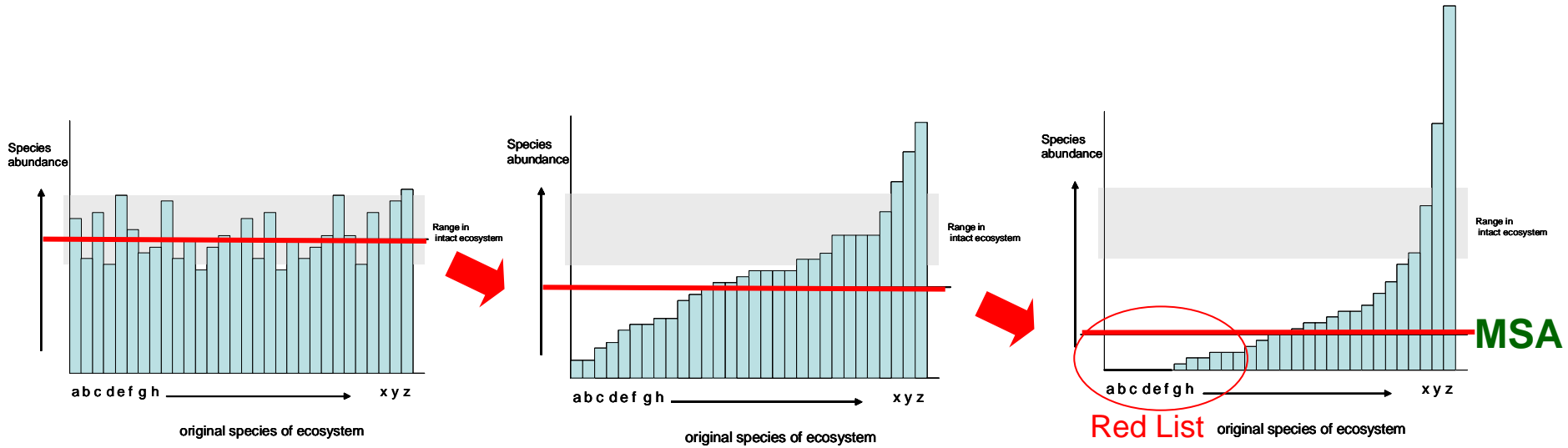


In search towards  
suitable biodiversity indicators

# A schematic picture of biodiversity loss



# A landscape view

**Forest**

100%

**Grassland**

Pristine



Lightly used



Secondary



Plantation



Degraded

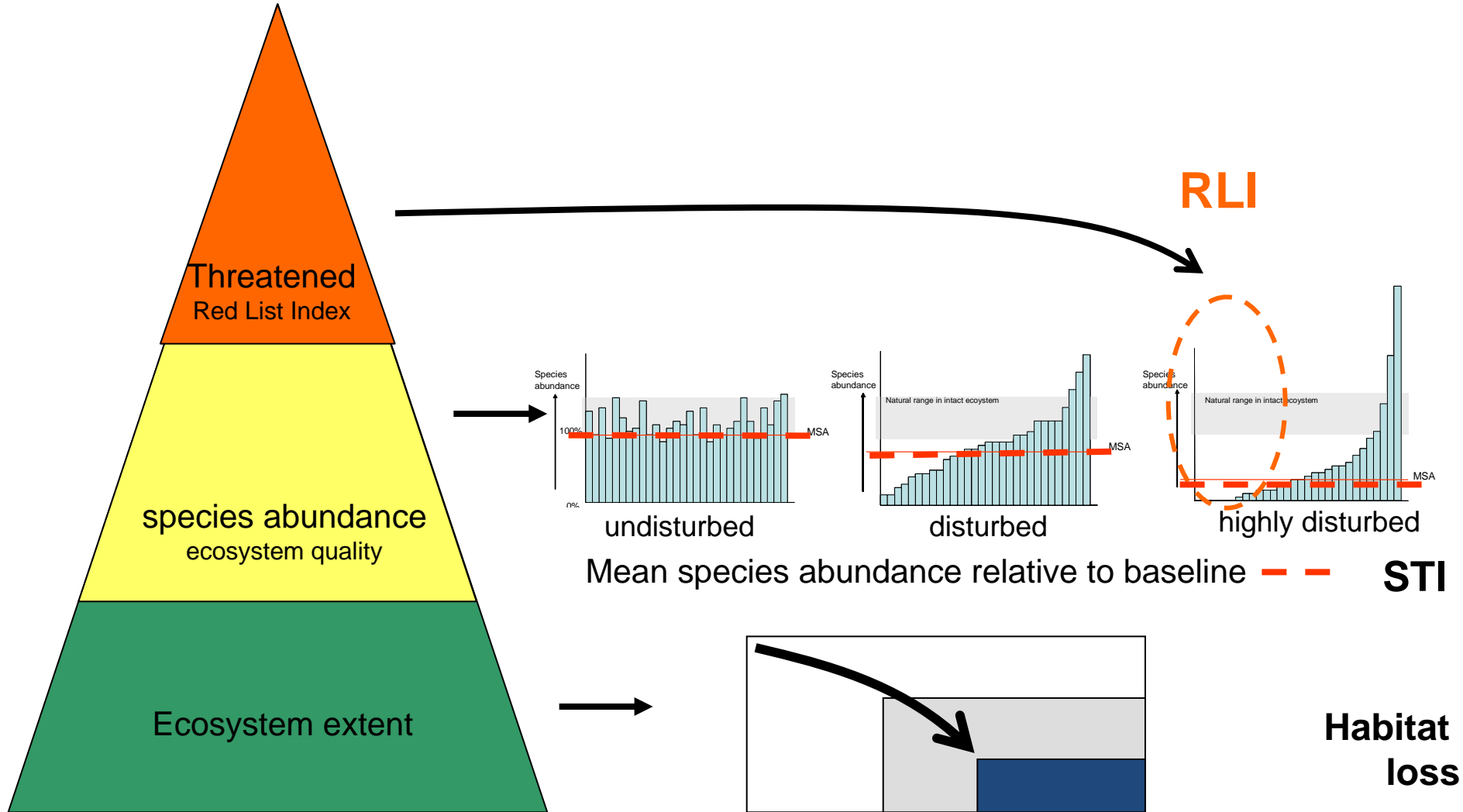


50%

0%

**MSA**

## 2. Three complementary state indicators



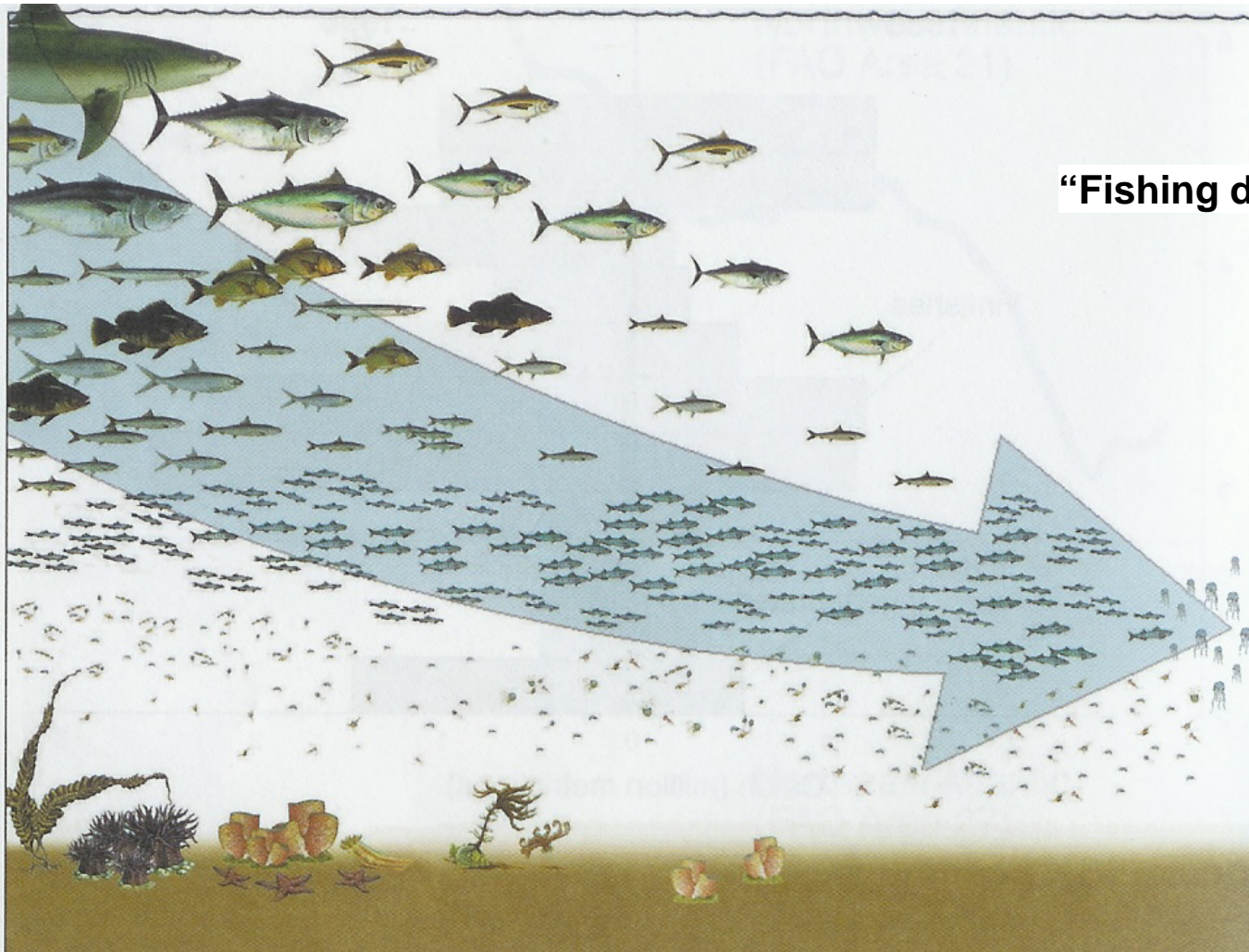
# Ecosystem extent (major ecosystem types)

<b>Agriculture area</b>		<b>Forest area</b>			
<b>Built up area</b>	<b>Inland water area</b>	<b>Grassland area</b>	<b>Heath &amp; tundra area</b>	<b>Polar area</b>	<b>Bare area</b>
<b>Marine area</b>					

