# Potensi dan ancaman keanekaragaman hayati Indonesia

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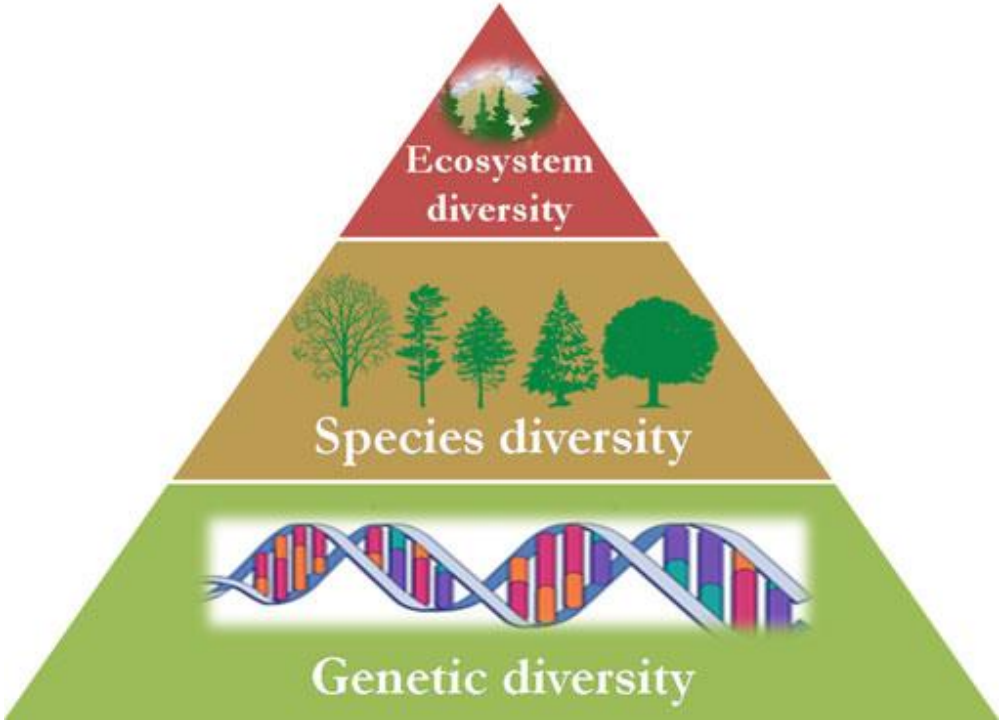
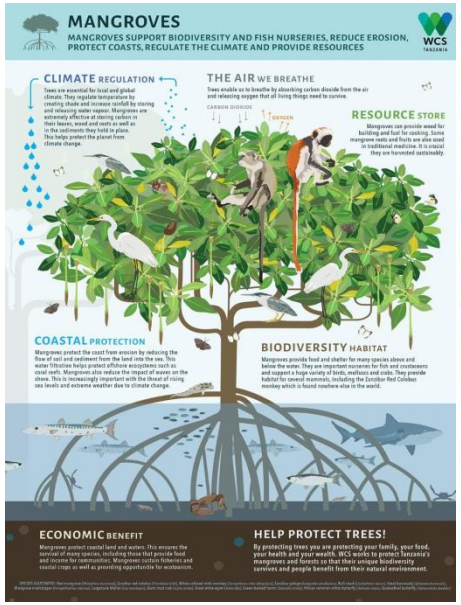
# INDONESIA

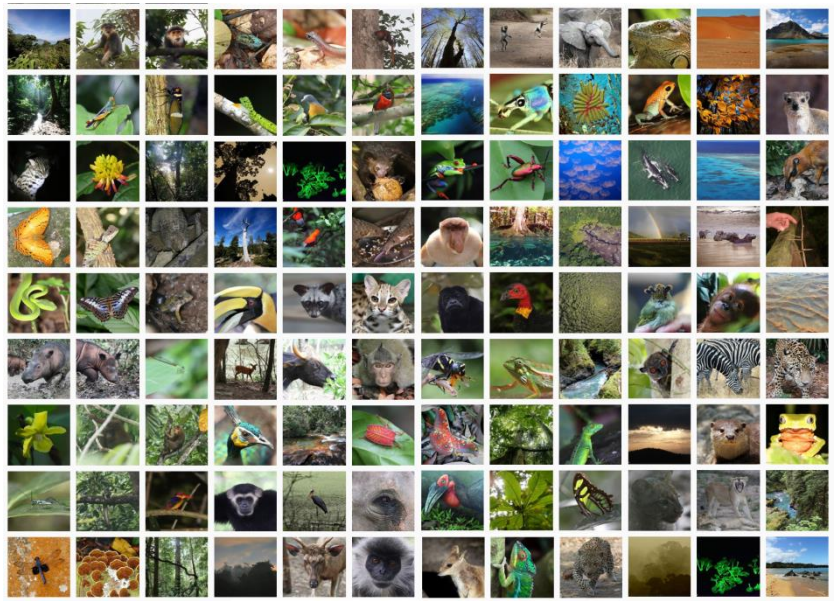
Pusat  keanekaragaman hayati (Biodiversitas).

Peringkat ketiga untuk terestrial biodiversity.

Peringkat pertama jika termasuk marine biodiversity.



