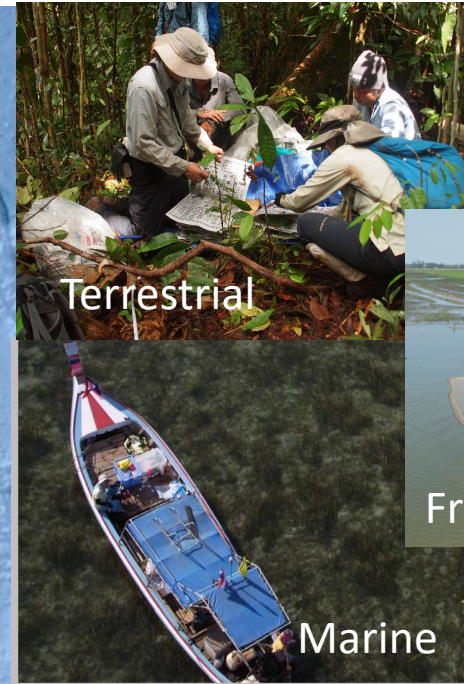
- **Multiple dimensions** of “biodiversity”
  - **Number of species, threatened species**
  - “Community” composition (species x abundance)
  - **Genetic diversity**
  - Ecosystem diversity
  - **Ecosystem functions** –e.g. Phenology, Biomass, Nutrients
  - **Habitats for species**
  - Ecological processes or interactions
- Values in society
  - **Ecosystem services**
  - **Nature’s contributions to society**
  - Visualization

# Biodiversity monitoring sites

## Field observation



(Takeuchi et al. 2021)



Observation data gaps in  
geography, time series,  
taxonomy, ecosystem types...

Data standardization, data  
accumulation



# The Project on Development of Management Systems for Multiple Utilization of Biodiversity in the Tropical Rainforests at the Protected Areas in Sarawak, Malaysia (YR2020-2025)

Target issues: Underestimated species diversity & Underused its information

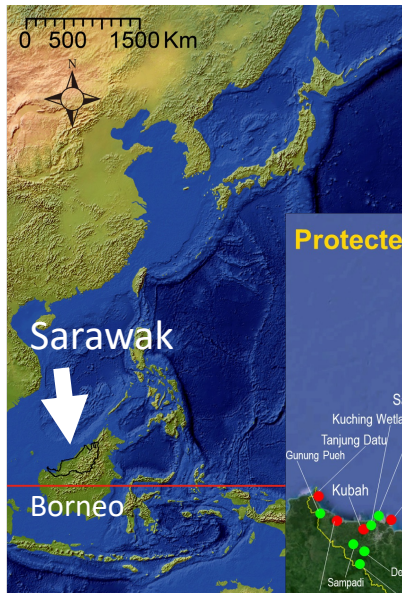
→ Assessment of multiple dimensions of Biodiversity & Establishment of platforms for multipurpose of intellectual industries



Dr. Itioka  
Kyoto Univ.



Ms.  
Punga  
Forest  
Departme  
nt Sarawak



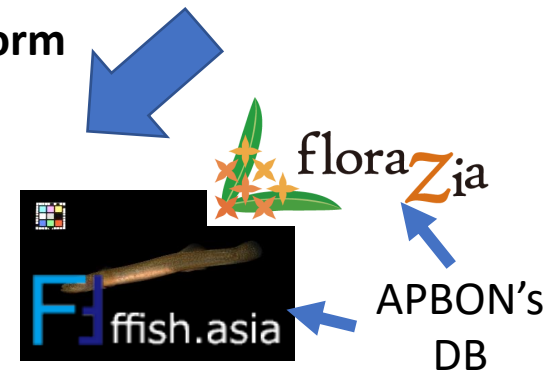
species diversity, genetic  
diversity, phylogenetic  
diversity for multiple  
taxa

A newly discovered  
*Rafflesia*  
(Diway et al. 2022)