country's surface

Indicators may be presented in many ways

*A few examples*



**“Fishing down the foodweb (Pauly)”**

We also log, plough, burn, convert, burn, pollute and hunt down ecosystems

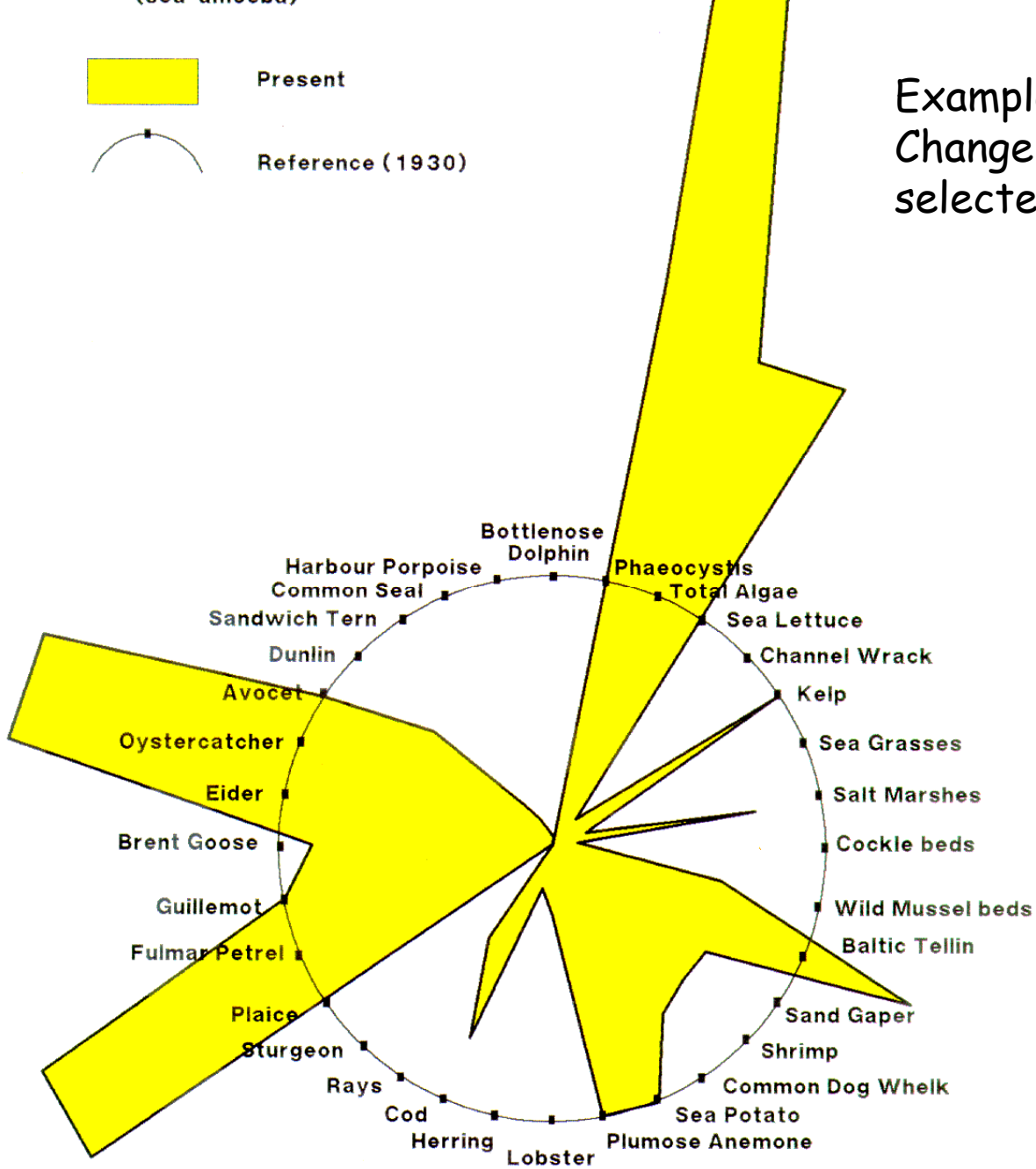


Present



Reference (1930)