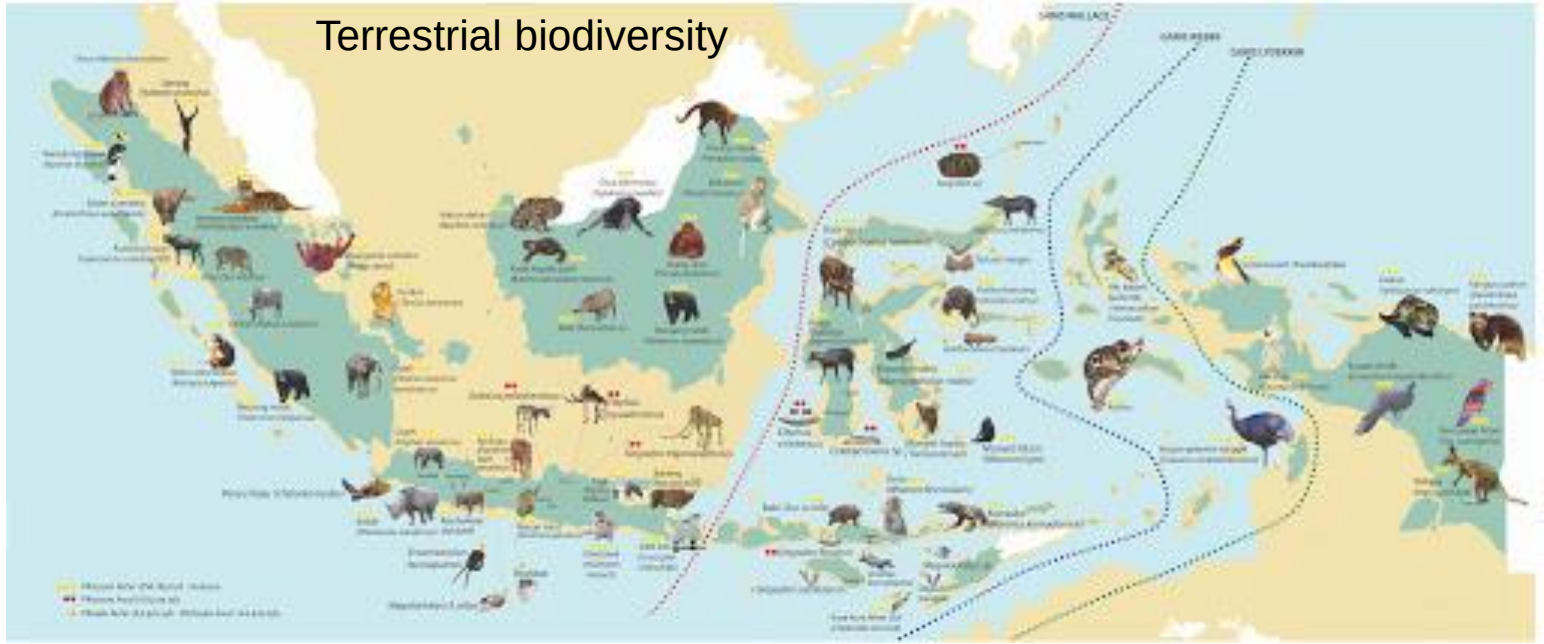



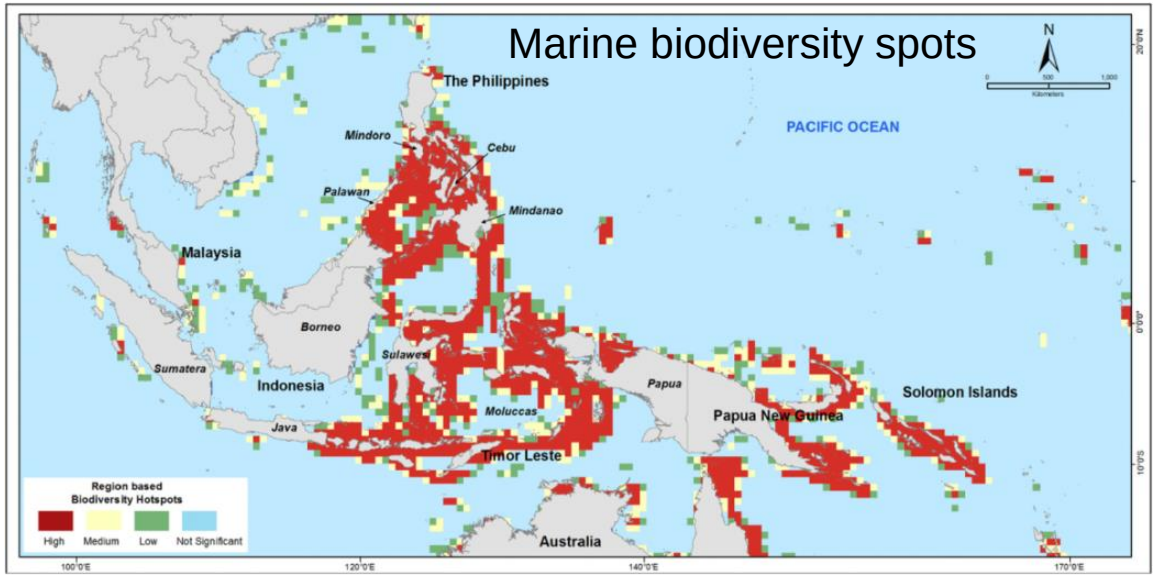



Nonic et al. (2019)

# Keanekaragaman hayati di Indonesia

- 13% Mamalia dunia
- 8% Reptil dunia
- 16% Burung dunia
- 15% Serangga dunia
- 10% Terumbu karang
- 23% Mangrove
- 15% Lamun
- Endemik tinggi e.g. 46% untuk Papua




Roos et al. (2004); Asaad et al. (2018)

# Indonesia negara kepulauan

- Negara kepulauan terbesar di dunia (17.504 pulau) dan 77% adalah pulau kecil.
- Garis pantai terpanjang di dunia (81.000 km).
- Maluku adalah provinsi kepulauan terbesar di Indonesia (92% laut, 1.340 pulau kecil).





Kastanya (2016): DOI:10.30598/jhppk.2016.1.1.1

# Mengapa biodiversitas penting?

- Penting untuk kualitas dan keseimbangan hidup.
- Sumber kehidupan: pangan, energi, air bersih, obat-obat, adat dan budaya, kesehatan mental.
- Modal / aset penting untuk pembangunan berkelanjutan.

*Diperkirakan sekitar 40 juta orang Indonesia tinggal di pedesaan dan bergantung pada keanekaragaman hayati –CBD*

# Potensi keanekaragaman hayati

❖ Bioproducts ← Bioprospection

JAMU

OBAT HERBAL TERSTANDAR

FITOFARMAKA


“IMMUNOCOV-19”

PANDEMIC COVID-19



❖ Bioeconomy

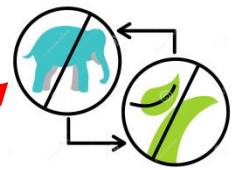
Ecotourism

ECOSYSTEM SERVICES

Image GPS Global Program on Sustainability

UNDP BIOFIN THE BIODIVERSITY FINANCE INITIATIVE

# Ancaman / tantangan keanekaragaman hayati

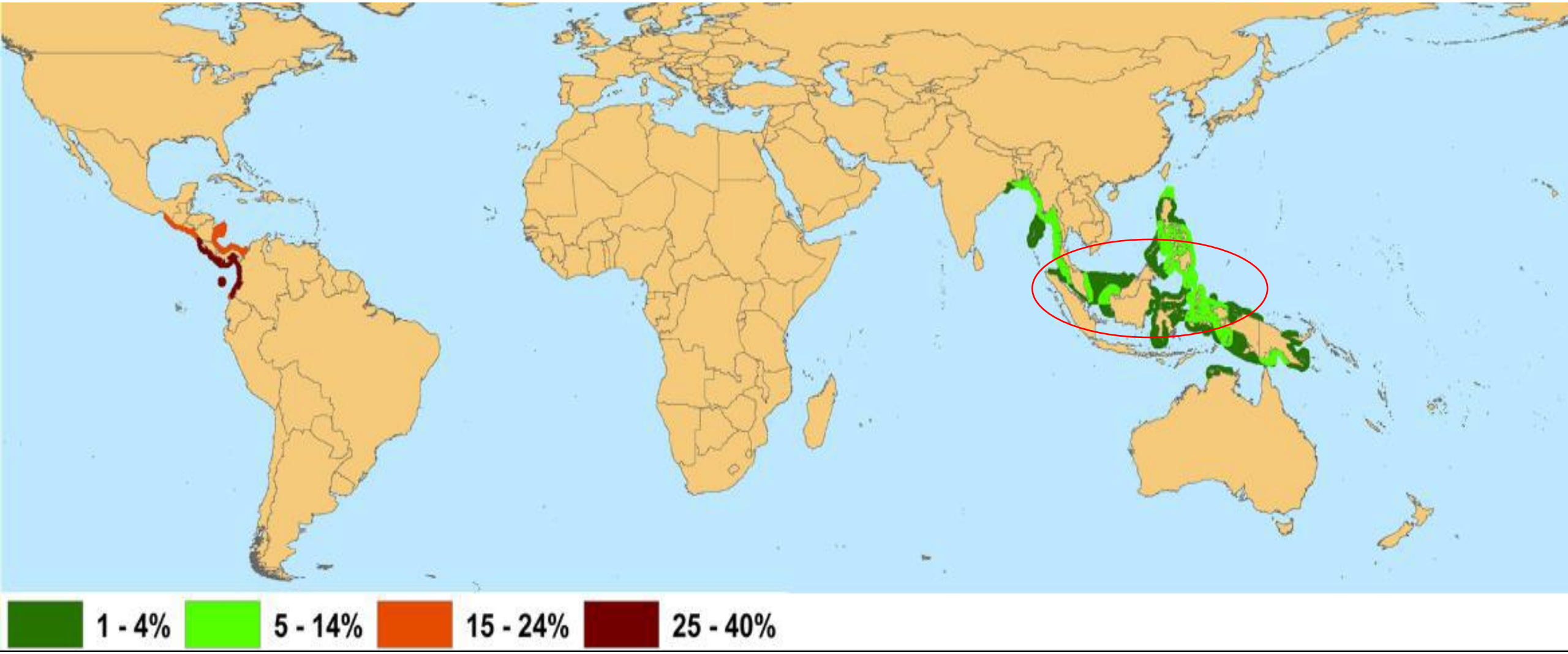
Biodiversity loss

Habitat destruction

Pollution (plastic, oil, etc.)

