

# PRIMARY FORESTS IN ASIA AND THE PACIFIC: DIVERSITY, STATUS, TRENDS AND THREATS

**Asia-Pacific Forest Sector Outlook:  
Roadmaps for primary forests conservation  
and innovative forest technologies**

**Validation Workshop, 23-24 November 2021**



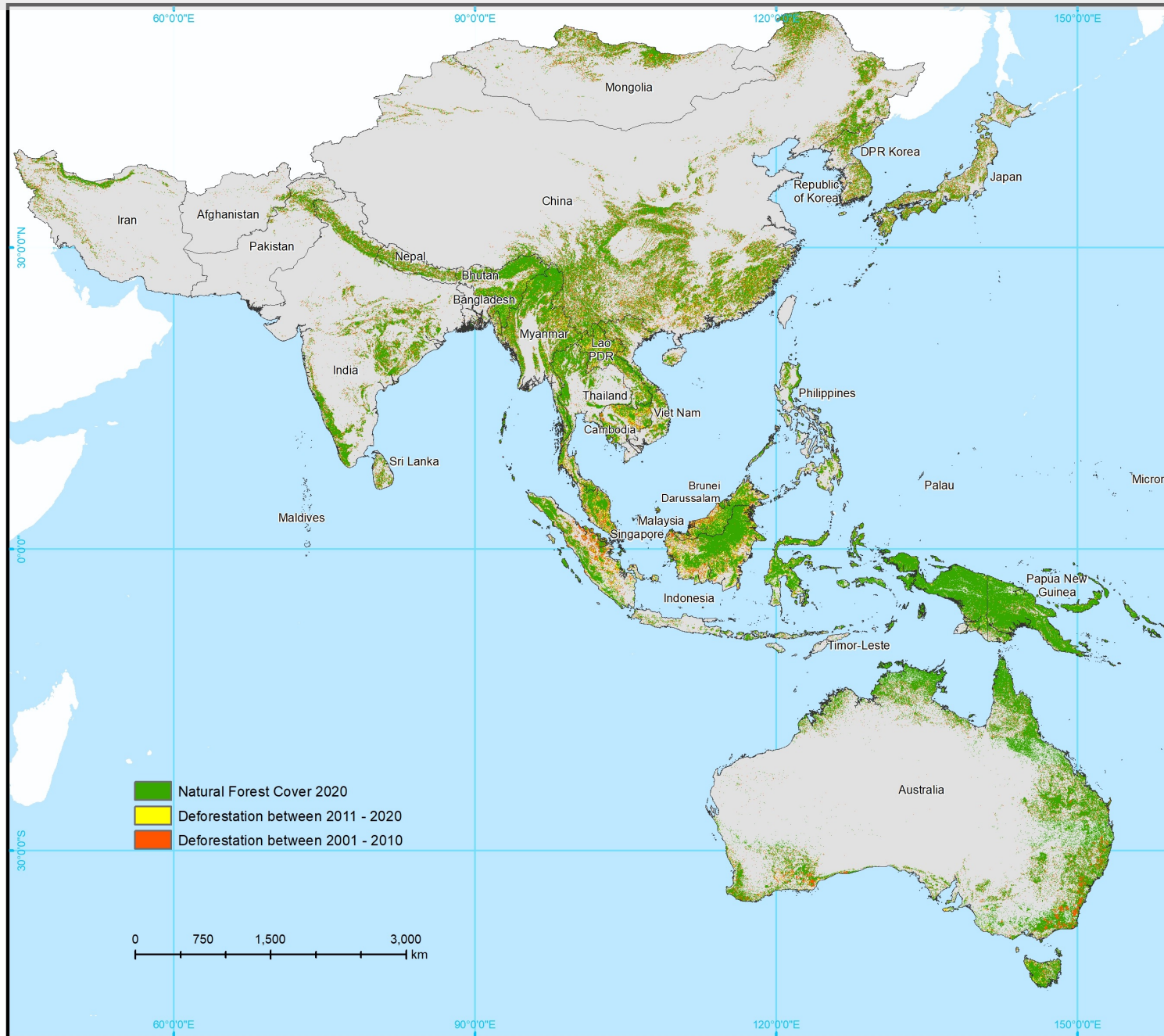
[cifor.org](https://cifor.org)  
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[ForestsTreesAgroforestry.org](https://ForestsTreesAgroforestry.org)



- 1. Historical extent and status of the Primary Forests in the Asia-Pacific region,**
- 2. Diversity of Primary Forest types in Asia and the Pacific,**
- 3. Pressures and threats on Primary Forests, modelling future risks,**
- 4. Governance instruments for Primary Forests conservation in the Asia-Pacific region,**
- 5. Mechanisms and tools for Primary Forests conservation,**
- 6. Recommendations and roadmap for Primary Forest conservation in Asia and the Pacific**