Example:  
Change in abundance of  
selected set of species





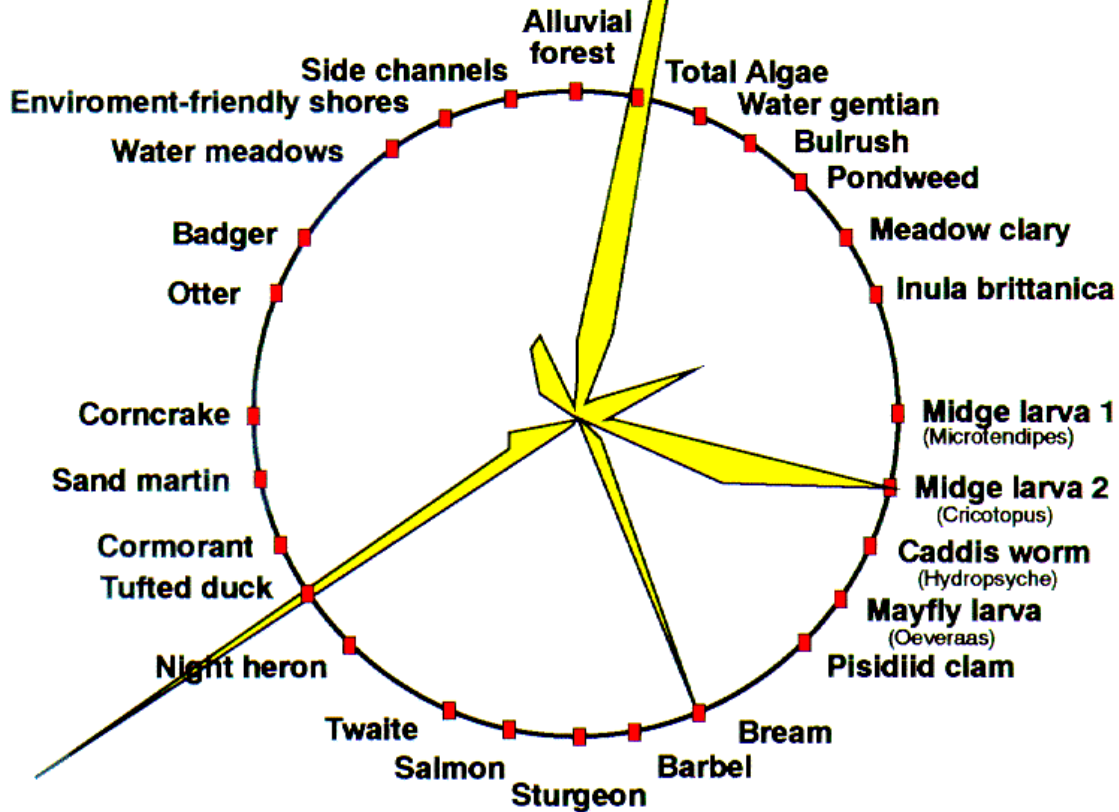


Current



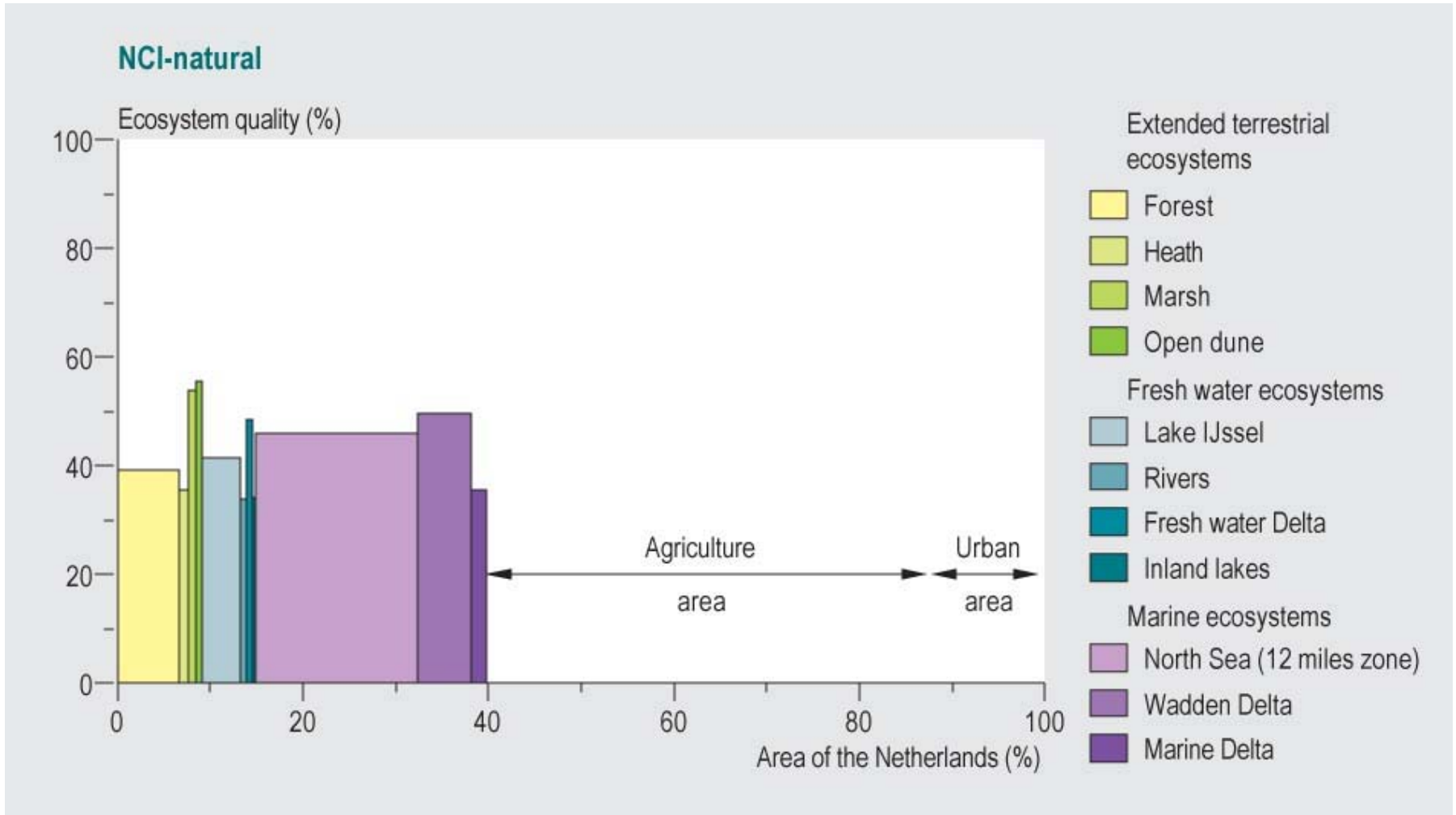
Reference

Example:  
Change in abundance of  
selected set of species

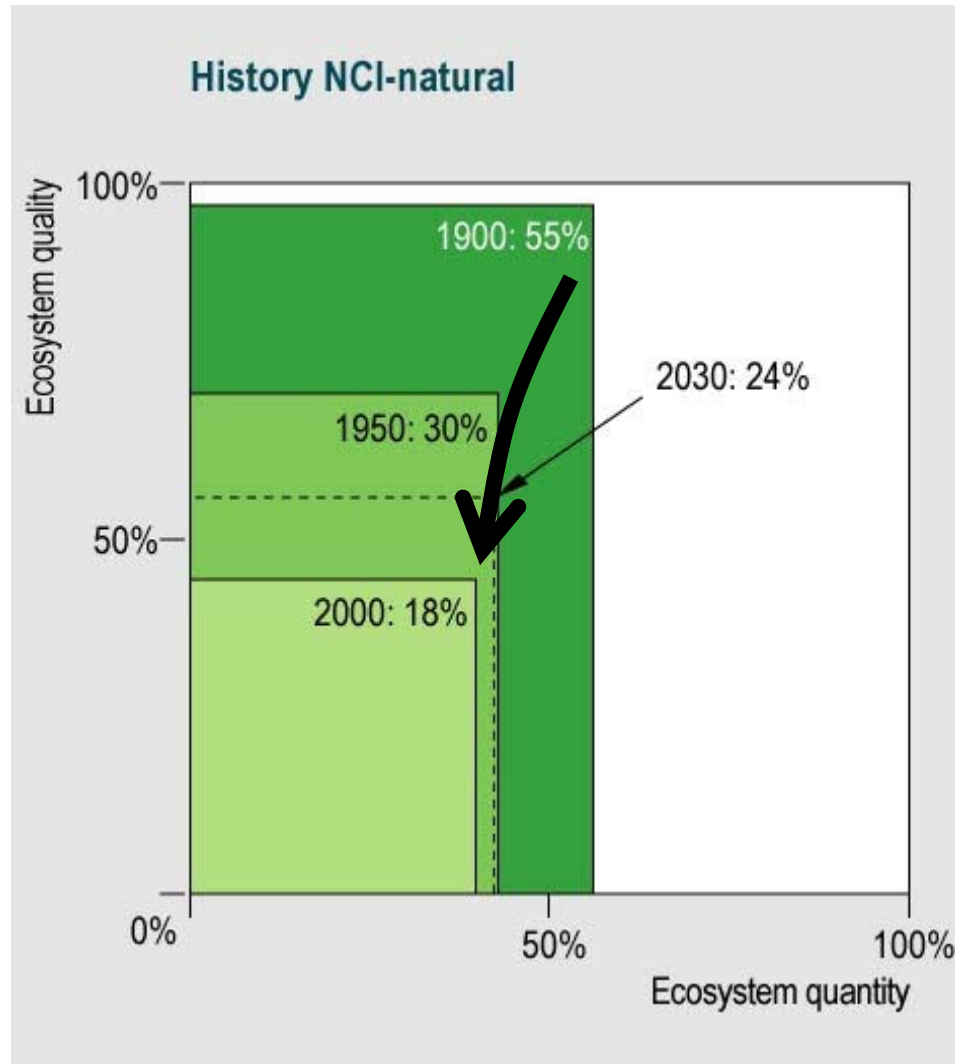


# Quality per major ecosystem type

# Netherlands

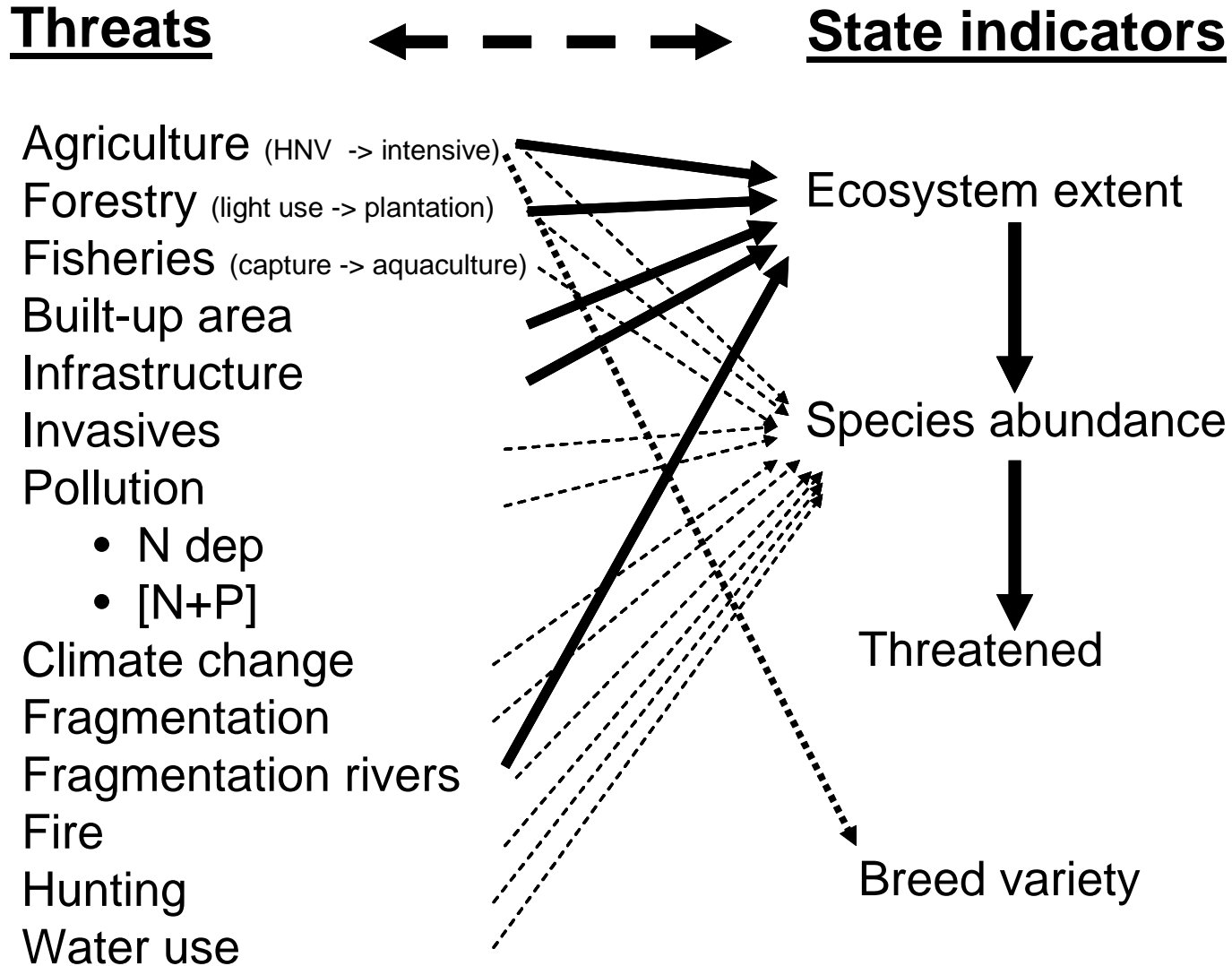


Norway, South Africa, Kenya, Belgium, Living Planet Index,



# Modelling extent & MSA by cause-effect relationships

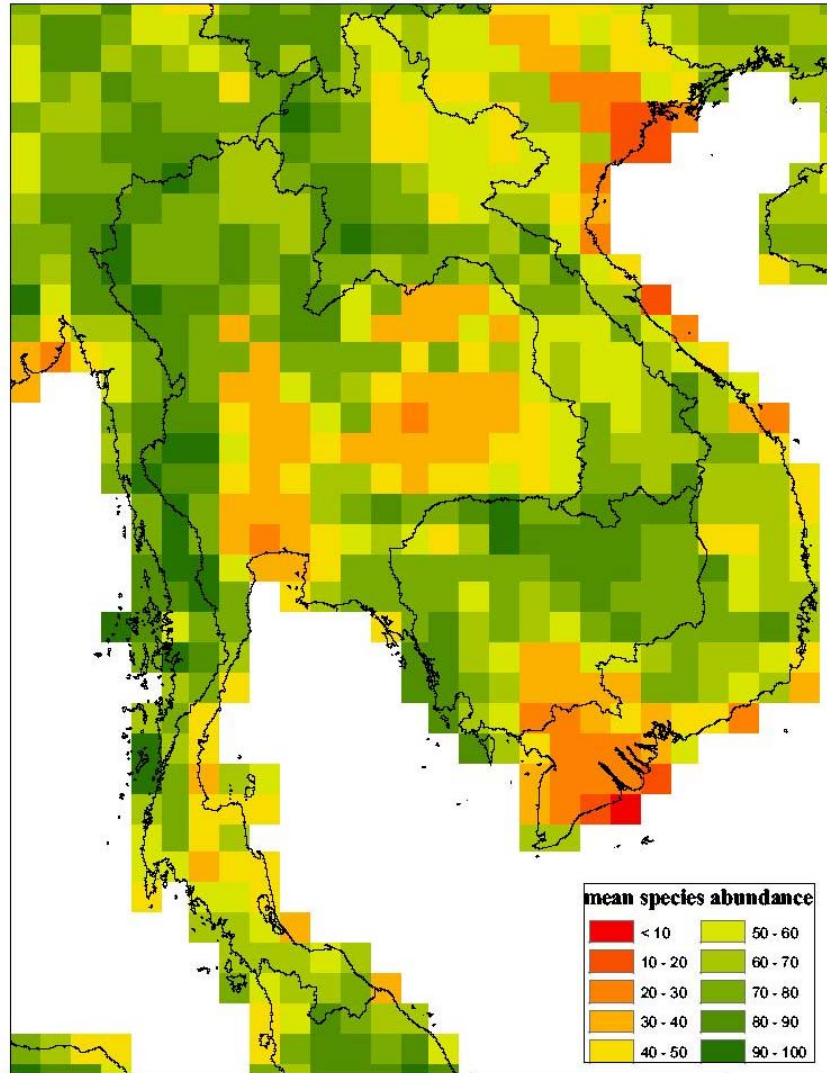
-> If no monitoring is available



# Modelling MSA South East Asia 1970

-> If no monitoring is available

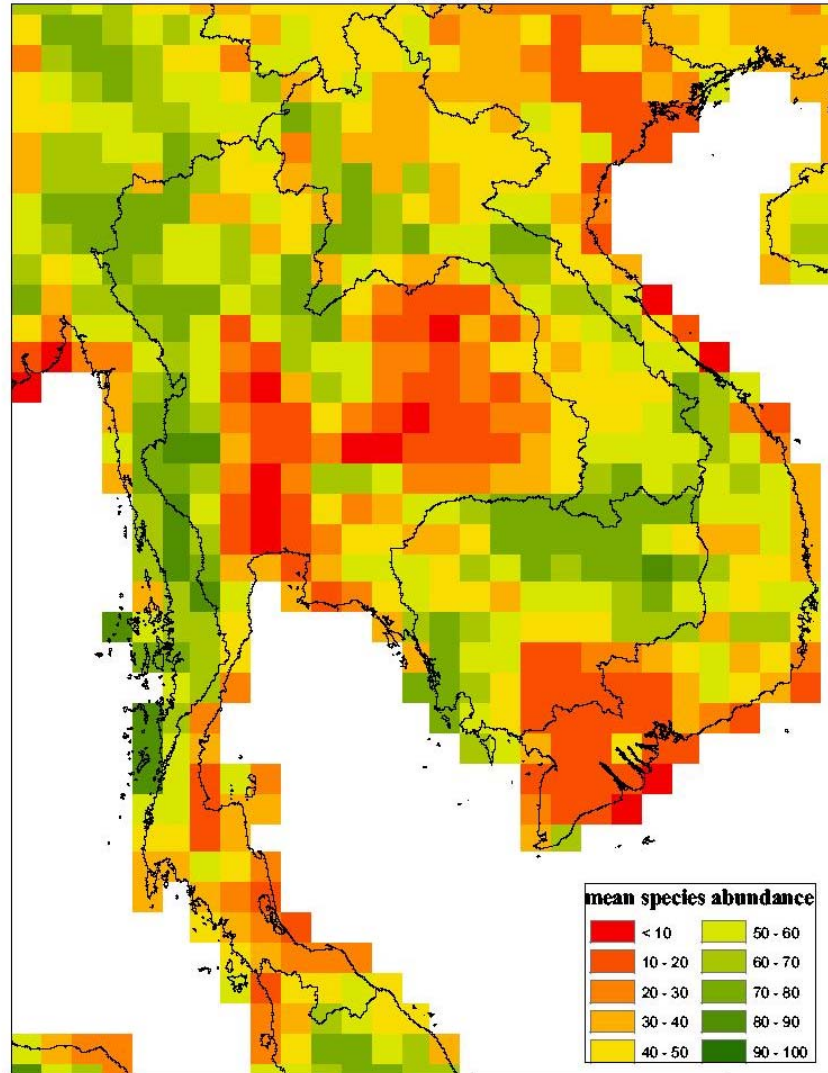
Mean species abundance (as % of original) in 1970



# Modelling MSA South East Asia 2000

-> If no monitoring is available

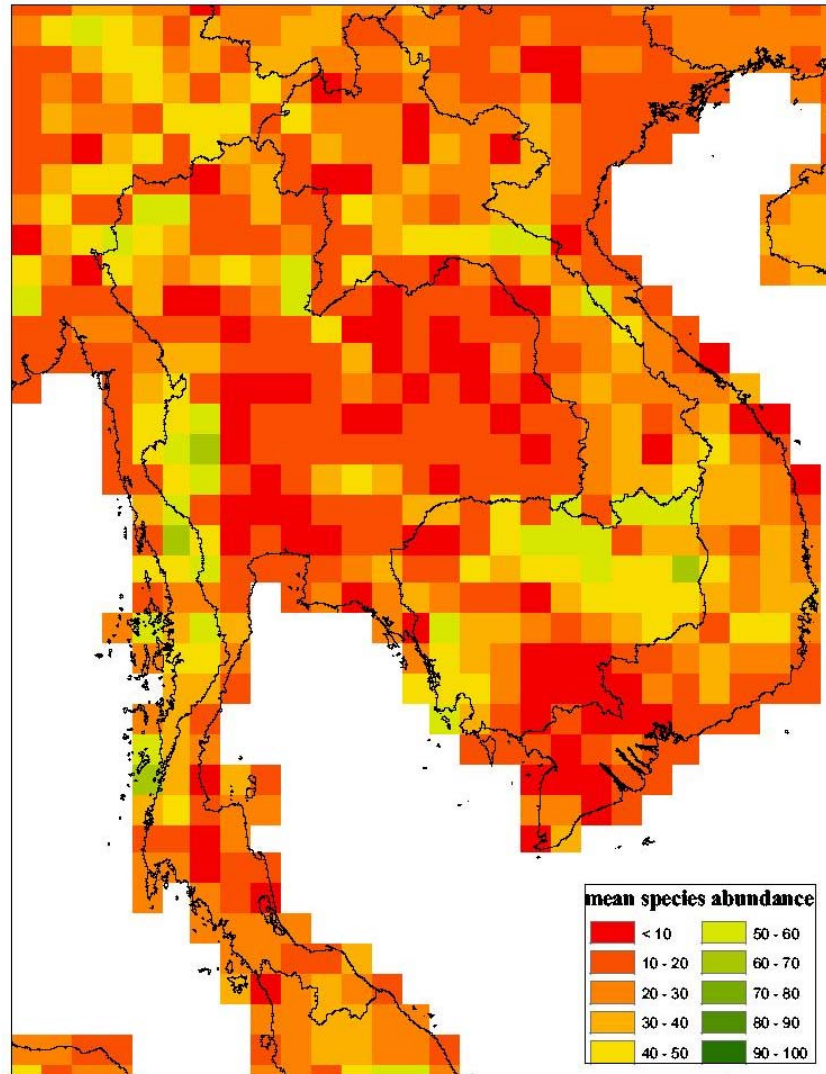
Mean species abundance (as % of original) in 2000