Climate change

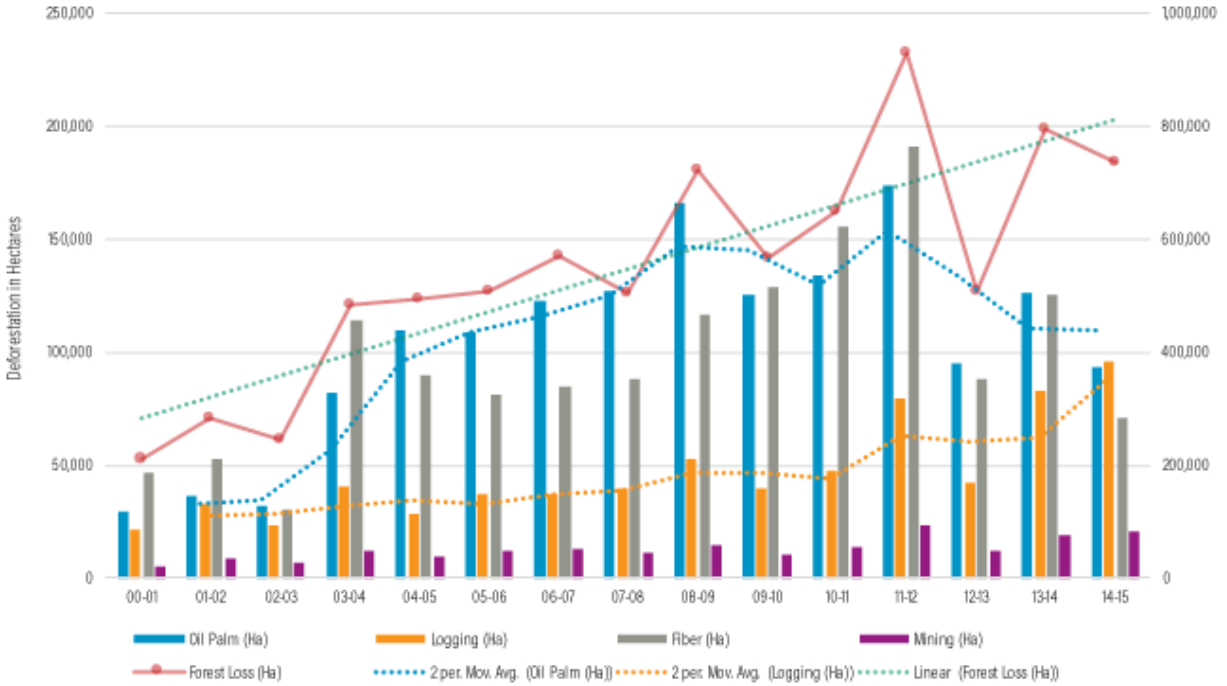
# Biodiversity decline



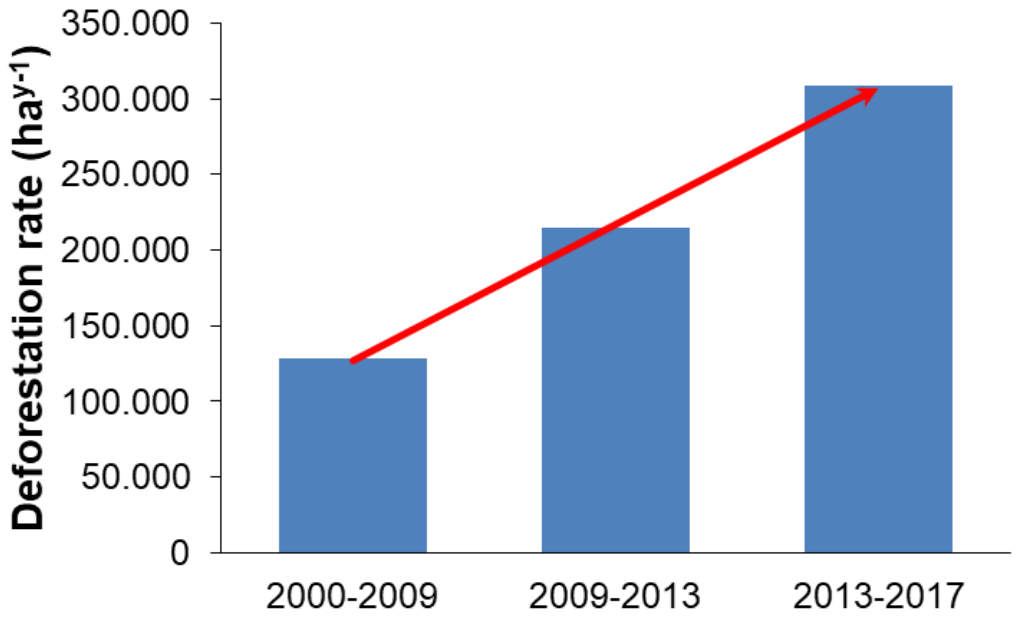

Polidoro et al (2010)

# Habitat loss

- Forest loss in Indonesia 2002-2018: 17%
- Deforestation rate in Indonesia: 1,692,221$^{y-1}$




- Deforestasi bergeser ke wilayah timur Indonesia
- Annual deforestation rate in last two decades: **217,403** (200-2009)
- Luas hutan di Maluku dan Papua (37,8 juta ha)