Education, Tourism  
Capacity building

Data platform

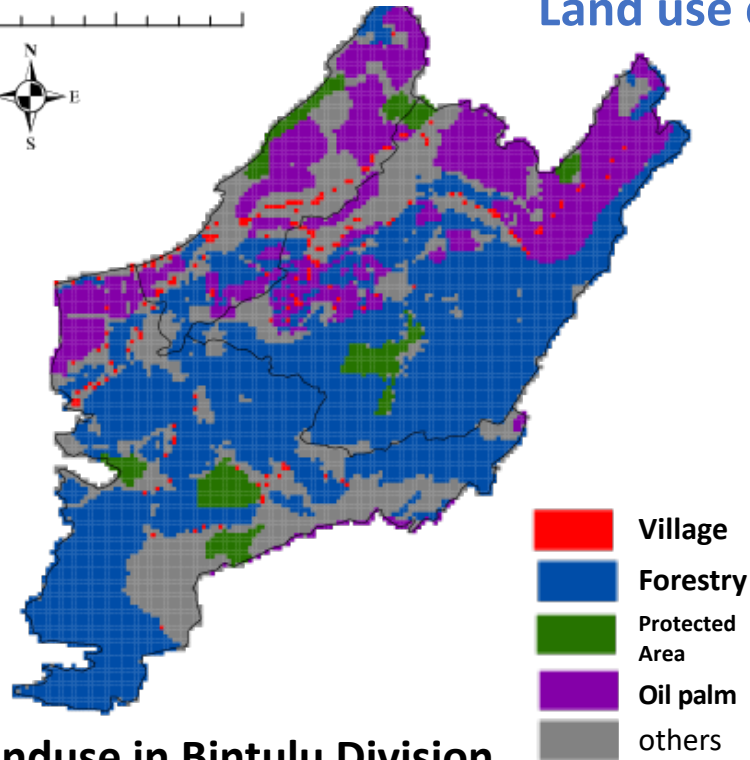


# The project on sustainable forestry in Sarawak (YR2017-ongoing)

0 60km



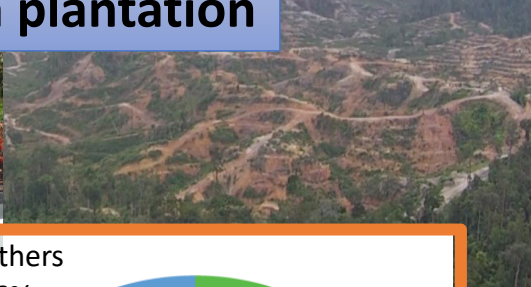
Land use change influenced by global market demand



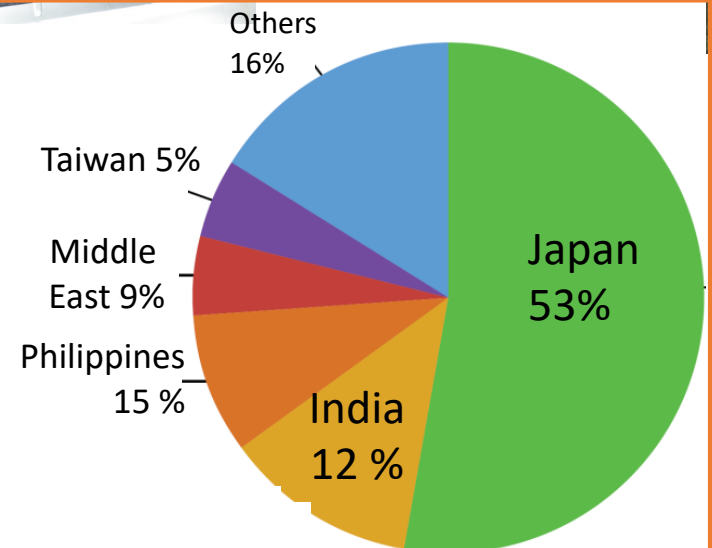
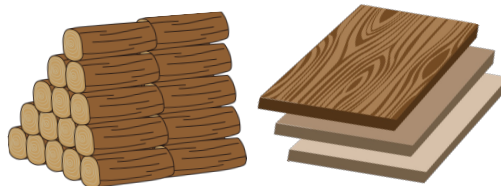
Commercial logging