# Modelling MSA South East Asia 2030

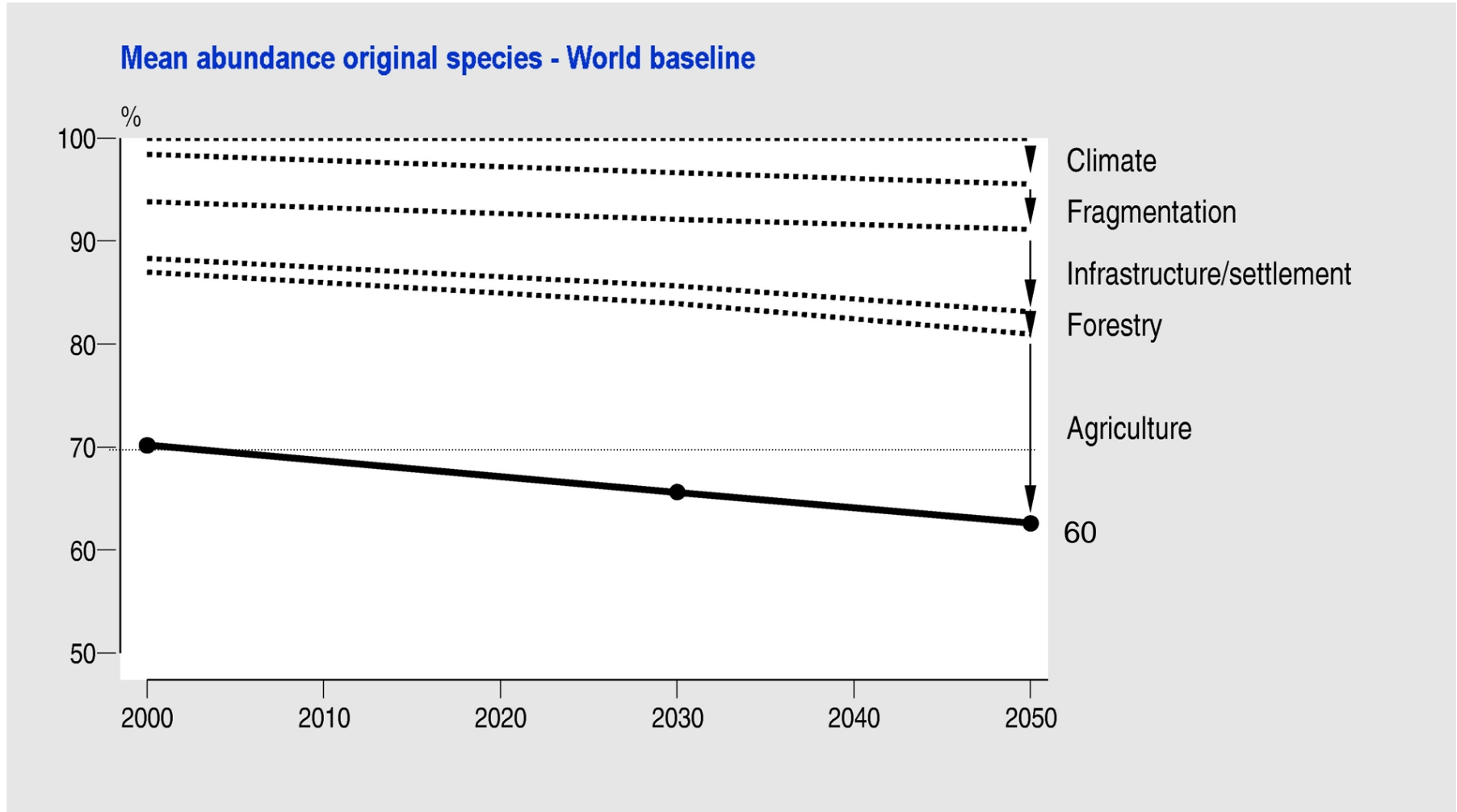
-> If no monitoring is available

Mean species abundance (as % of original) in 2030



Desperate for verification  
with real data

# Linking biodiversity loss with economic sectors



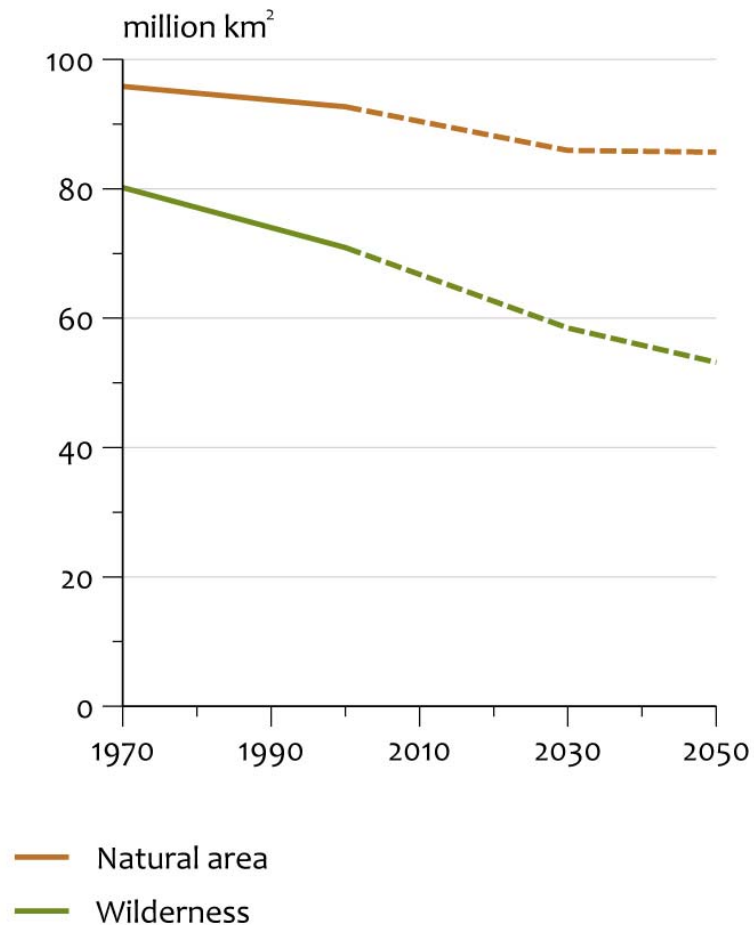
Datum: 20-dec-2005



# Change in natural ecosystem extent

## Global land use and natural area in baseline scenario

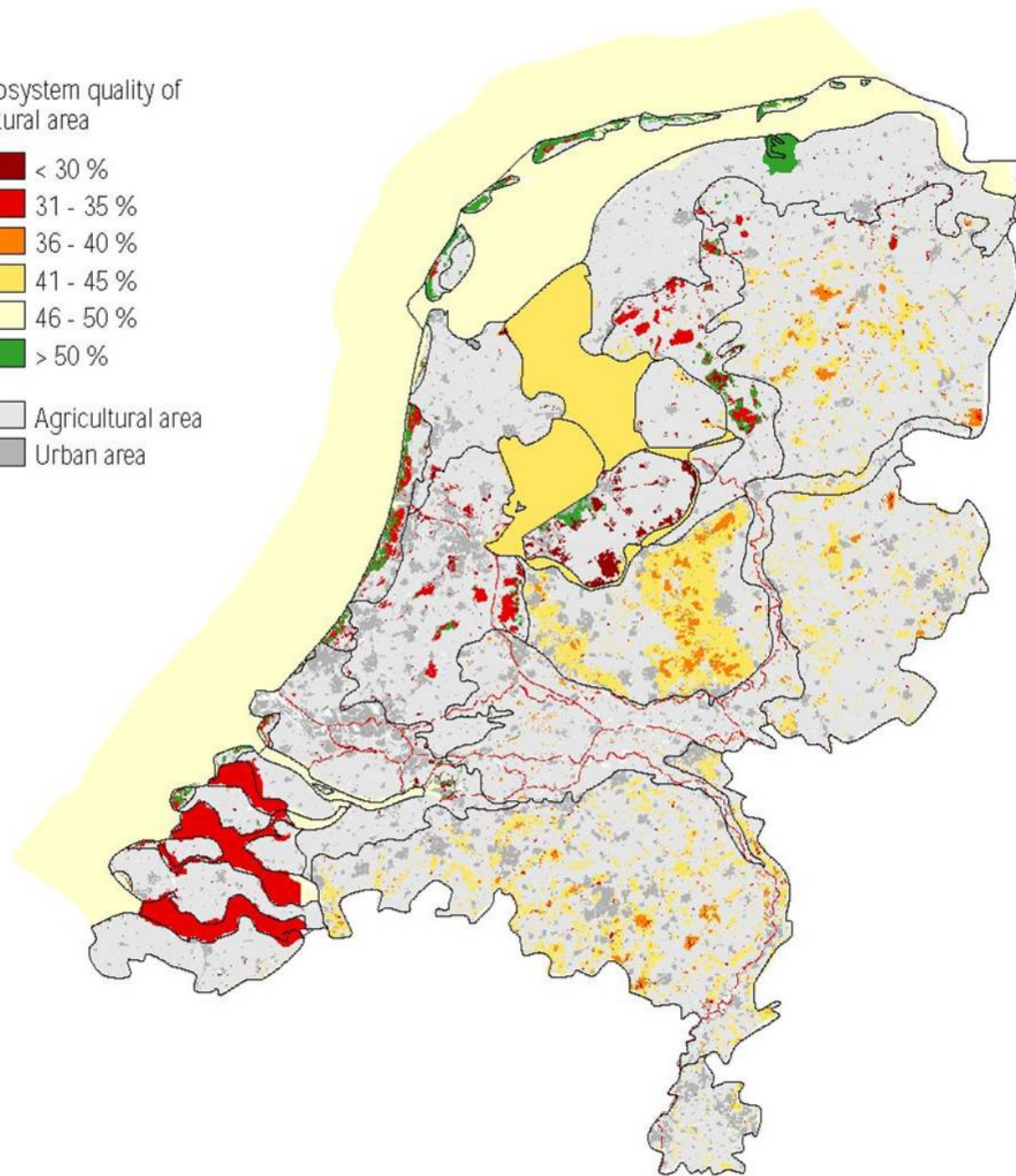
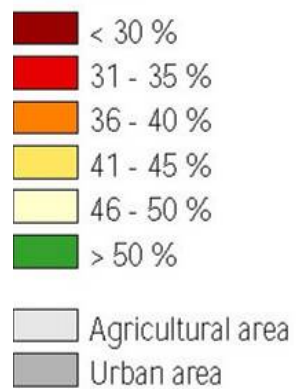
### Natural area and wilderness



## 4. Pros & cons

1. Universally applicable
  2. Easy to understand
  3. Fair comparison within & between countries
  4. Gradually implementable (cheap -> exp)
  5. Linkable with economic sectors
  6. Coherent with CBD and global assessments
- 
7. Establishing baselines
  8. Monitoring requires expertise & budget (methods available)

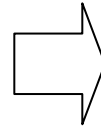
Ecosystem quality of natural area



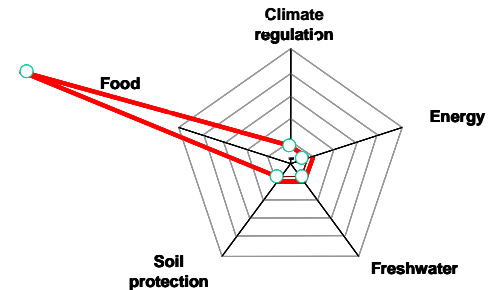
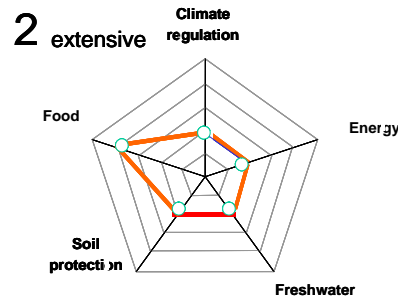
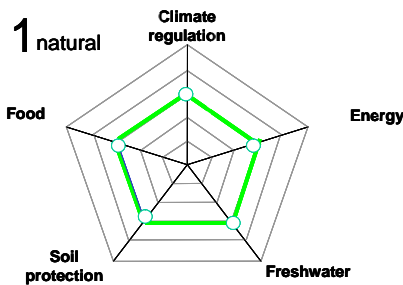
# 2. Why it happens?