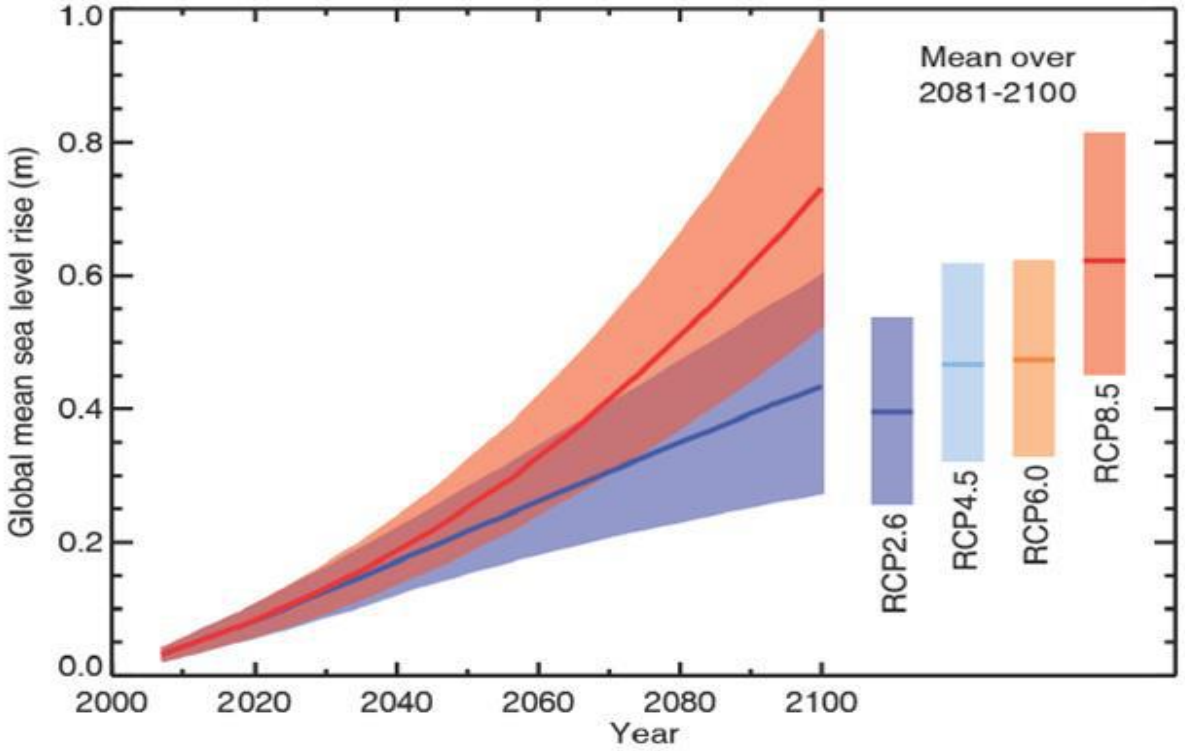


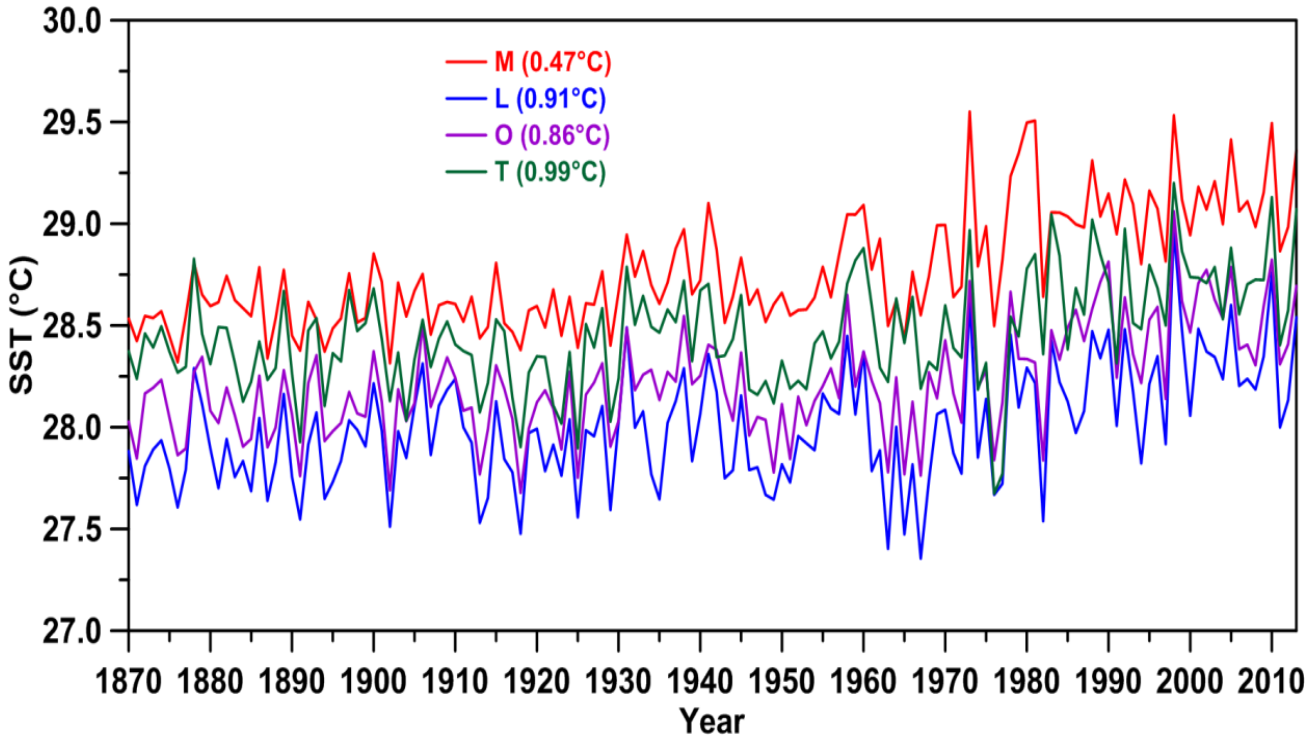

FWI (2020), WRI (2016); Mongabay (2020)

# Climate change (Sea level rise and temperature)

- Sea level increased by 1–8 $mm^{-y}$

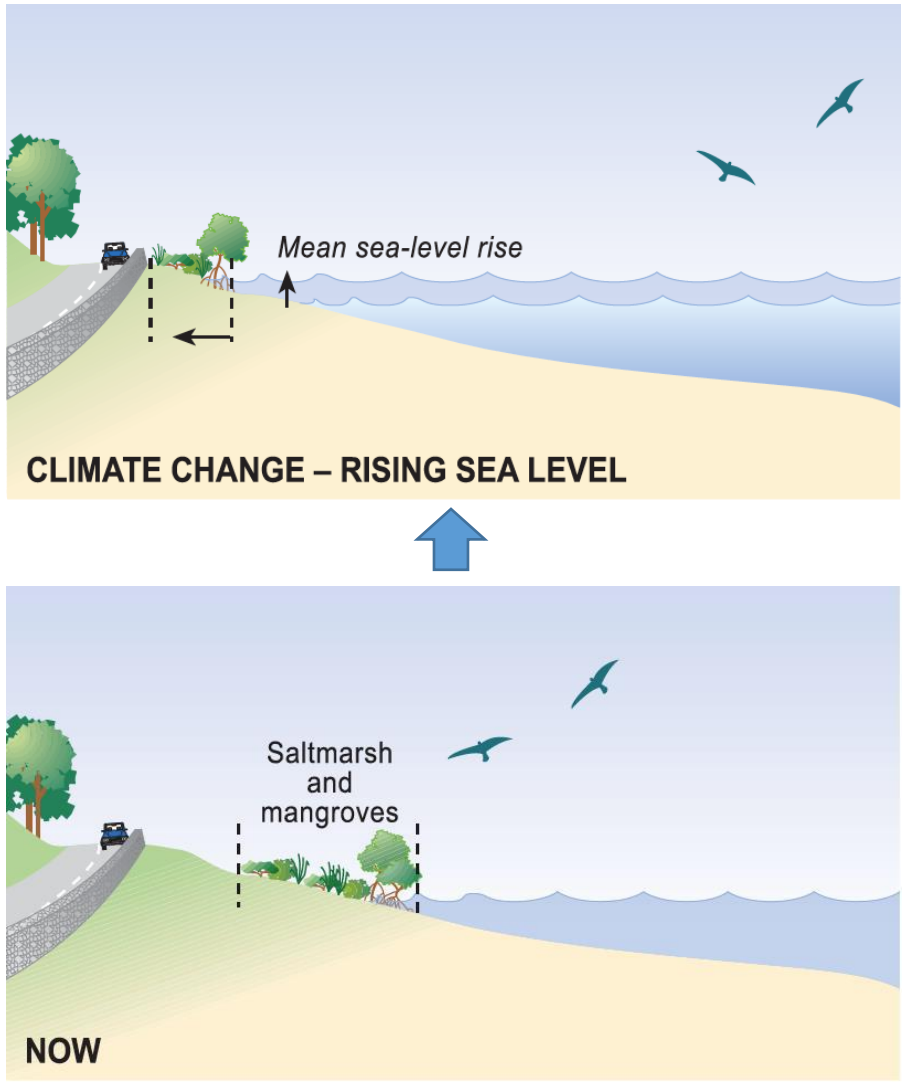
- Sea surface temperature increased by 0.47-0.99ºC