Oil palm plantation

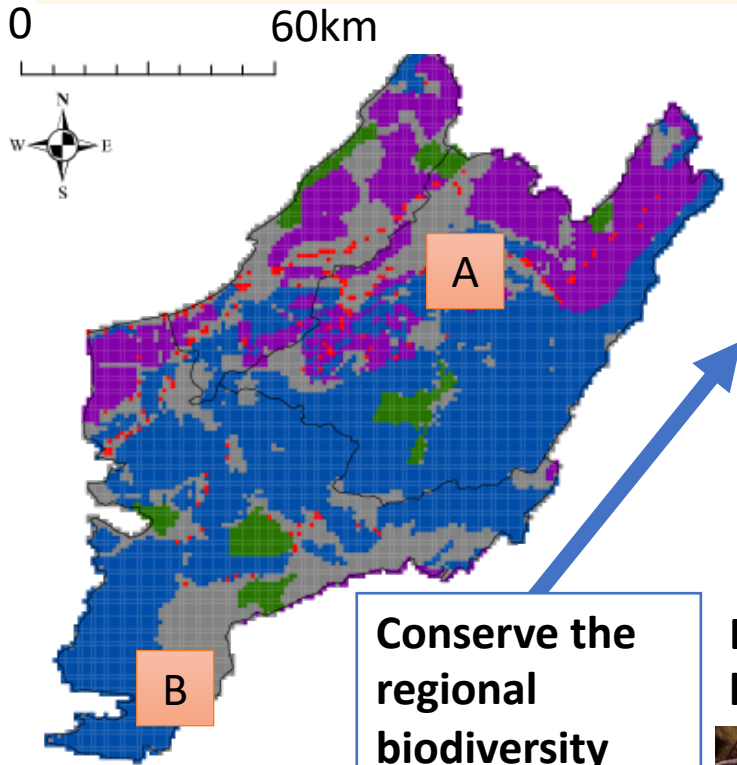


Sarawak's timber export earning by major destinations in 2021





# The project on sustainable forestry in Sarawak (YR2017-ongoing)



## Tree species diversity in fragmented forests

Area	No. of community forest	Total area (ha) of plots	No. of Individual	No. of Species	Averaged Shannon's $H$ (SD)	
A	8	4	2741	551	3.90	(0.46)
B	8	4.75	3138	531	3.79	(0.31)
Total	16	8.75	5879	813	3.84	(0.38)

The forests covered **> 20% of threatened species** occurring in Sarawak

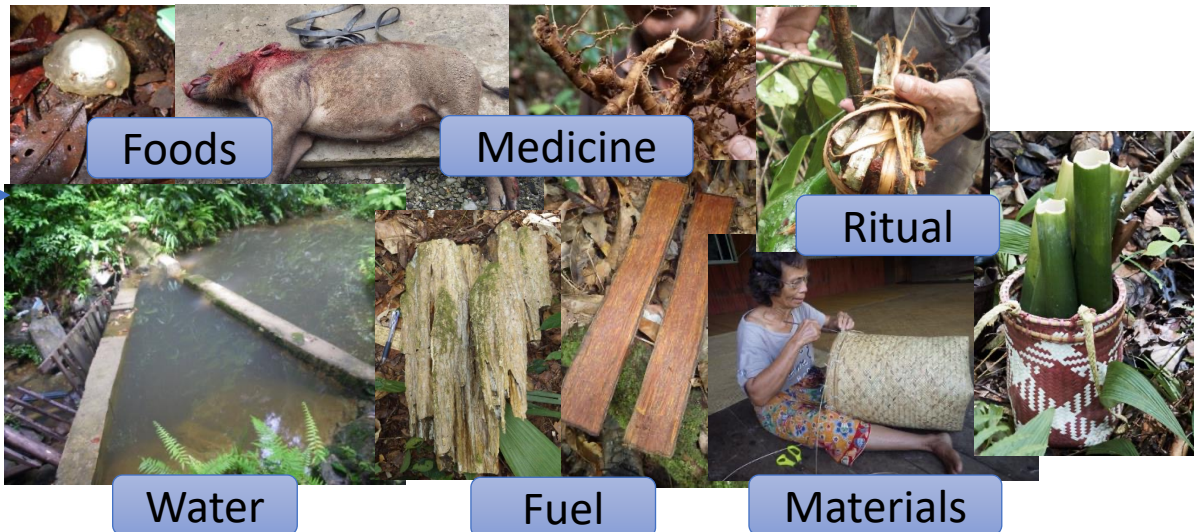
(Takeuchi et al. 2017)