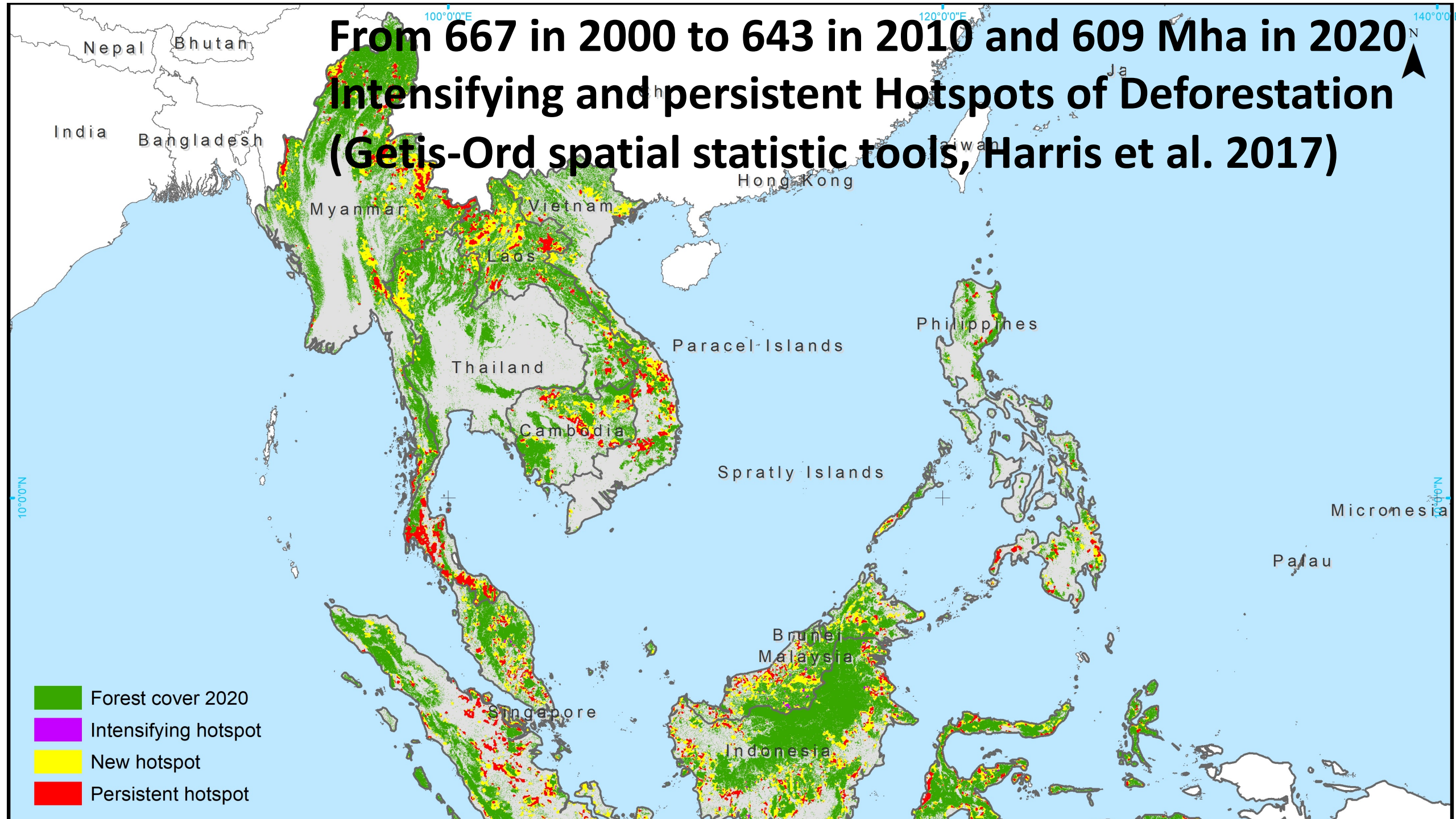


# 1. Historical changes in natural forest cover 2000, 2010 and 2020



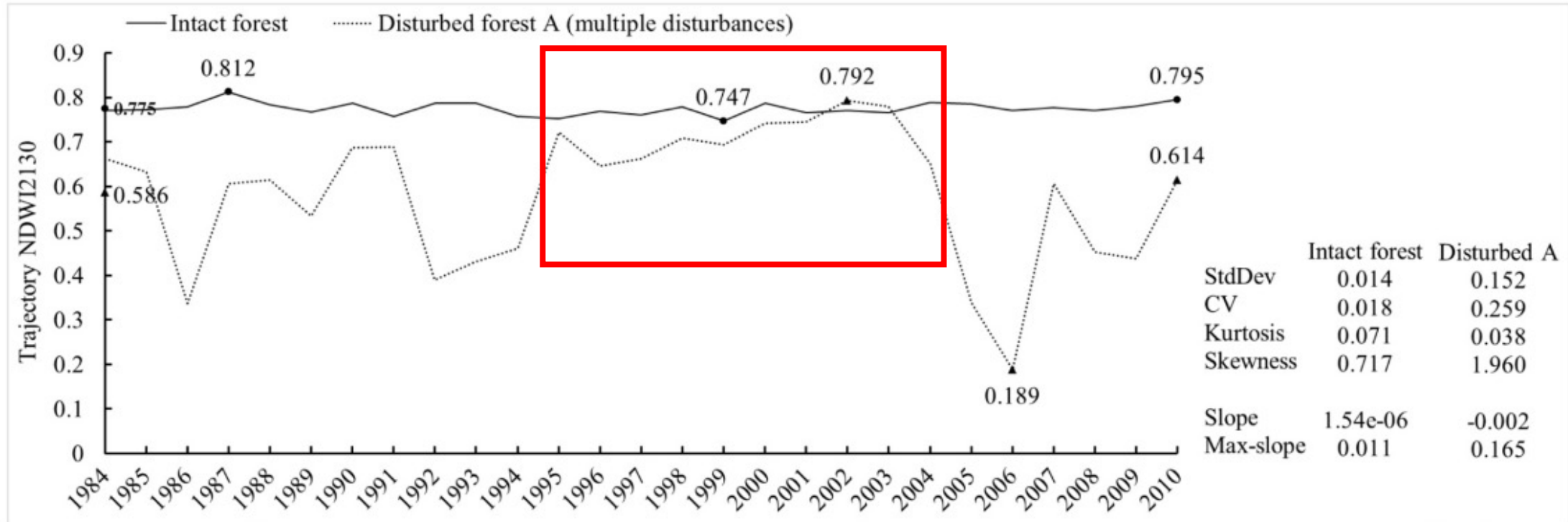
- **FAO definition**
- **Minimal mappable area 1 ha**
- **Forest cover analyzed by Ecological Zone (GEZ-FAO 2010), Humid vs. Seasonal vs. Temperate**
- **In line with the minimal 10% tree cover threshold of the FAO forest definition**
- **Includes logging 2000 - 2020 and old fallow forest  $\geq 20$  yrs old.**

# From 667 in 2000 to 643 in 2010 and 609 Mha in 2020 Intensifying and persistent Hotspots of Deforestation (Getis-Ord spatial statistic tools, Harris et al. 2017)





# Intact forest assessment using Landsat time-series trajectories (adapted from Wang et al. 2019)



- Intact/undisturbed forest tend to have low slope of regression and low standard deviation of the NDWI.
- Forest experiencing large disturbances have higher coefficient of variation than undisturbed forests.