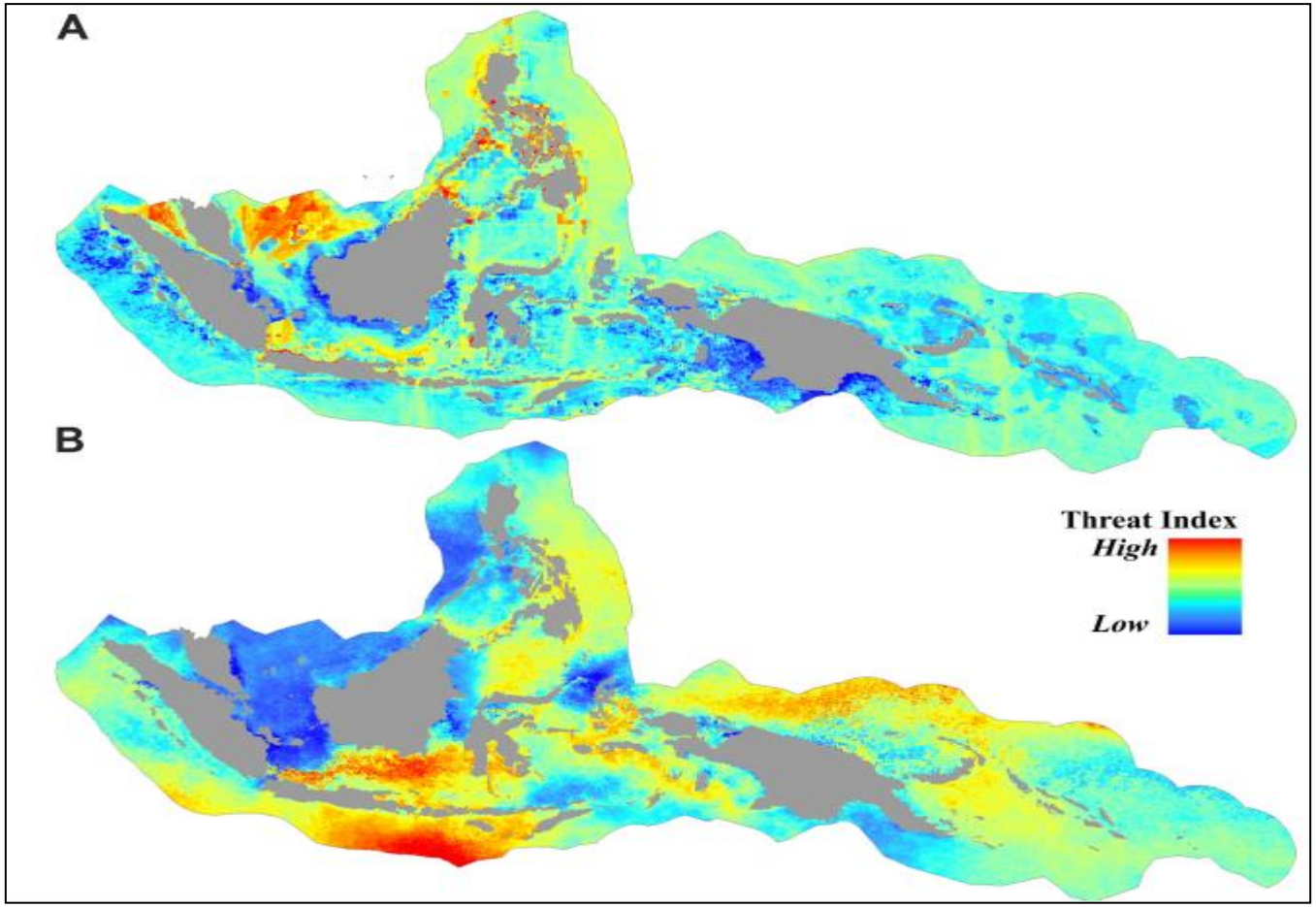




Church et al. 2011, Manjunatha et al., (2015), Foster et al (2011), Marfai & King (2008)

## Habitat inundation



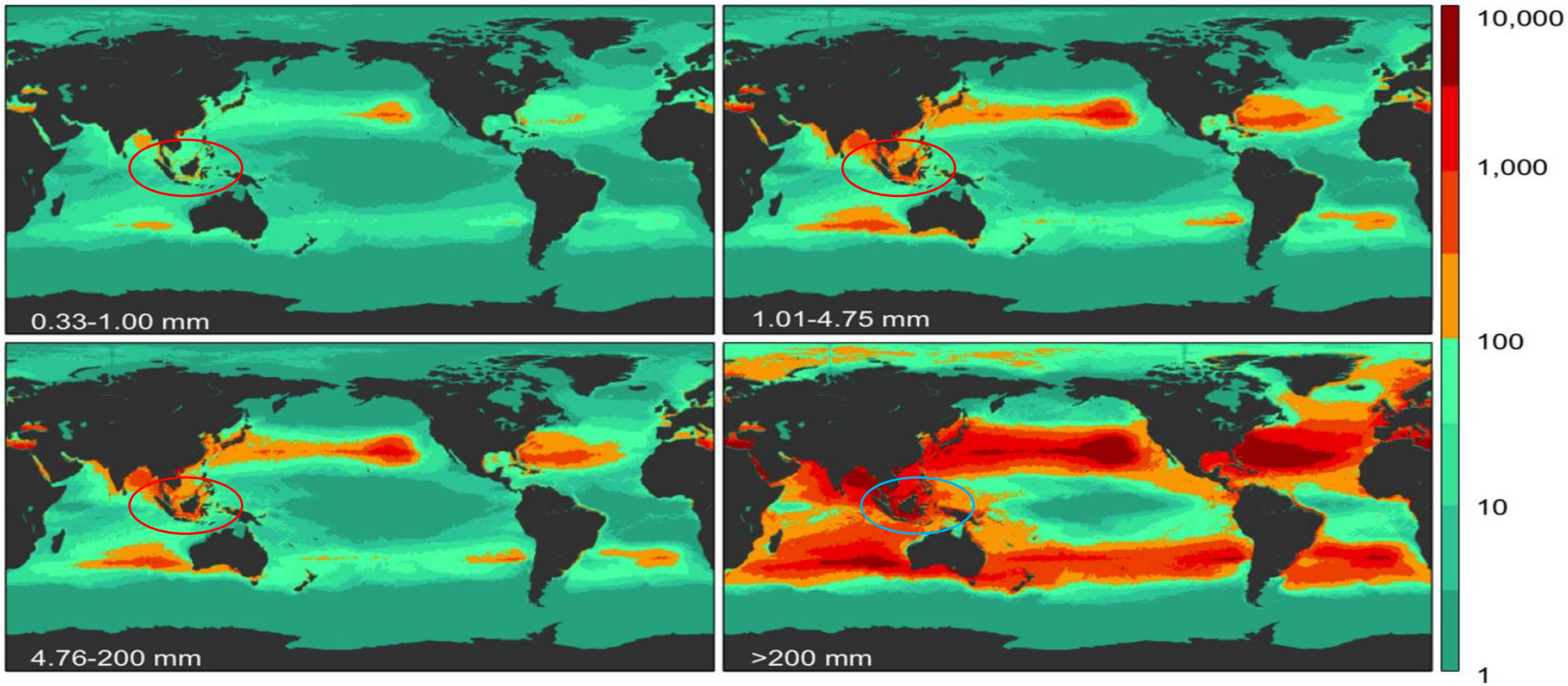

## Spatial distribution of threats from (A) anthropogenic pressures and (B) sea surface thermal stress



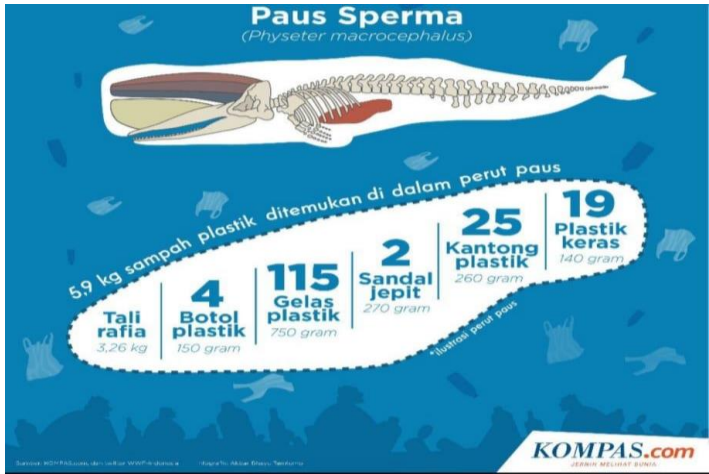

Asaad et al (2018), Adams (2011)