'We parcelate the world'  
 Swap services for goods  
 Fight for the photons

Natural ecosystem



crops	Water basin		National Park	
	Shrimp farm		golf	
timber plantation	cattle	road		city
		Energy crop		



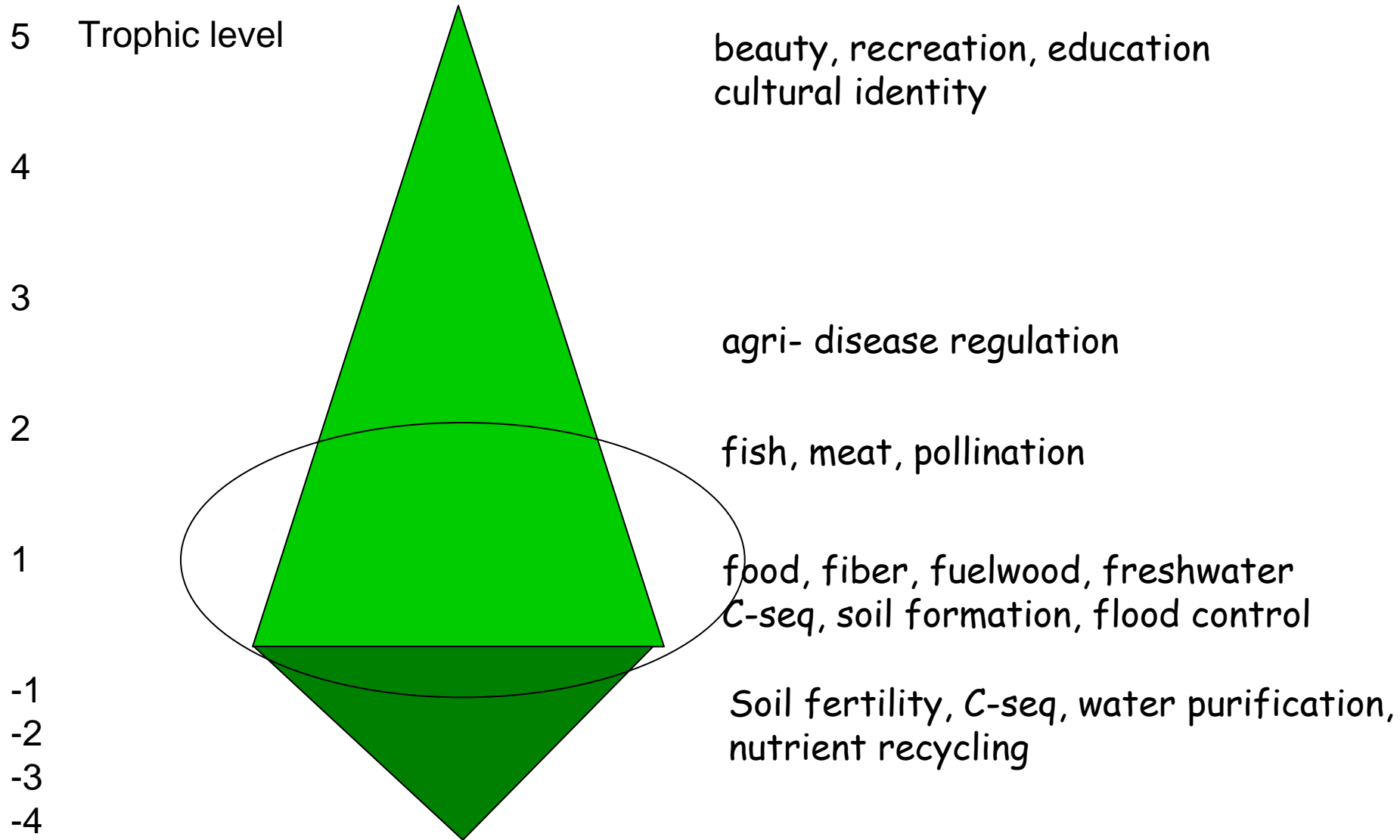
Food: —————> 40-80 kg/ha

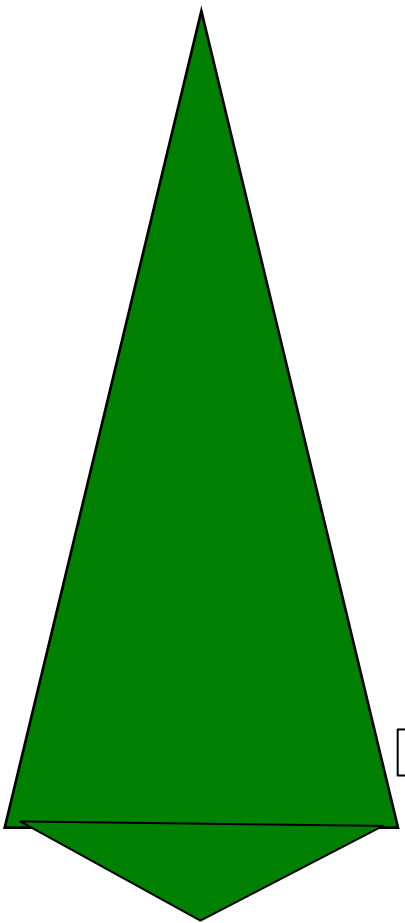
400-800 kg/ha

4000-8000 kg/ha

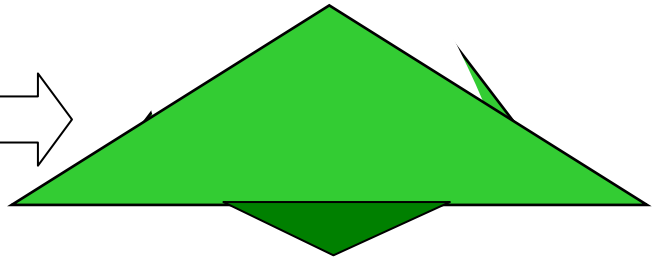
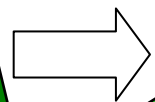
# 3. Why is it important?

## Goods & services





original



diversified

beauty, recreation, education  
cultural identity

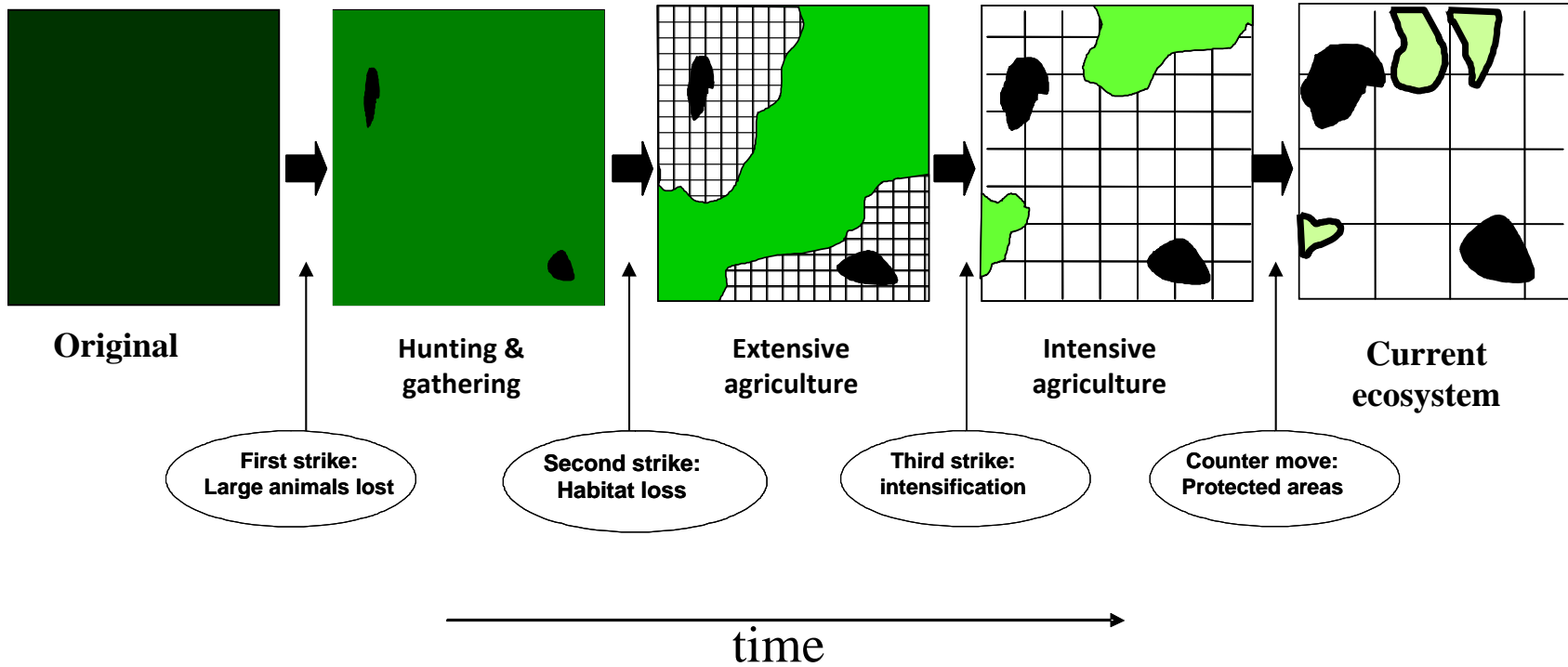
agri- disease regulation

fish, meat, pollination

**food, fiber, fuelwood**, freshwater  
C-seq, soil formation, flood control

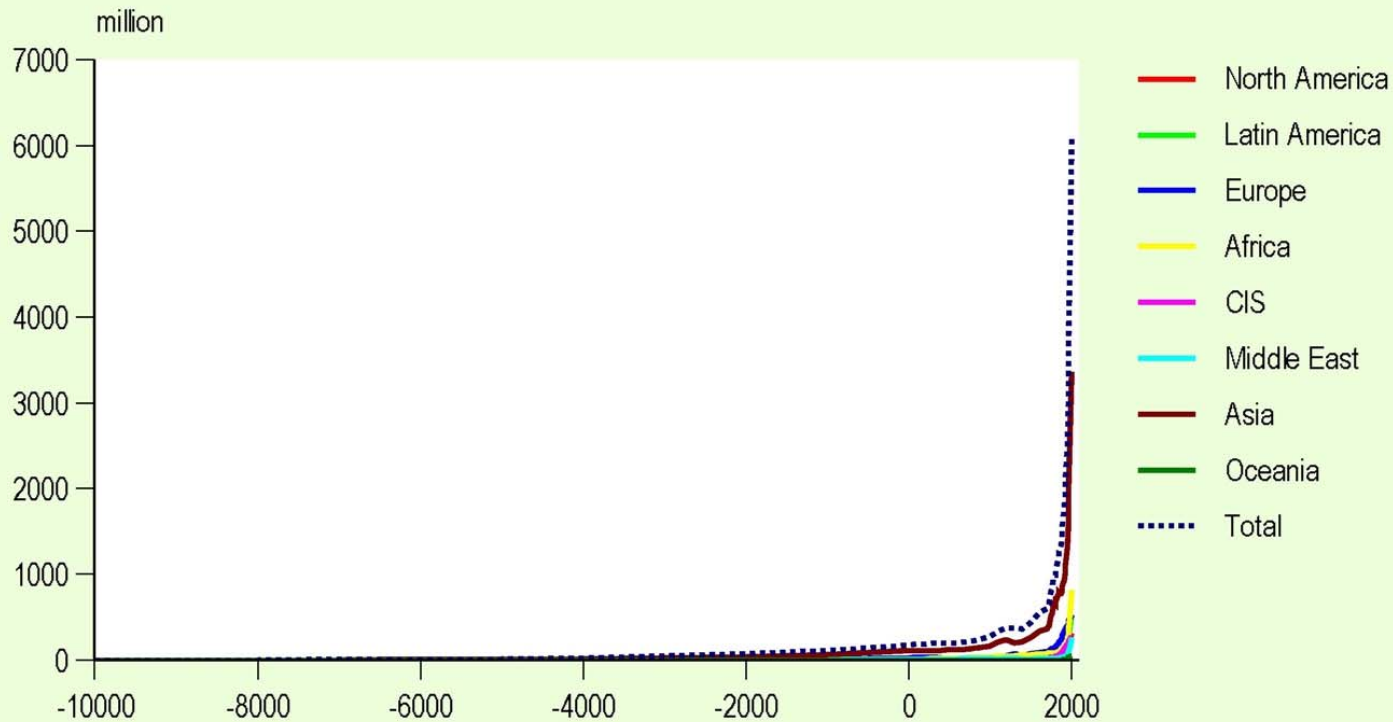
Soil fertility, water purification,  
nutrient recycling

# Transforming landscapes over millennia



# Human population in Antropocene

Historical population estimates over the Holocene (10,000 B.C - 2,000 A.D.)