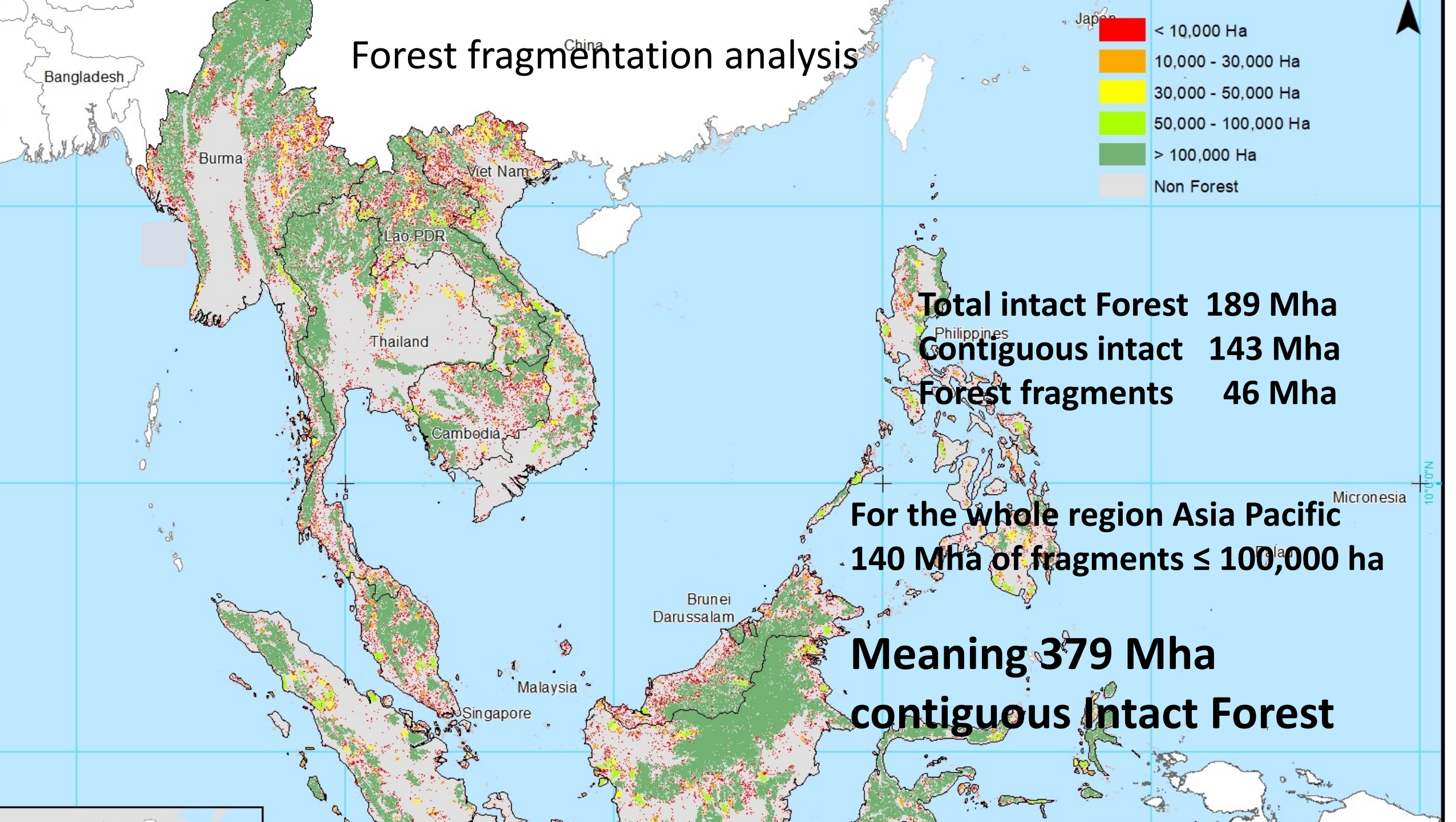
# Intact forests cover 519 million ha in the Asia-Pacific region