# Plastic polution

About 268,940 tons of plastic are currently floating at sea



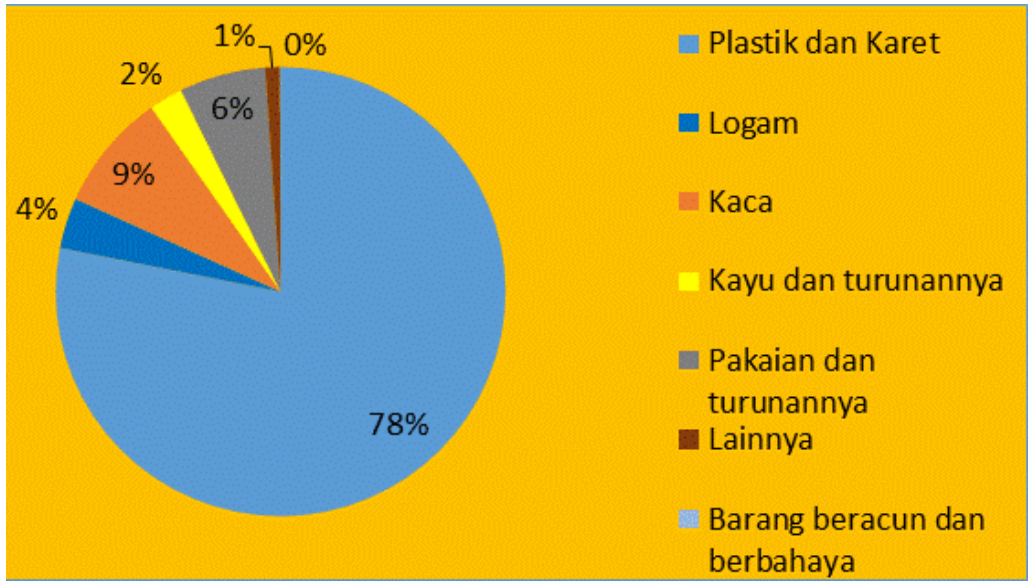




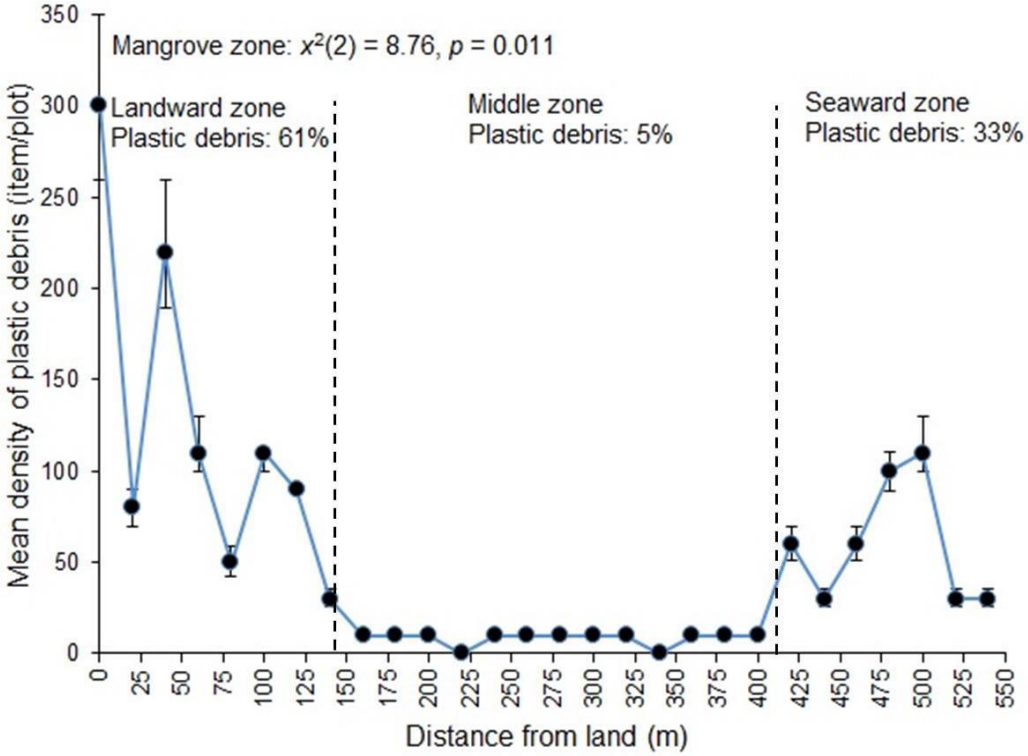

Eriksen et al (2014): DOI:10.1371/journal.pone.0111913

# Plastic pollution in Maluku

- Sekitar 38% sampah di Kota Ambon masuk ke lingkungan atau dibakar.
- Kerapatan sampah di Teluk Ambon mencapai 92 item per m².
- Dibanding tahun 1995 rata-rata jumlah sampah di Teluk Ambon meningkat.






Suyadi & Manulang (2020), Suyadi & Manulang (2019)

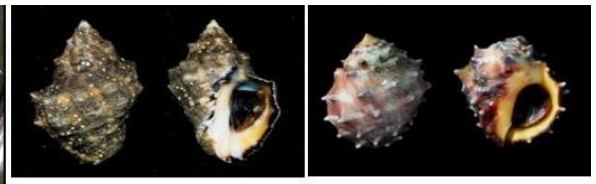
# Dampak pencemaran plastik

| Kelompok spesies | Jumlah total spesies | Jumlah spesies terkontaminasi plastik | |
|---|---|---|---|
| | | 1997 | 2012 |
| Mamalia laut | 115 | 26 (23%) | 30 (26%) |
| Ikan | 16.754 | 33 (0.20%) | 41 (0.24%) |
| Burung laut | 312 | 111 (36%) | 119 (38%) |
| Penyu | 7 | 6 (86%) | 6 (86%) |

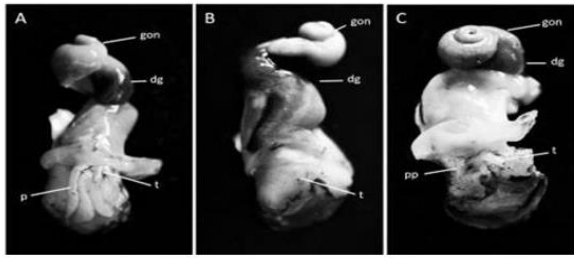
CBD (2012)