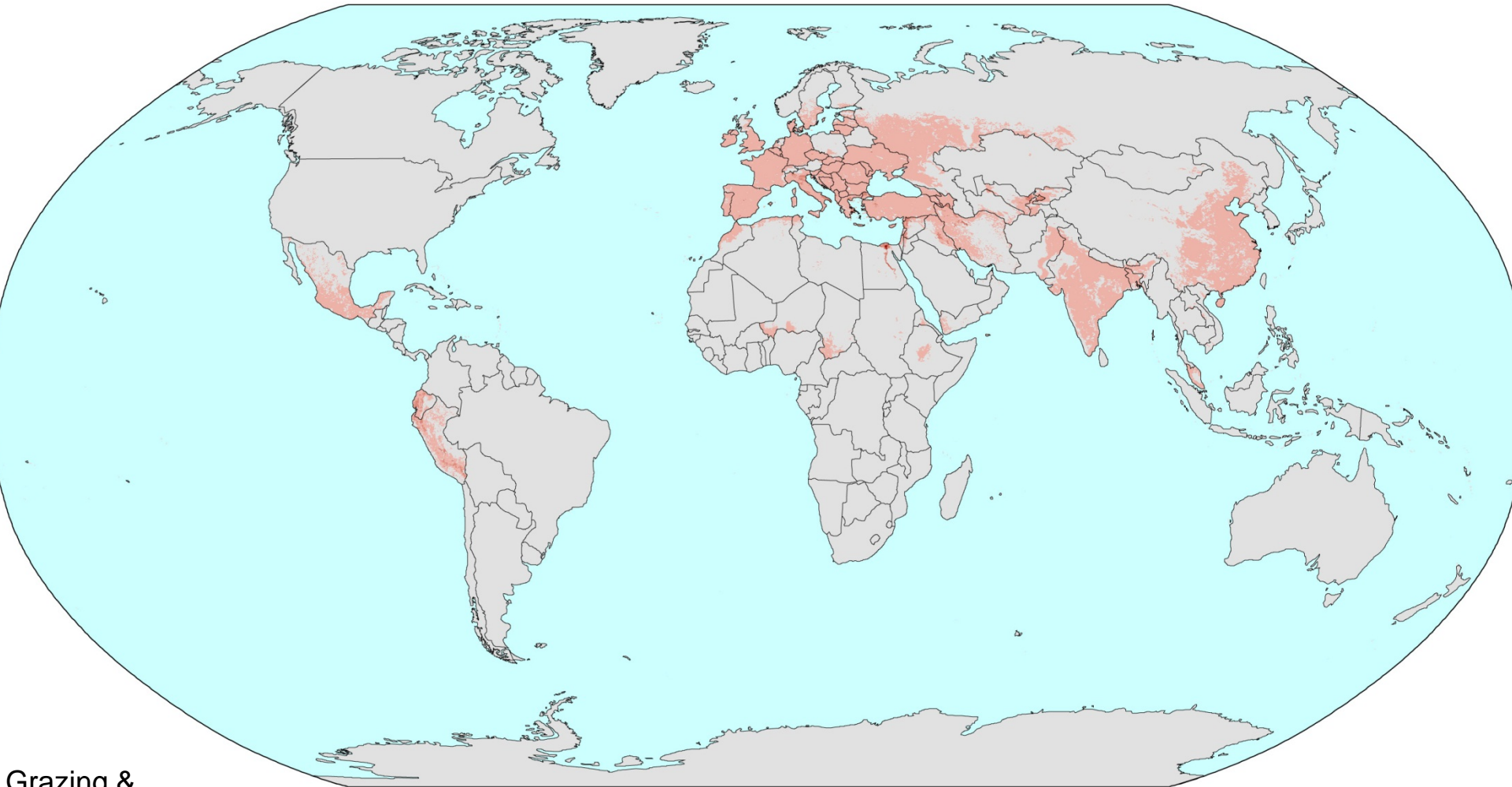


Klein Goldwijk et al., 2008

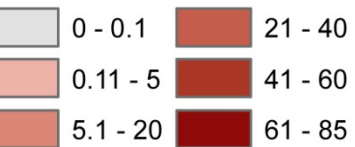


# land use in the past

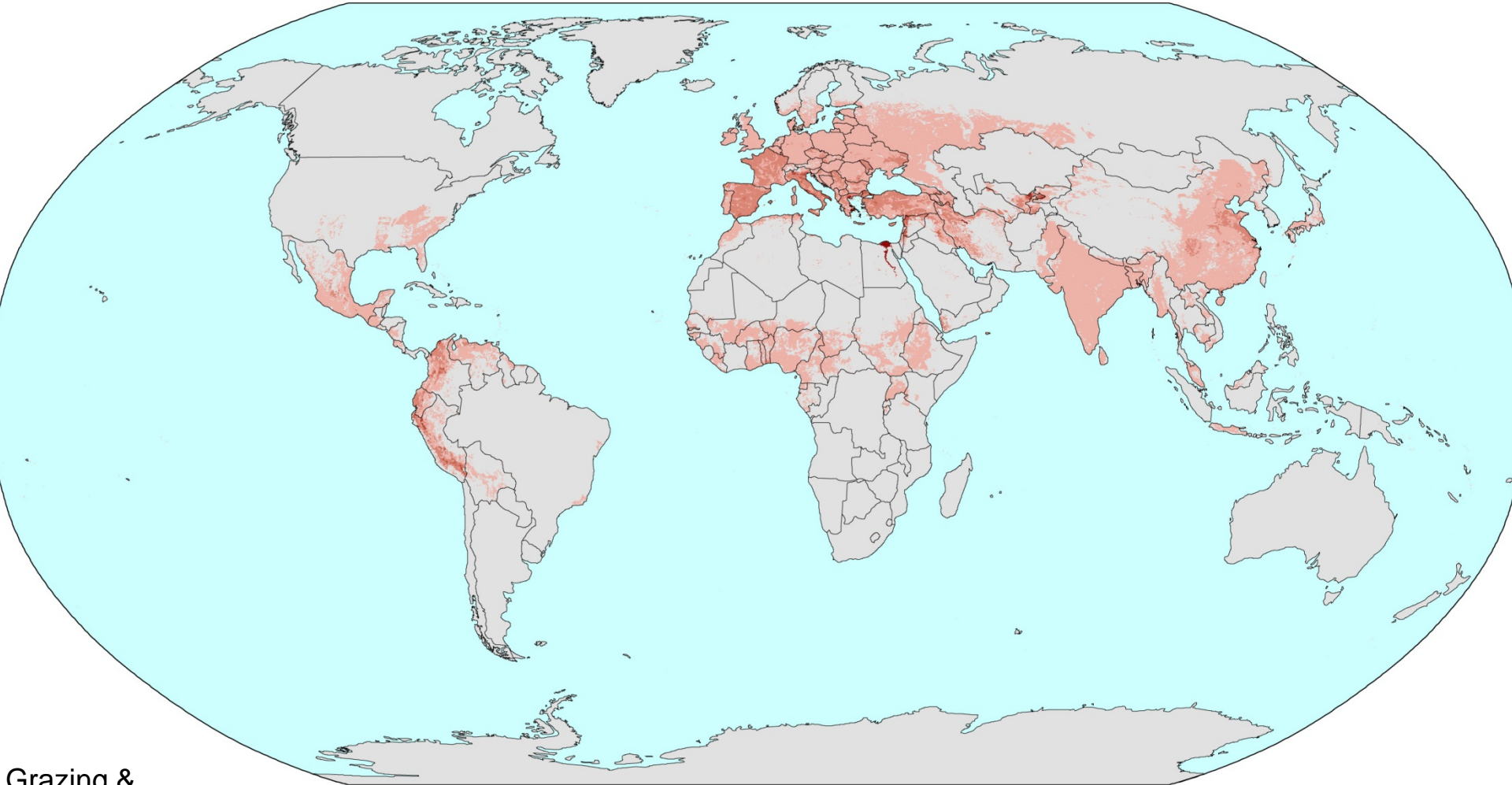
3000 BC



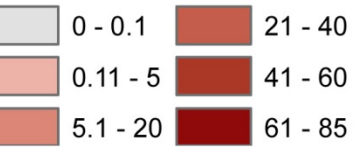
Grazing & cropland (km<sup>2</sup>/gridcell)



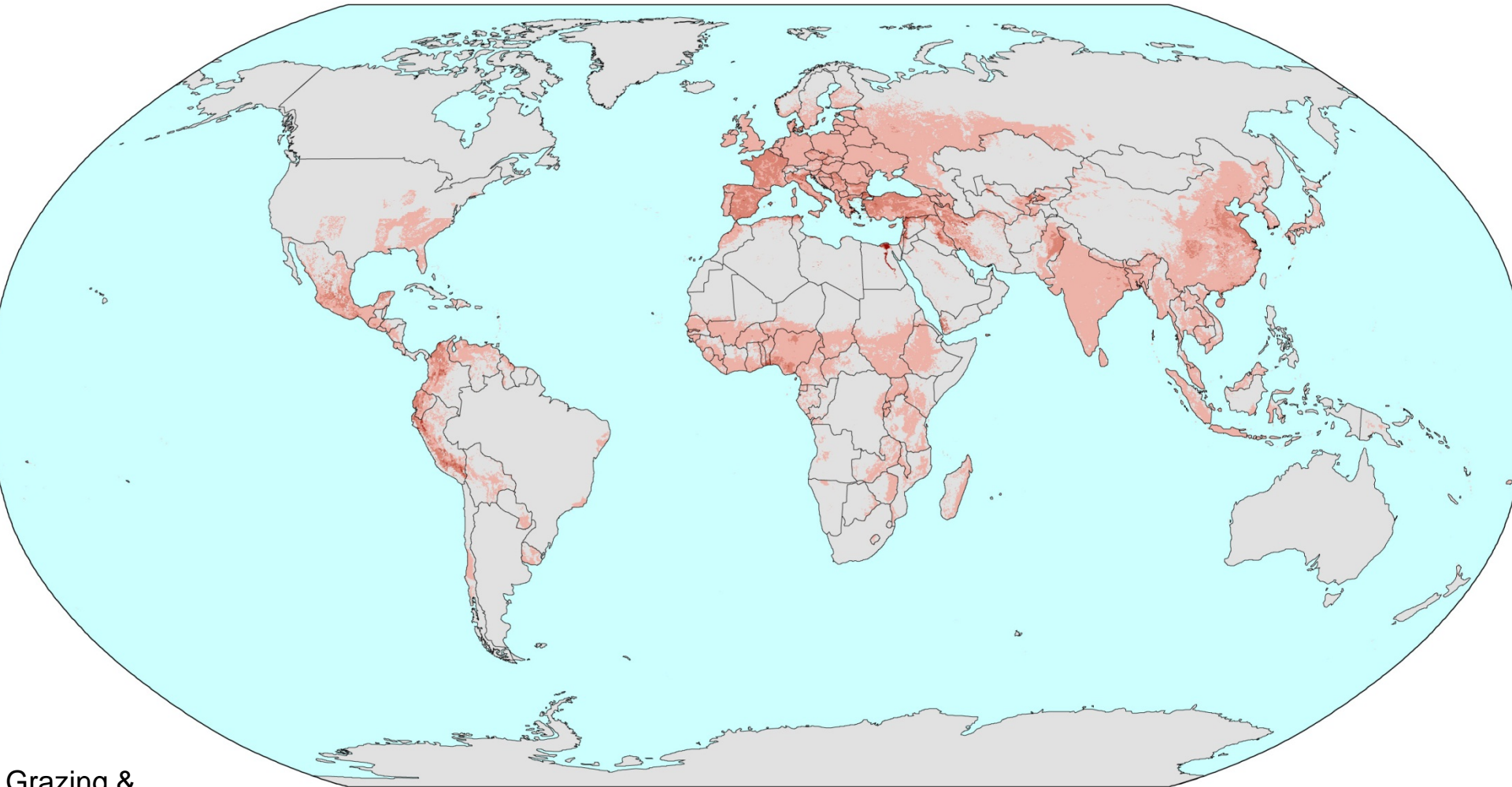
0 AD



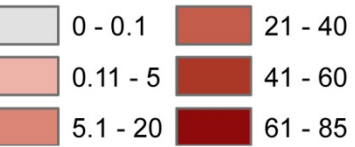
Grazing & cropland (km<sup>2</sup>/gridcell)