## Large intact forest surfaces outside the Protected Area

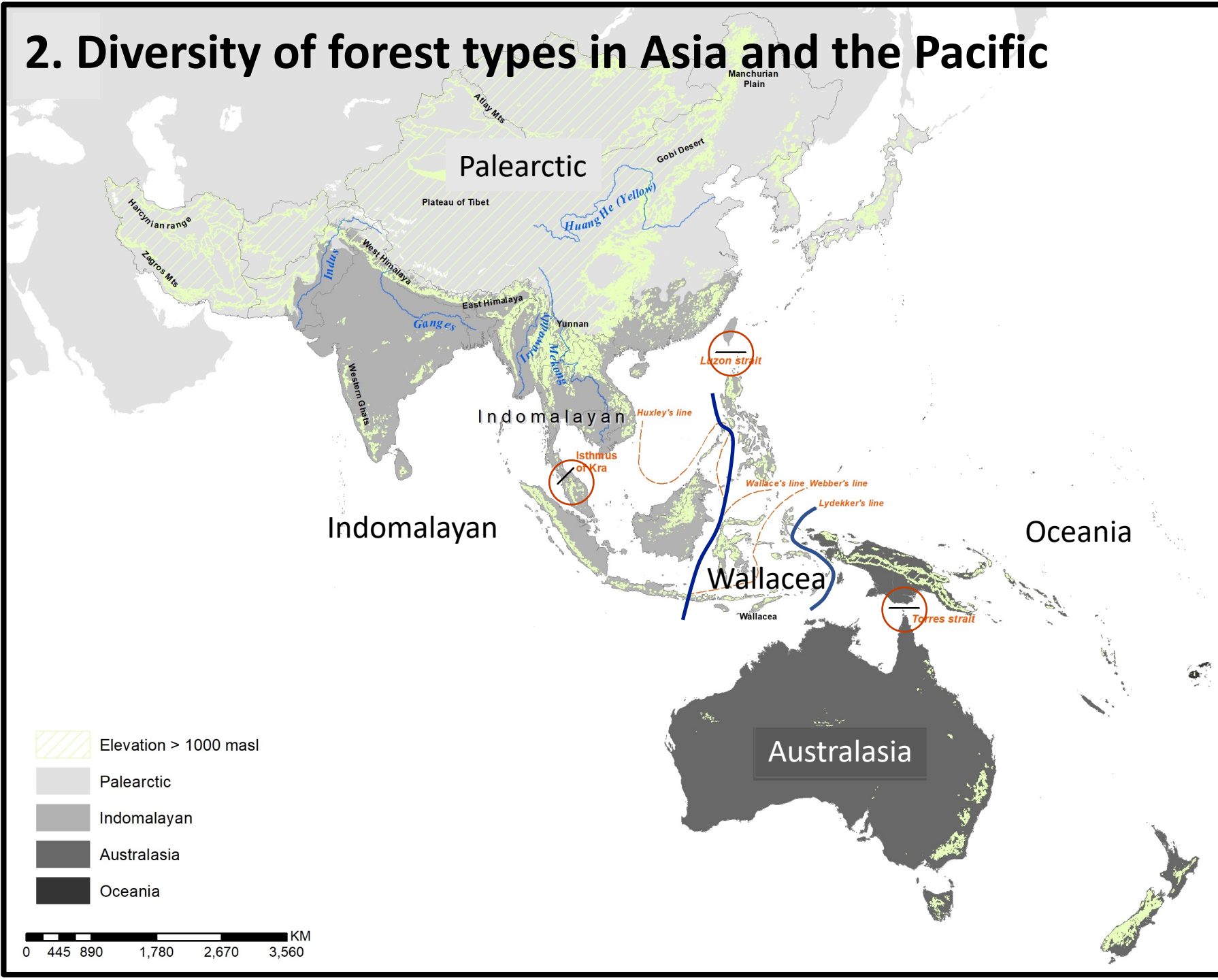




# Forest fragmentation analysis



## 2. Diversity of forest types in Asia and the Pacific

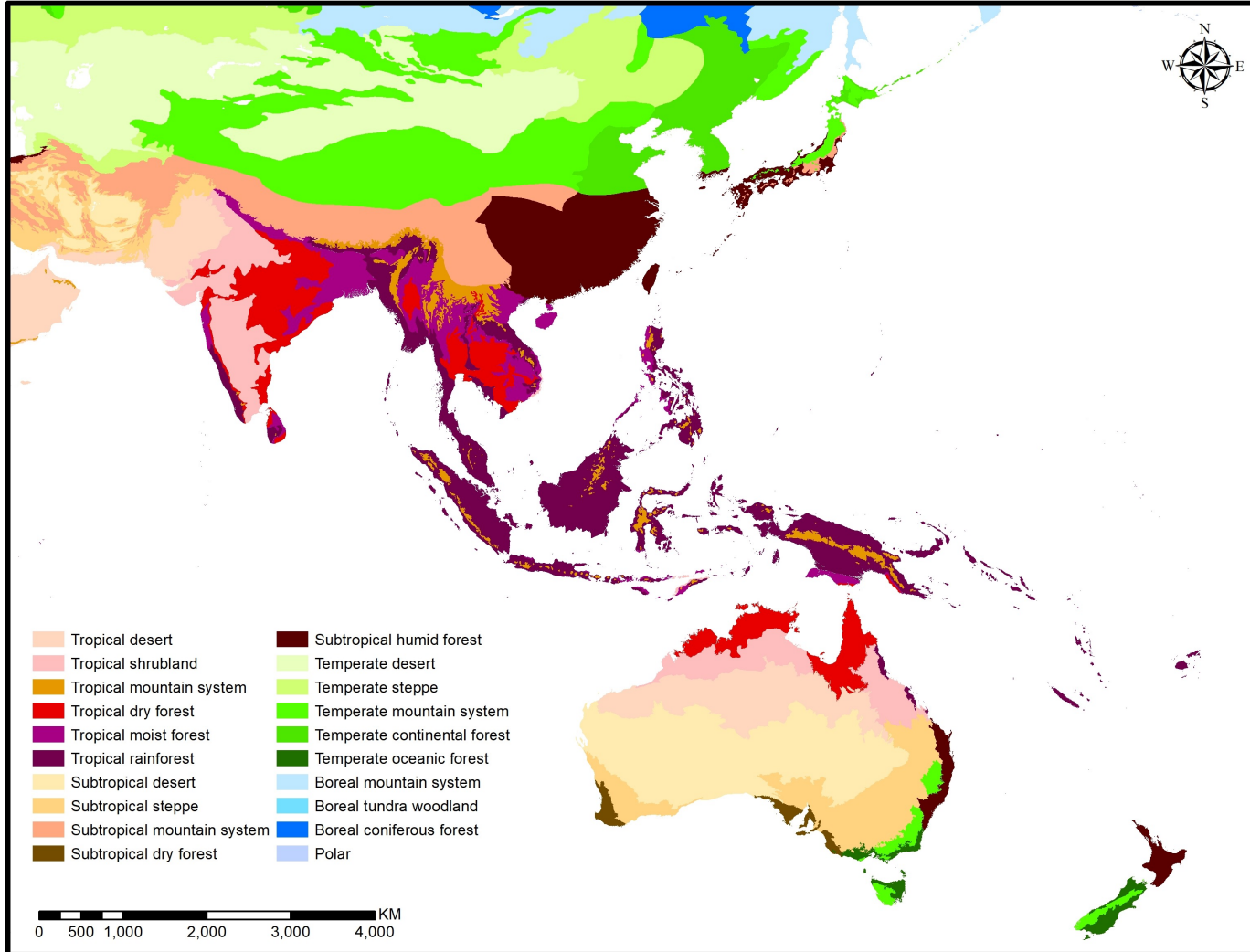


## Cradle of evolution

- 4 biogeographic realms
- 10 biodiversity hotspots
- NW vs. SE Himalaya, Myanmar, Yunnan floristic region
- Sino-Japanese floristic region
- Succession of glacial-interglacial cycles: refugial flora
- Wallacea transition zone between Australasia and SE Asia



# Framework for a finer ecological zoning and mapping of the Asia Pacific Forest formations and types




**UNESCO 1973**

**FAO Global Ecological Zoning (FAO 2010)**

**World Ecosystems (Sayre et al. 2020)**

*“An alternative route for a new FAO Global Ecological Zoning map would be to determine EZs independently of the national or regional maps by using a more objective approach, notably by relying solely on climate and altitude data to delimit zones, taking into account potential vegetation, and vegetation classification” (FAO, 2012)*