## Kontaminasi plastik di tuna dan reproduksi moluska

Plastik di dalam organ pencernaan tuna

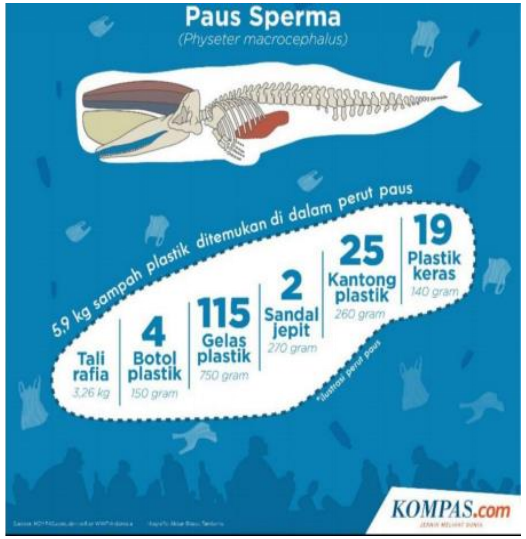


*Tylothais aculeate* *Thais mancinella*




Kelainan organ reproduksi moluska

## Kontaminasi plastik di paus sperma

# Land-based stressor in Maluku



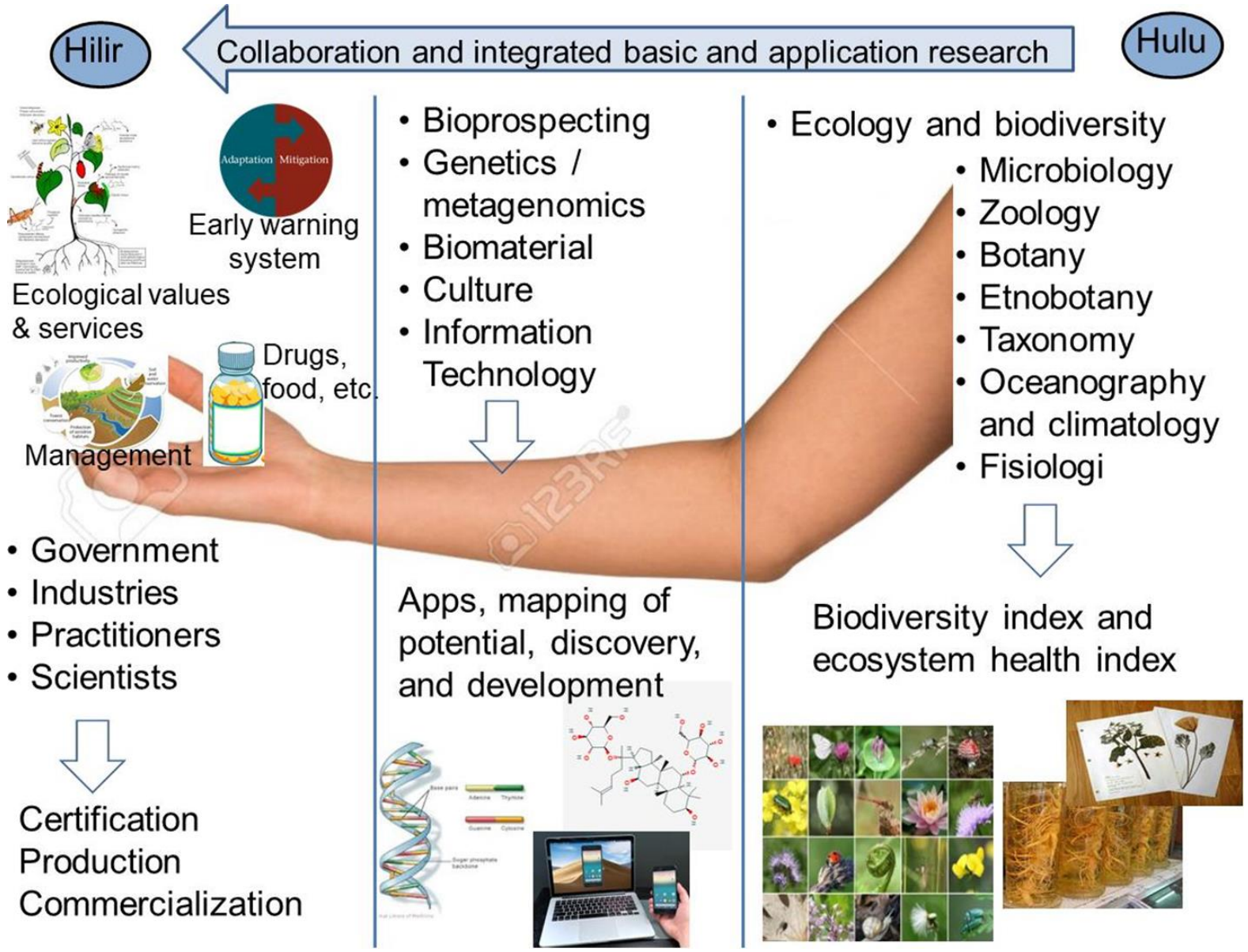
Suyadi et al (2013),

# Research challenges


1. Research are conducted at single sites (small scale of measurement)
2. Limited long term systematic and integrated monitoring
3. Ineffective and inefficient research (overlap & less novelty)
4. Potential to Contribution
5. Poor data / Partial data of biodiversity
6. Bridging basic science and application / hulu – hilir
7. Number of scientists 90: 1 million (< Malaysia & Singapore)
8. Limited  audients of publication → Low public participation

# We need

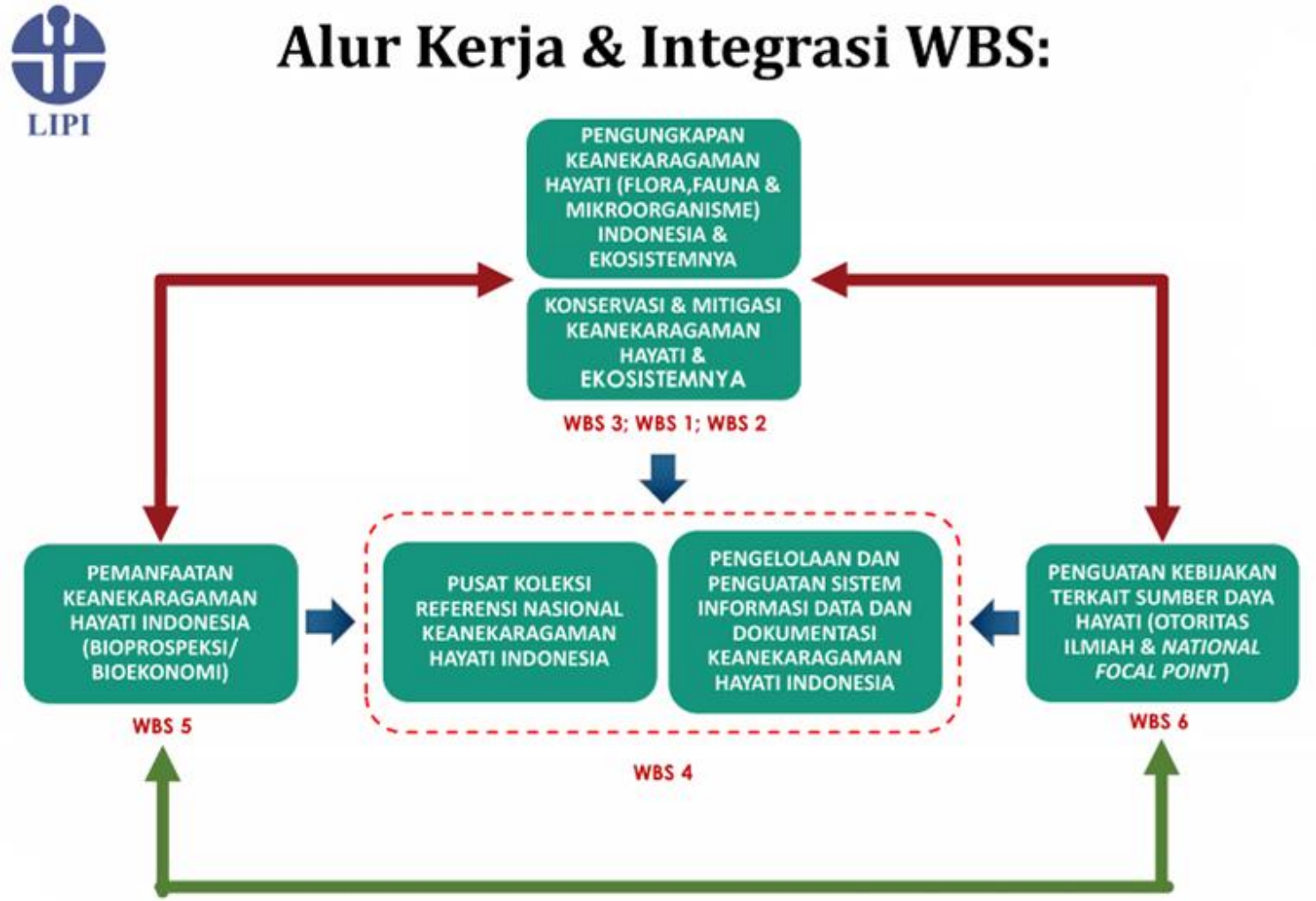
- **User / Consumer based research**
- **E3D approaches:** Explore / Discover → Development → Deliver
- **KIS:** Koordinasi, Integrasi, dan Sinergi



# Pohon Iptekin Keanekaragaan Hayati

**Work Breakdown Structure (WBS)**

1. Peningkatan populasi spesies terancam punah di habitat ex-situ dan insitu;
2. Konservasi Ex-situ dan insitu tumbuhan terancam kepunahan Indonesia;
3. Pengungkapan dan pemetaan biodiversitas nusantara;
4. Depositori dan informasi koleksi referensi dan barcoding Kehati Indonesia;
5. Pemanfaatan Kehati Indonesia (Bioprospeksi & Bioekonomi);
6. Regulasi kelembagaan dan capacity building Kehati.