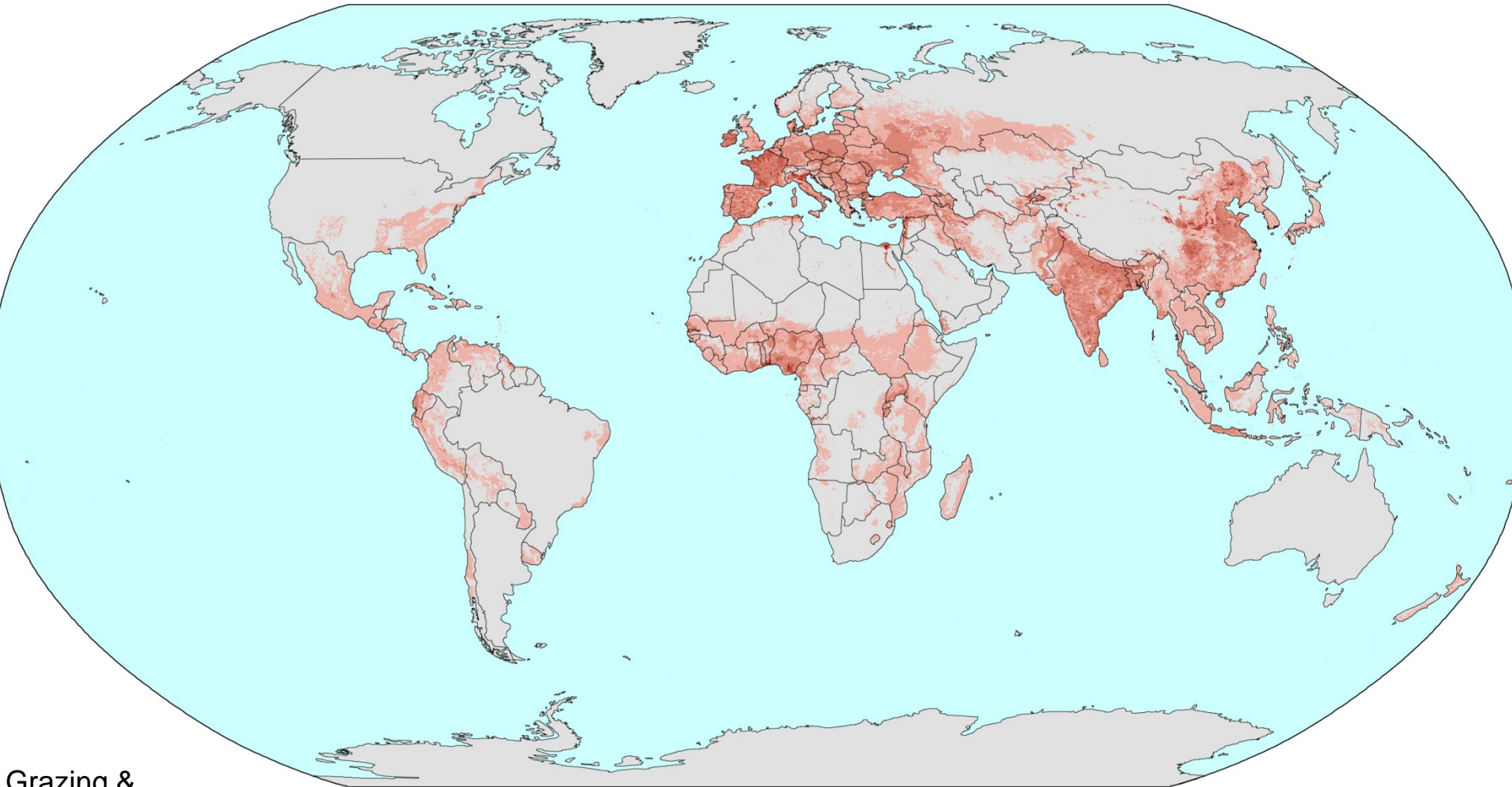
1000 AD



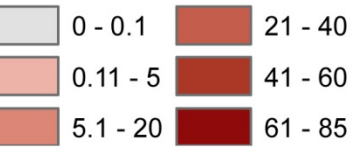
Grazing & cropland (km<sup>2</sup>/gridcell)



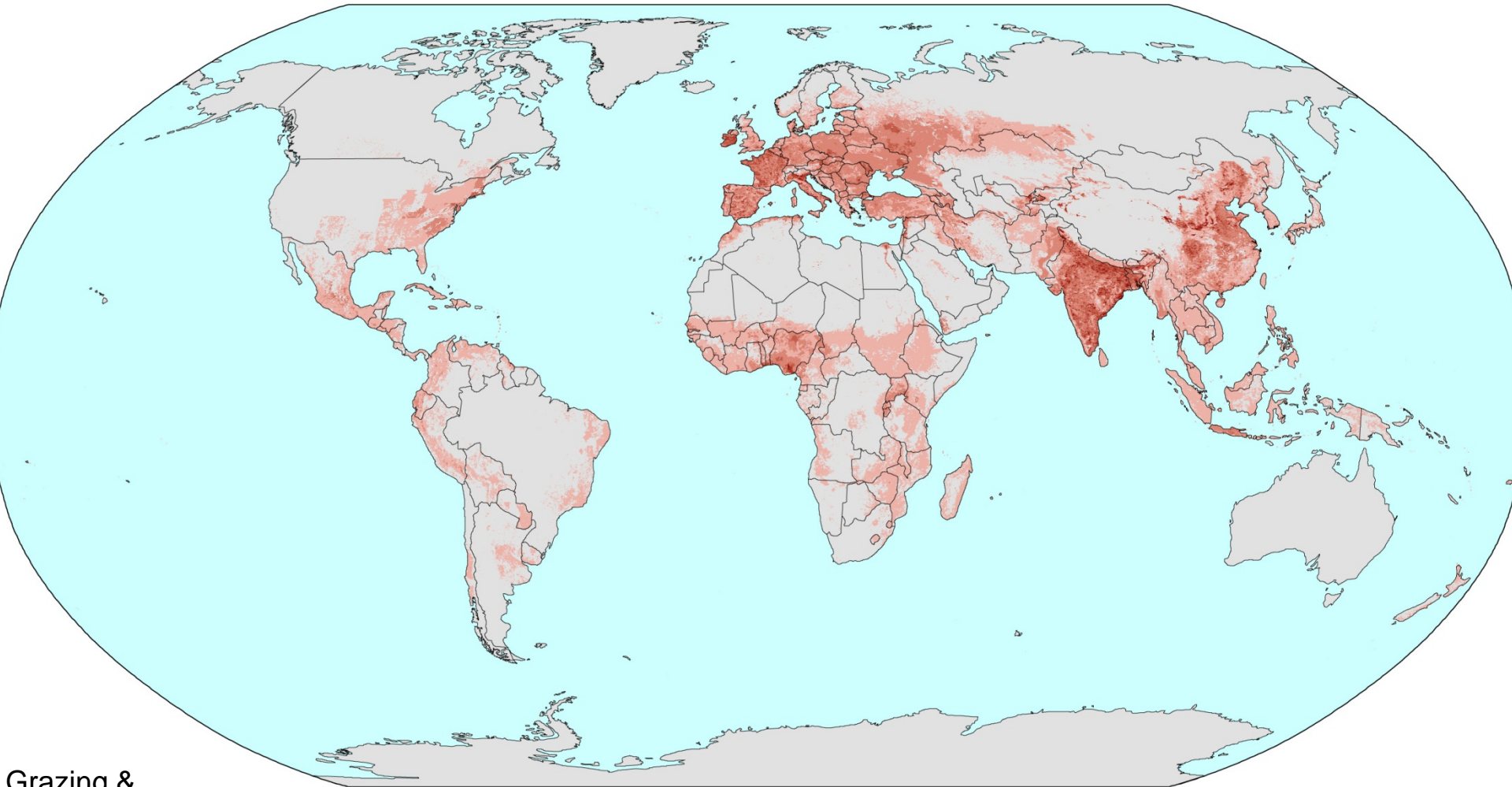
1700 AD



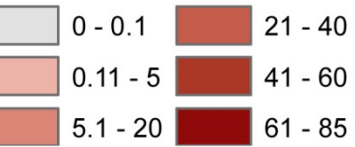
Grazing & cropland (km<sup>2</sup>/gridcell)



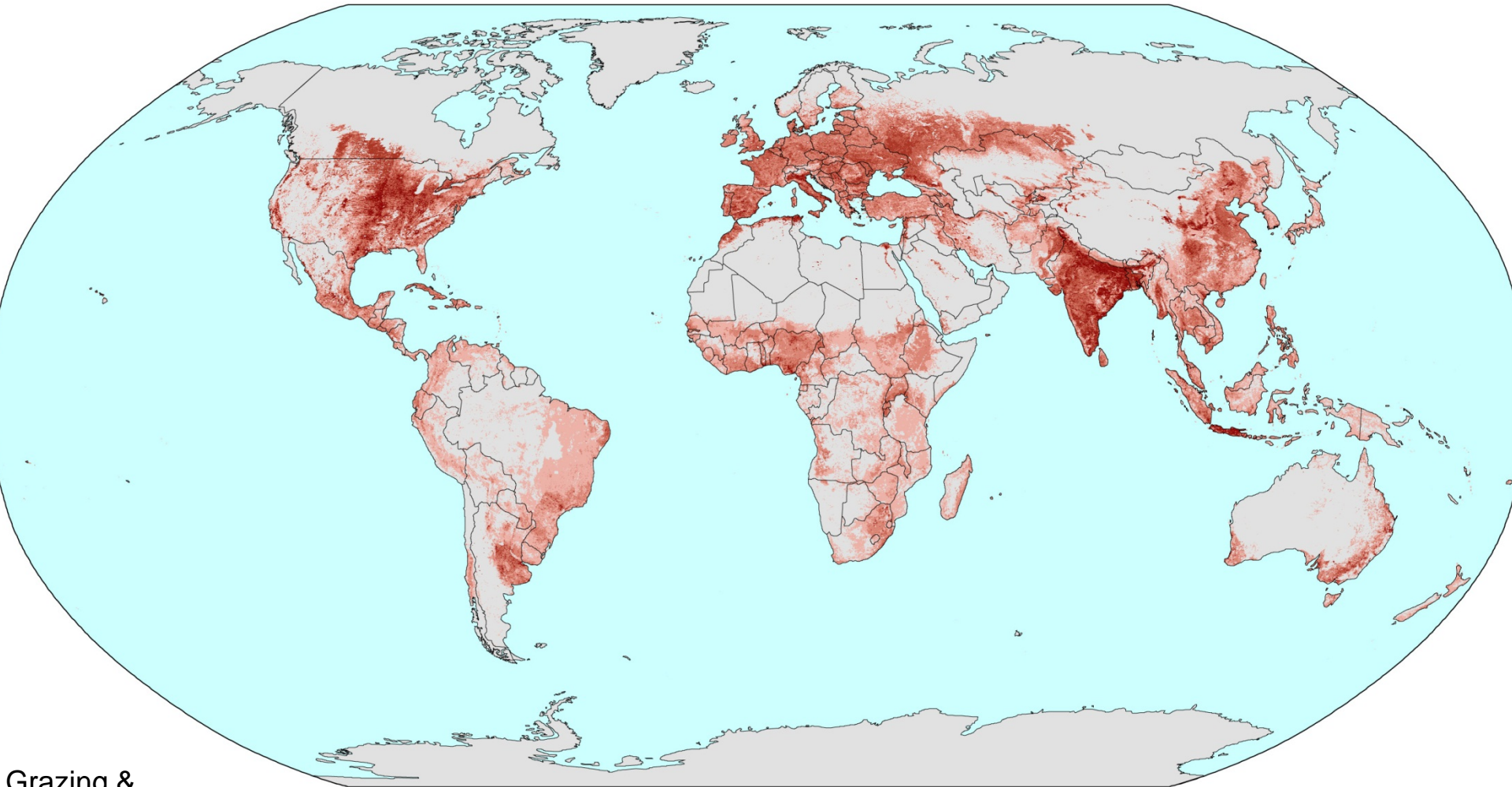
1800 AD



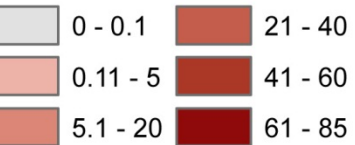
Grazing & cropland (km<sup>2</sup>/gridcell)