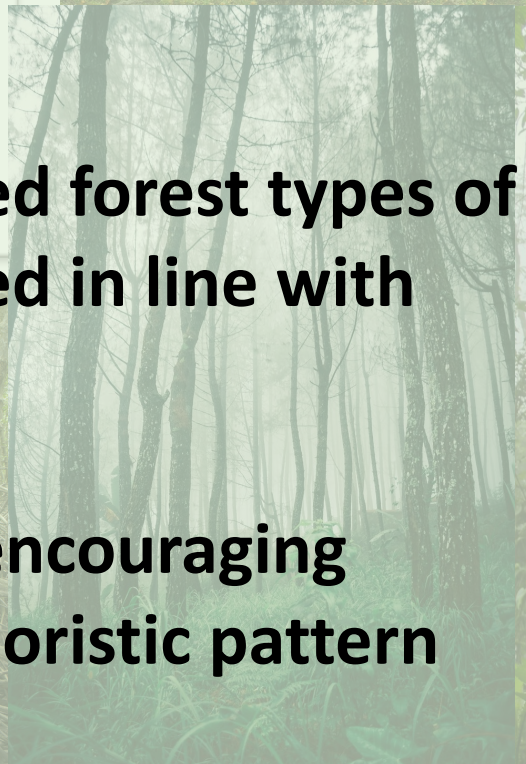


**Building upon existing classifications and knowledge, review the forest formations of the Asia Pacific region and their specificities**

**Classification derived from widely measured, simple parameters: Bioclimates, physiography, elevation, and main substrate**

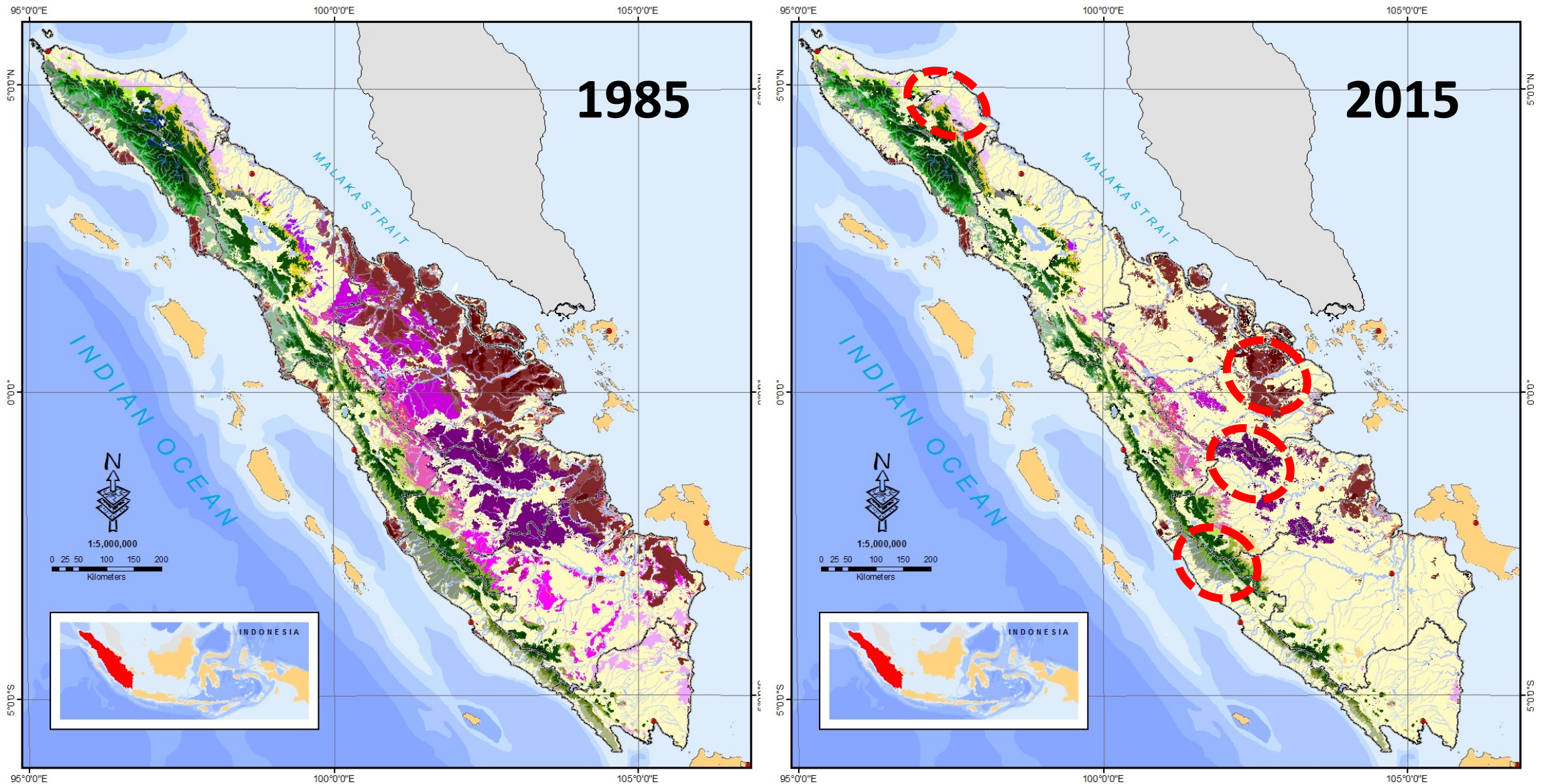
**25 forest formations and related forest types of the Asia-Pacific region identified in line with regional classifications**

**Provide basic information for encouraging further research into the eco-floristic pattern inherent to each forest type.**