Forest fragments

Secure the ecosystem services

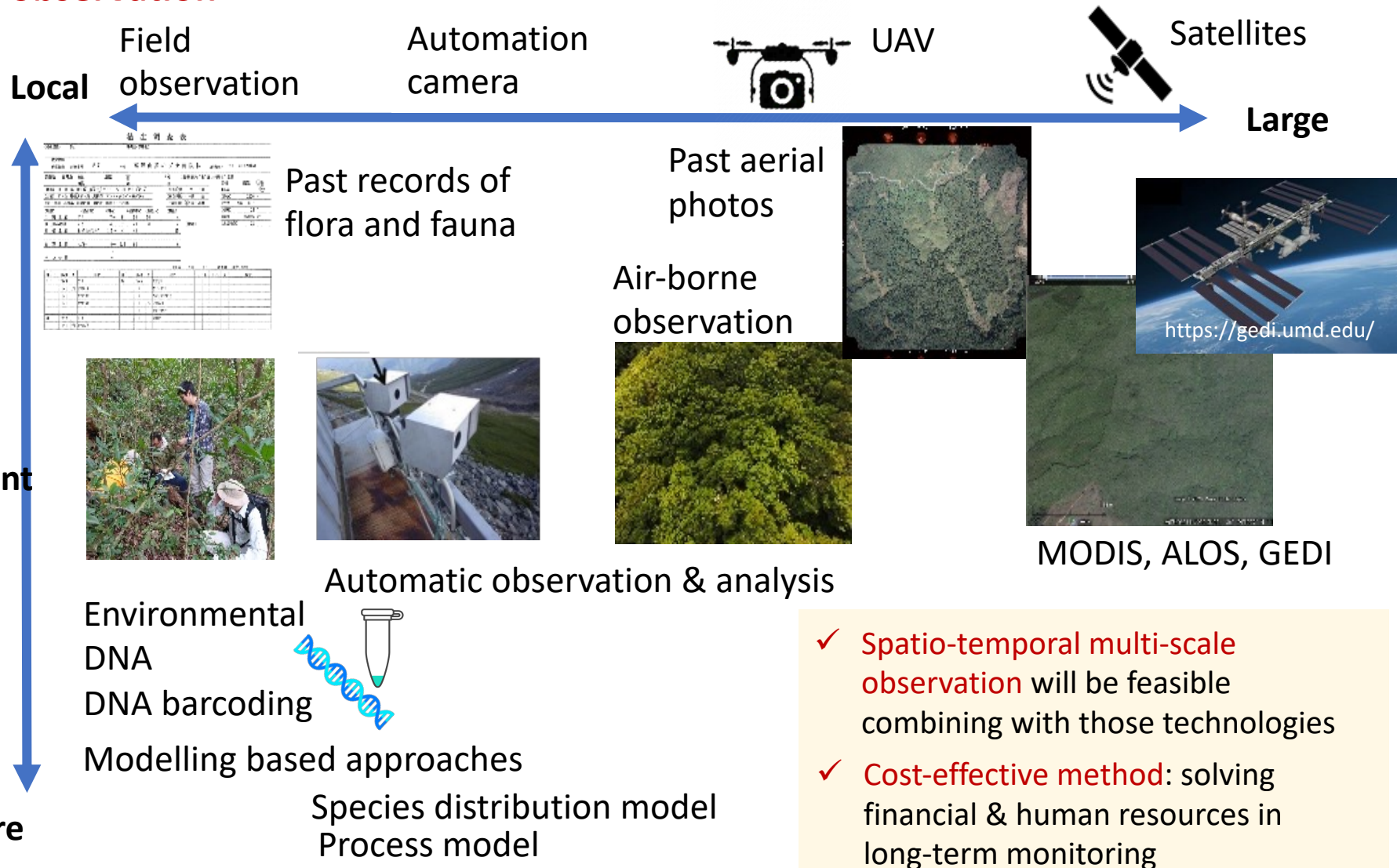
## Ecosystem services from fragmented forests to local communities