# Solusi teknis untuk riset nasional

Ecosystem **monitoring and assessment (ECOMA)**

Biodiversity exploration (**discovery**) and **potential mapping (BIOMAP)**

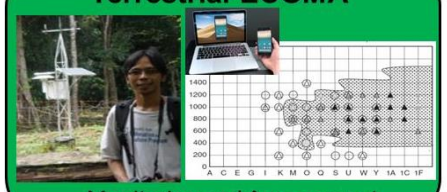
**Save (Conservation)**

**Use (Sustainably)**

**Coastal-ECOMA**

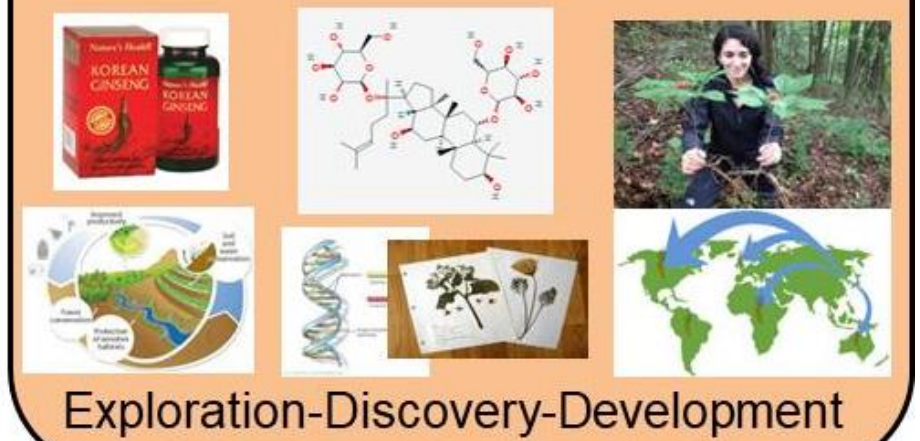

Monitoring and Assessment

**Terrestrial-ECOMA**



Monitoring and Assessment

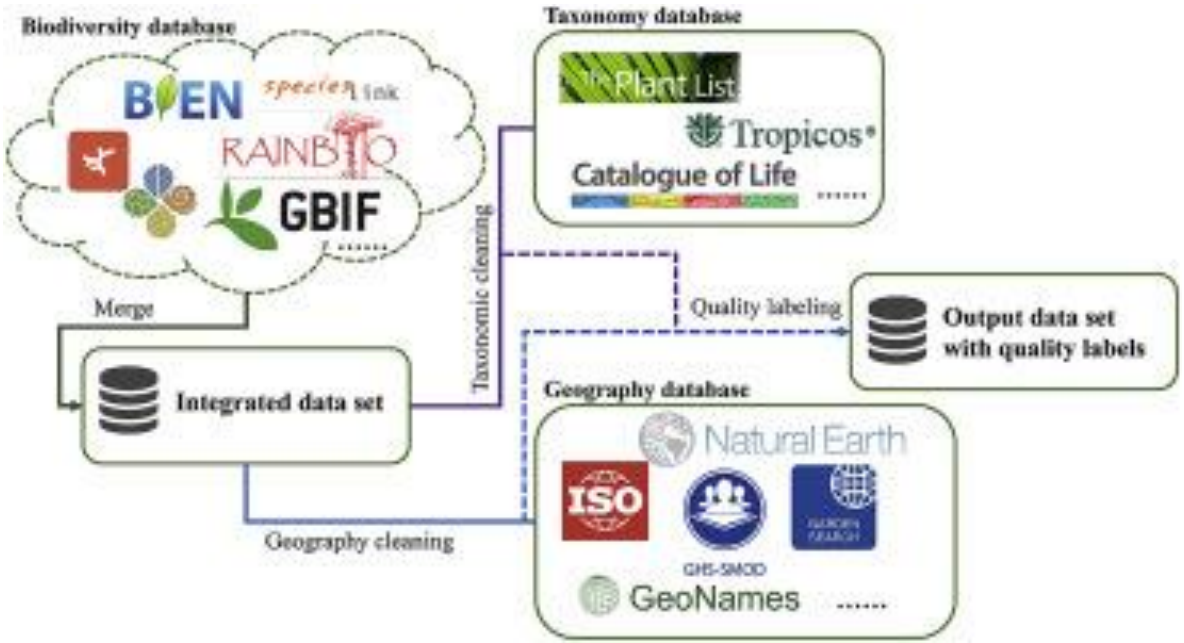
**BIOMAP**




Exploration-Discovery-Development

# Solusi teknis untuk data biodiversitas nusantara

**Nusantara Biodiversity Database (NBD)**

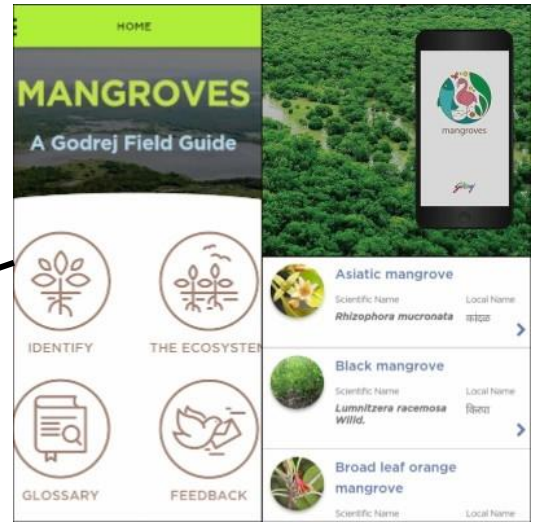


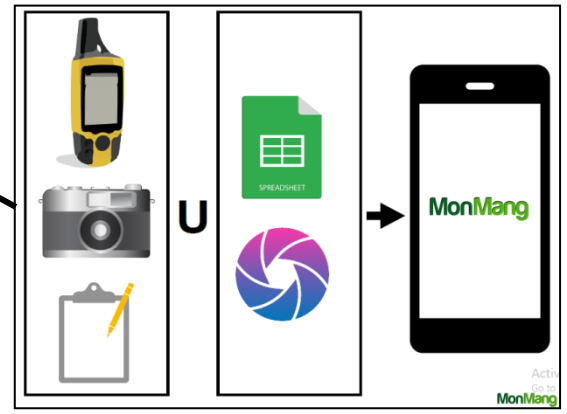

- Data services
- Biodiversity management
- Natural product development
- Regulation
- Conservation

# Solusi teknis untuk critical mass SDM

- Menambah jumlah peneliti
- Citizen scientists





# Solusi teknis untuk diseminasi hasil riset

## Diversifikasi publikasi


Citizen jurnalistik


TV / Radio show

Film dokumenter

Jurnal ilmiah

# Daftar pustaka


Adams (2011). *Impacts of climate change on coastal ecosystems*

Asaad et al. (2018): DOI.org/10.1016/j.biocon.2018.03.037

CBD (2012). *Impacts of microplastic in marine fauna*

Eriksen et al. (2014): DOI:10.1371/journal.pone.0111913

Foster et al. (2011): DOI 10.1007/s10113-011-0226-9

Gross, M. (2015). *Deep-sea in deep trouble?*

Manjunatha et al. (2015). *Anomalies of the sea surface temperature in the Indonesian Throughflow Regions*

Marfai & King (2008): DOI 10.1007/s00254-007-0906-4

Nonic et al (2019) DOI 10.1007/978-3-319-71065-5_53-1

Roos, et al. (2004). *Species diversity and endemism of five major Malesian islands: diversity-area relationships*.

Smith et al. (2009): DOI.10.1073pnas.0908322106

Suyadi & Manulang (2019) Konservasi sumber daya hayati laut tantangan dan pengelolaan.

Suyadi & Manulang (2020), DOI. 10.1016/j.marpolbul.2020.111642

Documentary movie

**Pelindung Pantai Amboina (The Guardian of Amboina)**

Part 1: https://www.youtube.com/watch?v=2v1dKq2u0Ec

Part 2: https://www.youtube.com/watch?v=QlVL8usQVds

Part 3: https://www.youtube.com/watch?v=GIfbM_7MLbc

# Dangke