# Ecofloristic zoning for conservation priorities in the Asia Pacific



### 3. Increasing pressures and threats on primary forests:



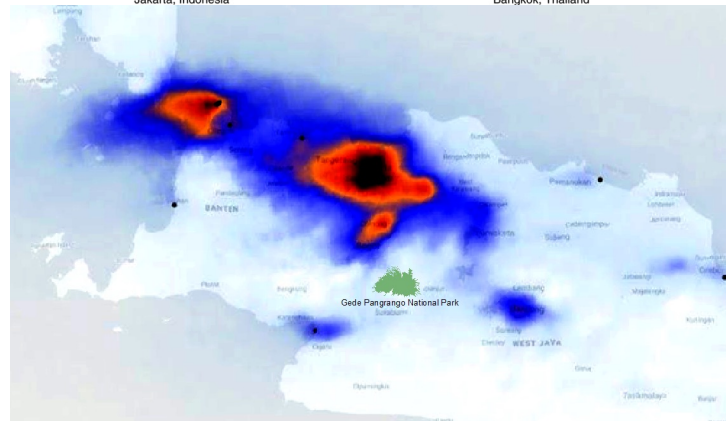
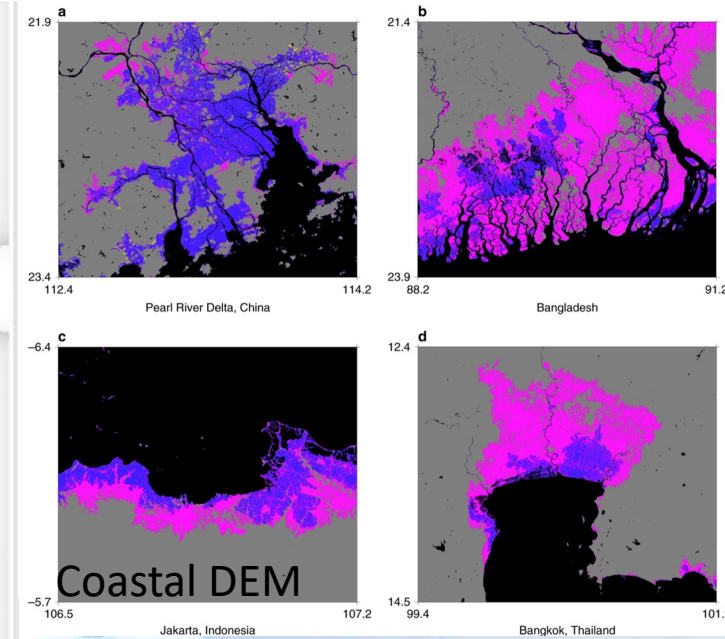
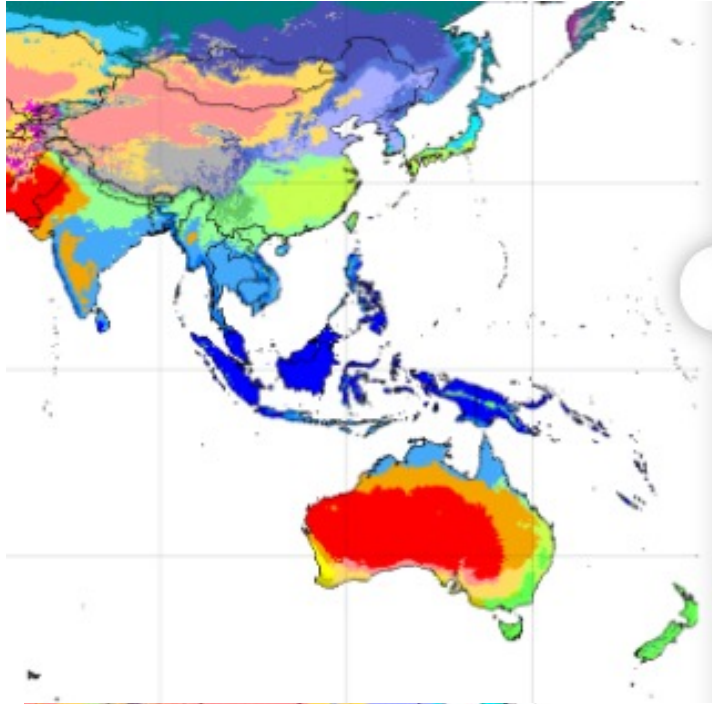
#### Socio-economics drivers

#### Political ecology

- Population growth (4.9 billions 2050)
- Migrations and conflicts
- Globalization and economic growth
- Urbanization and infrastructure development
- Agriculture and planted forest expansion
- Land grabbing and land tenure conflicts, war
- Loss of traditional knowledge and wisdom
- Lack of capacity, policy and regulatory framework