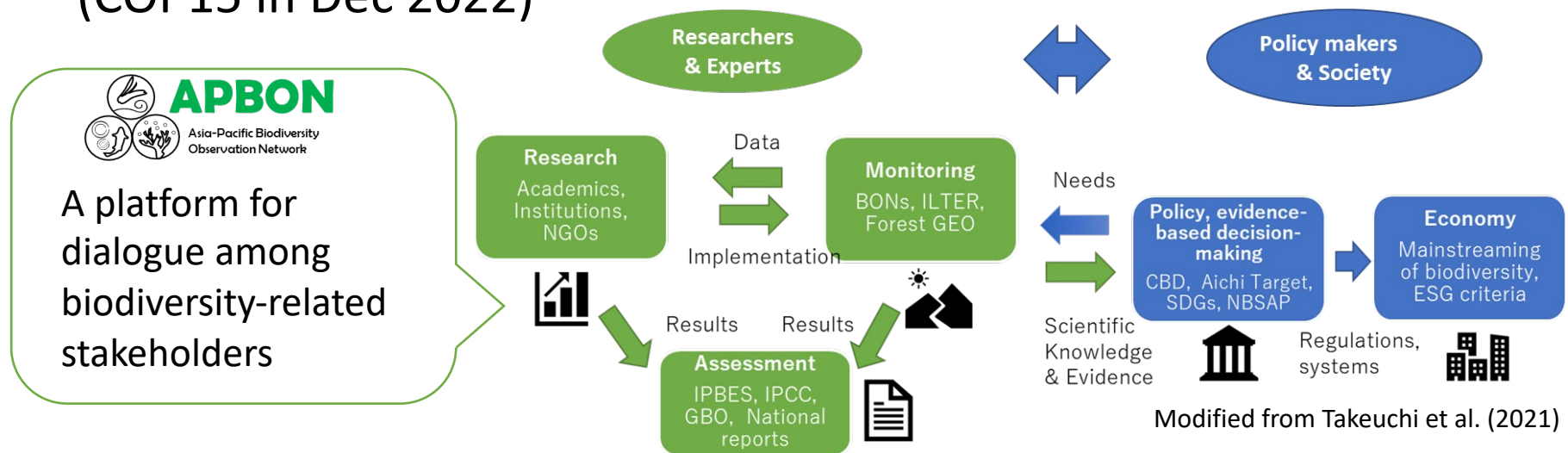
# Biodiversity observation for Next Decade

**Combining with cutting-edge technologies for cost effective and real-time observation**



# Biodiversity observation for Next Decade

- Biodiversity observation **not only** by researchers but also **by public domains**
- Promoting **interdisciplinary research** and **problem-solving approaches** with filling the knowledge gaps
- Promoting the **data accessibility, deliver** our information and knowledge to global platforms such as CBD and IPBES and the **economic section**
- Meet the targets of **post-2020 Global Biodiversity framework** (COP15 in Dec 2022)



# How does biodiversity observation contribute to integrating nature into economic activities?

First step: Find **the common ground** between the monitoring community and the economic section

- Define the **term “biodiversity”**
- Define the **monitoring & reporting target**
- Recognize we can't measure whole dimensions of biodiversity
- Recognize we could have **trade-offs** between biodiversity and social targets
- But try to include “multiple” values of biodiversity for multiple stakeholders – **Inclusion through Nature-based Solutions**