### 3. Increasing pressures and threats on primary forests: biophysical drivers



Köppen-Geiger Climate Classification  
1980–2016 <http://www.gloh2o.org/koppen/>

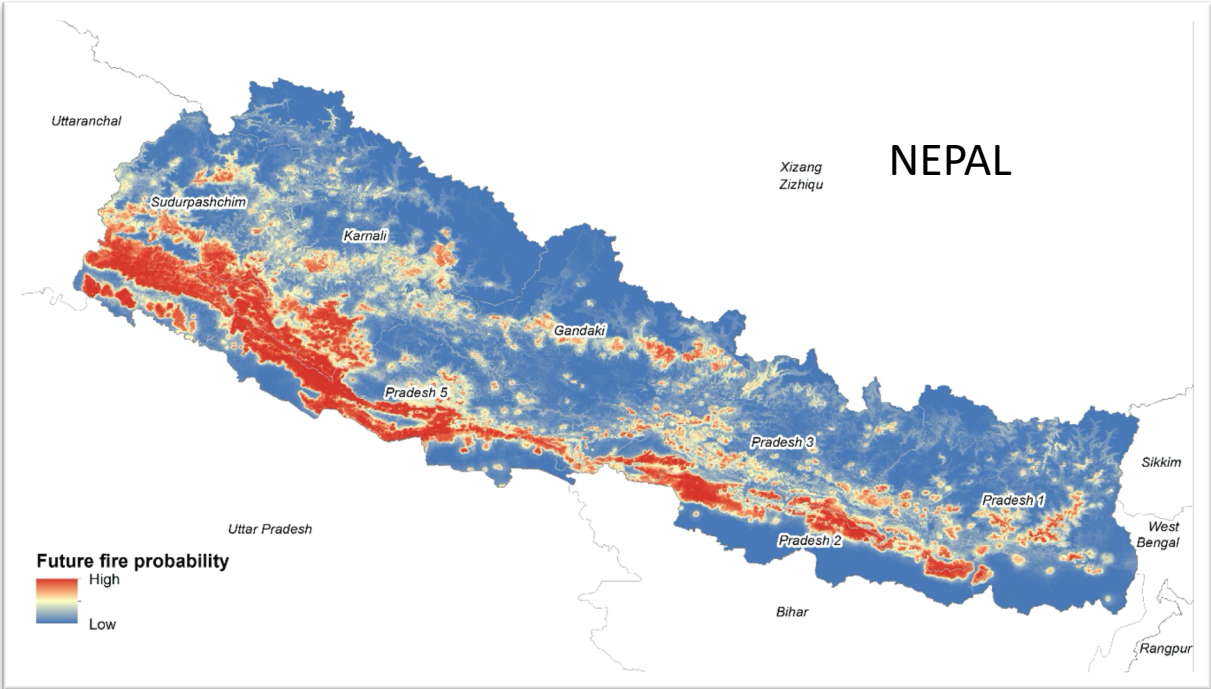
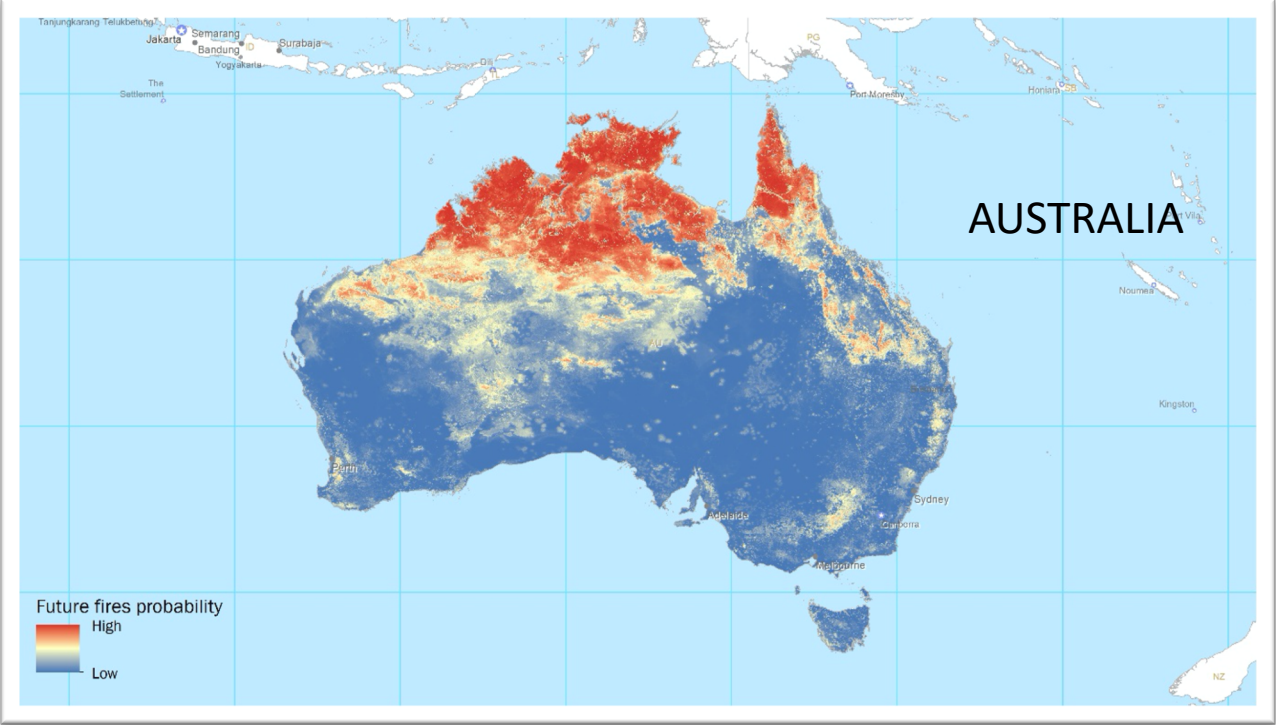


Climate changes  
(temperature, rainfall pattern, sea level rise)  
Fires  
Pollution  
Invasive species

Detecting forest fires with satellites  
(MODIS and VIIRS)

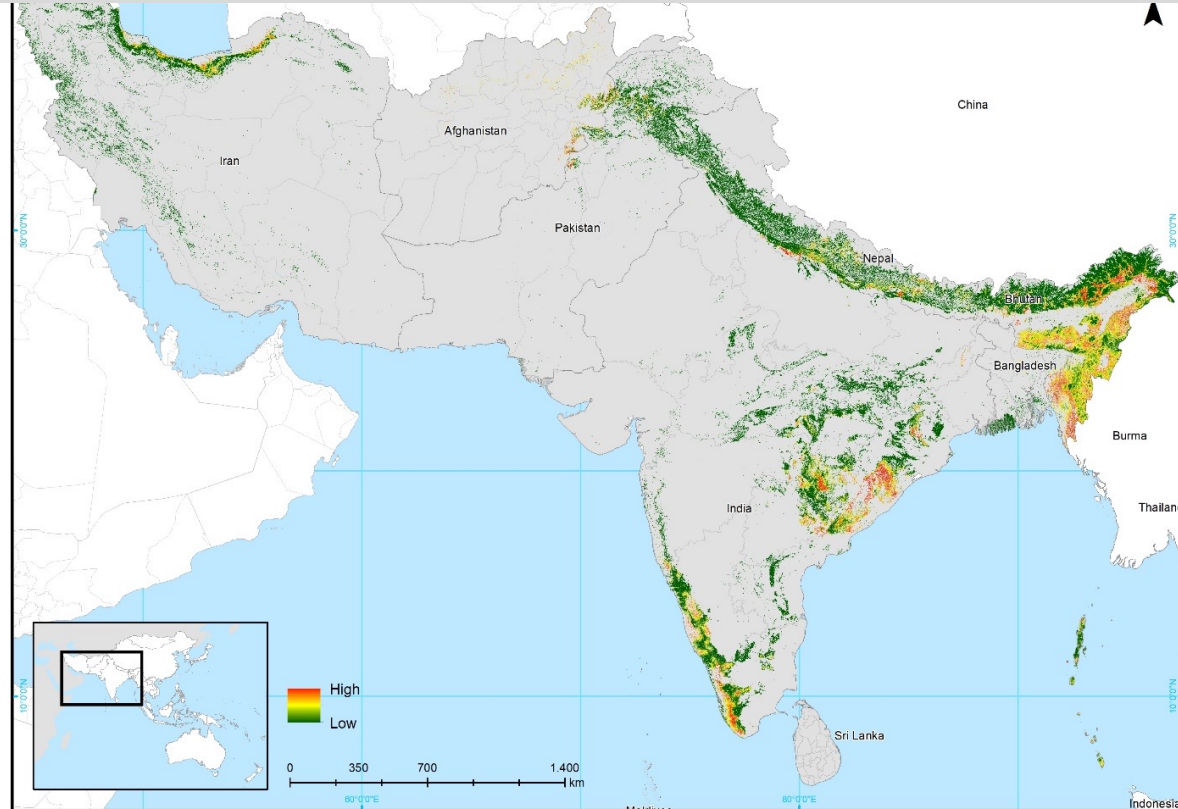


# Fire risk assessment





# Forecasting the primary forest cover in 2050 in Southern and South East Asia



*“forestatrisk”* Python package (Vieilledent, 2021)

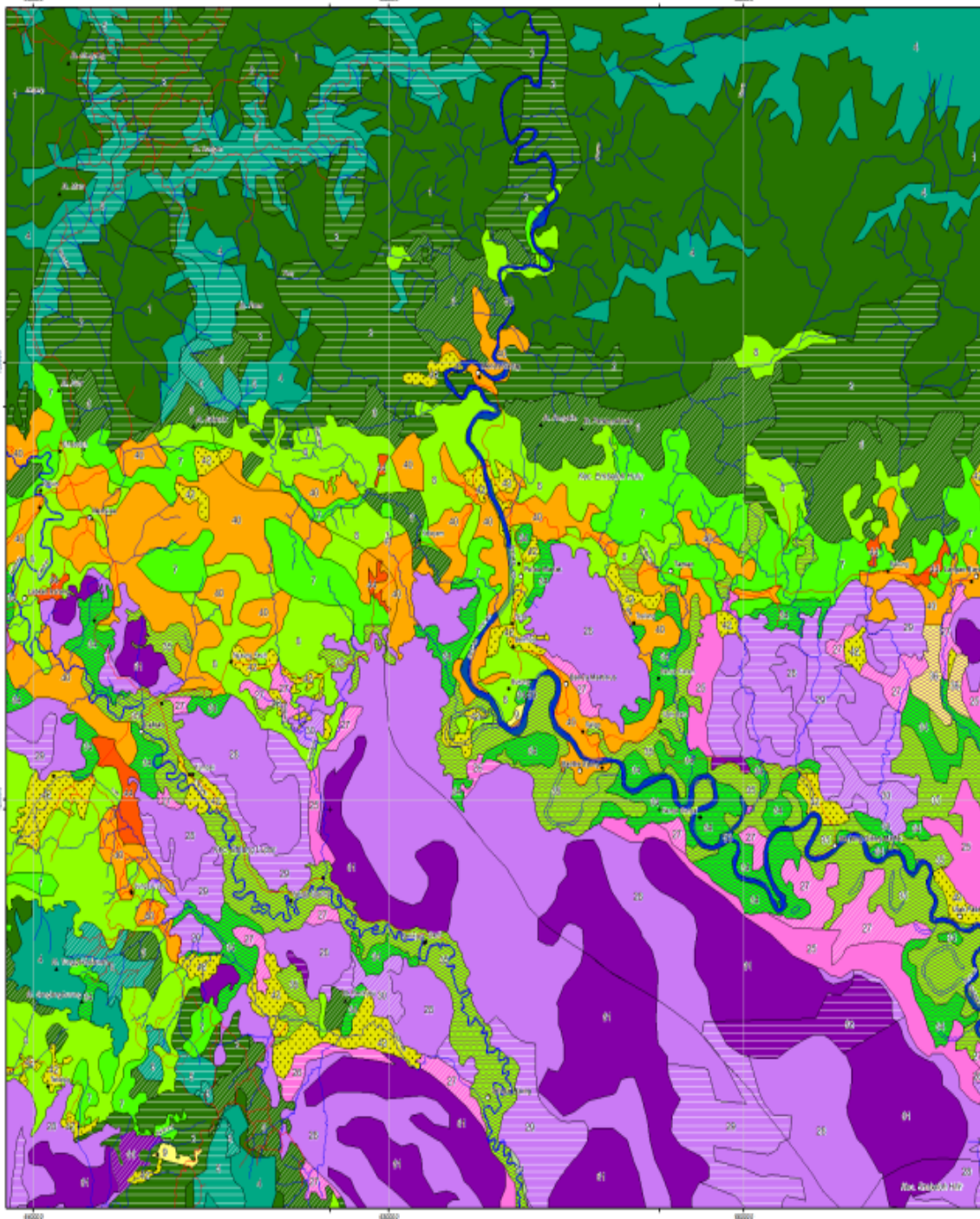


**Intact forest area of the Asia Pacific  
is predicted to decline from 519  
Mha in 2020 to 415 Mha in 2050**

## Among the main conclusions

- There are still important areas of primary forests in the Asia Pacific region
- A large part of these primary forests is not covered by any Protected Area network and represent identified regions for OECMs (**Other effective area-based conservation measures**) concept that IUCN and FAO are developing
- The diversity of forest formations and types in the region is unique, and many specific types of primary forests are particularly threatened by deforestation and degradation
- Lack of knowledge on the floristic variation with forest types, on the distribution of species, and on population dynamics, especially in the tropical zone





## Large-scale ecological vegetation mapping (1:50,000) and related socio-ecological surveys

- New satellite remote sensing platforms
- Very high-resolution sensors
- Sentinel satellites series
- Protocol to initiate at sub-national level analysing rather large area, then zooming into specific with higher resolution, eventually completed by drone surveys
- Easily integrated with SEPAL platform



# Thank you