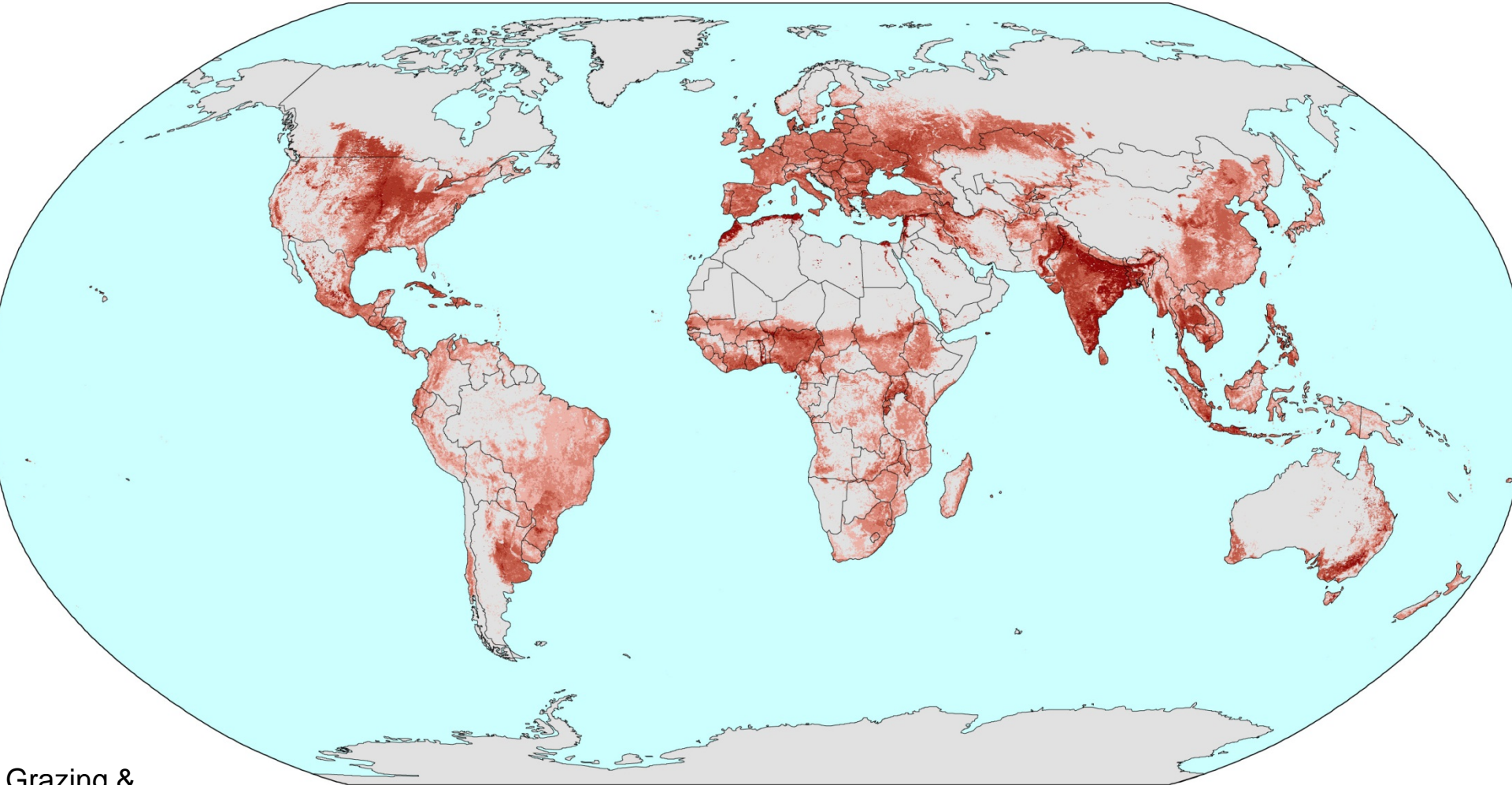
1950 AD



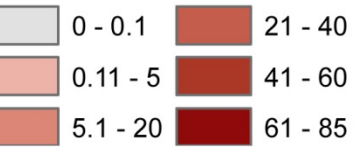
Grazing & cropland (km<sup>2</sup>/gridcell)



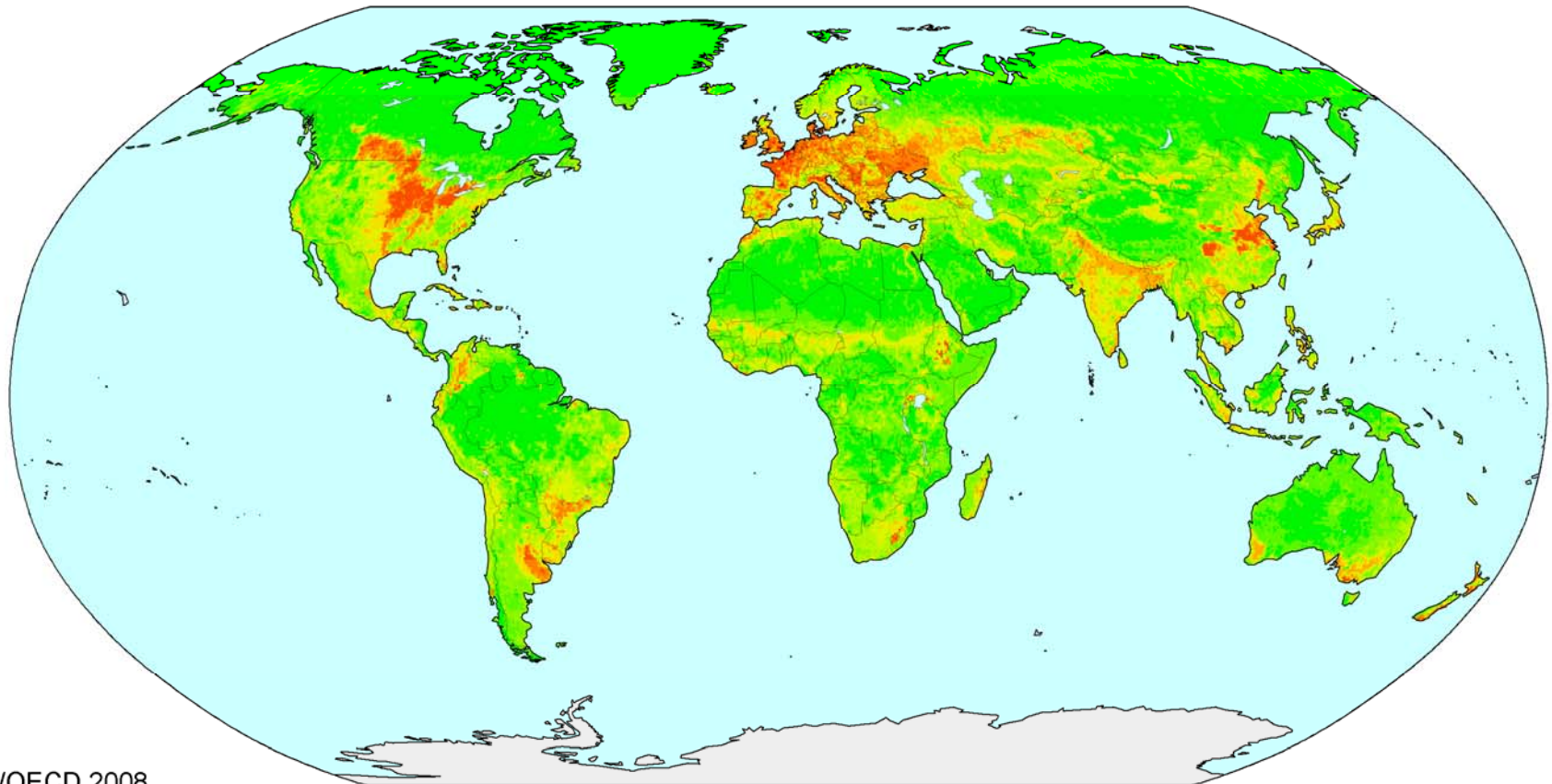
2000 AD



Grazing & cropland (km<sup>2</sup>/gridcell)

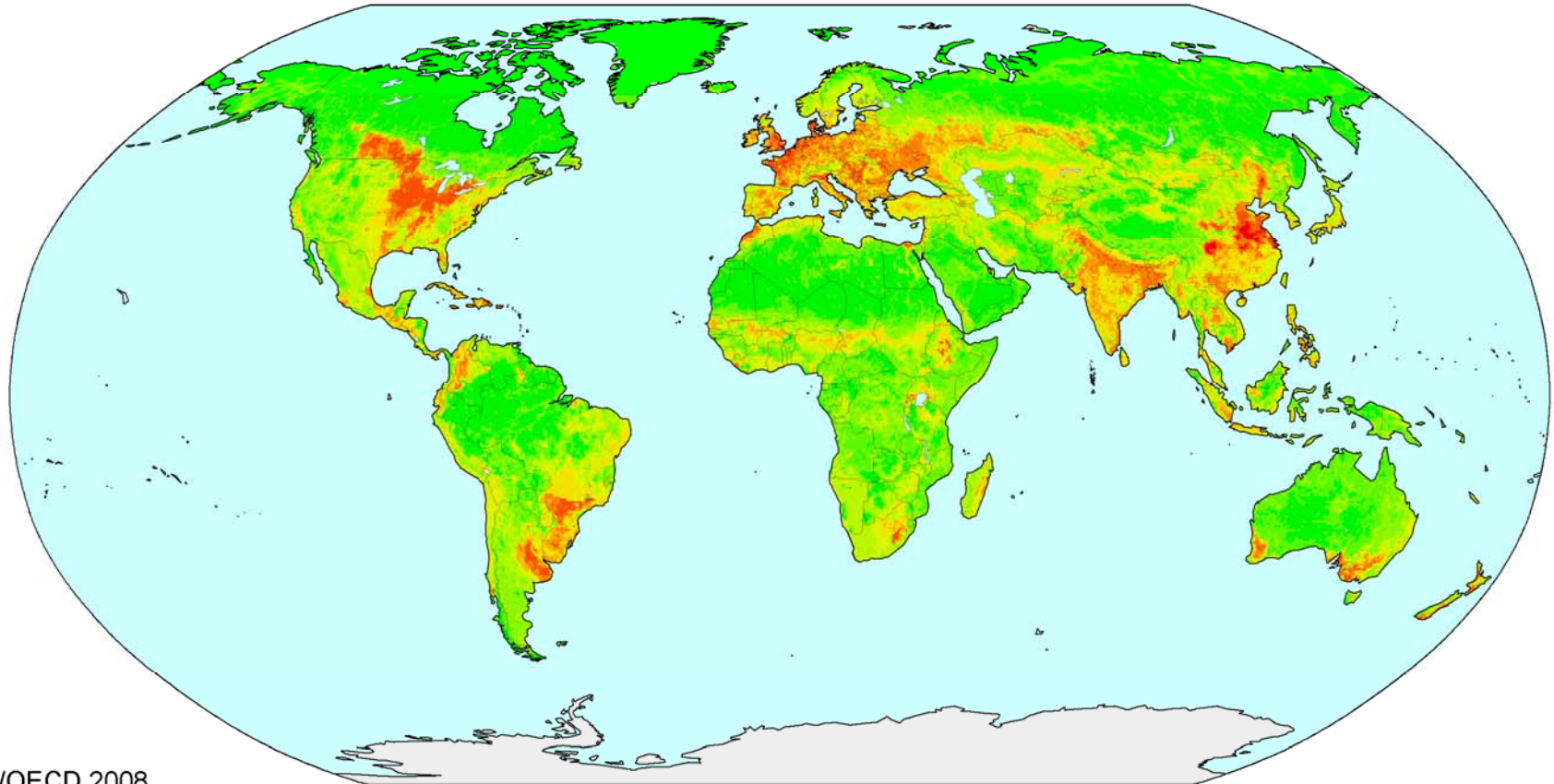


## Biodiversity in 1970 (MSA)

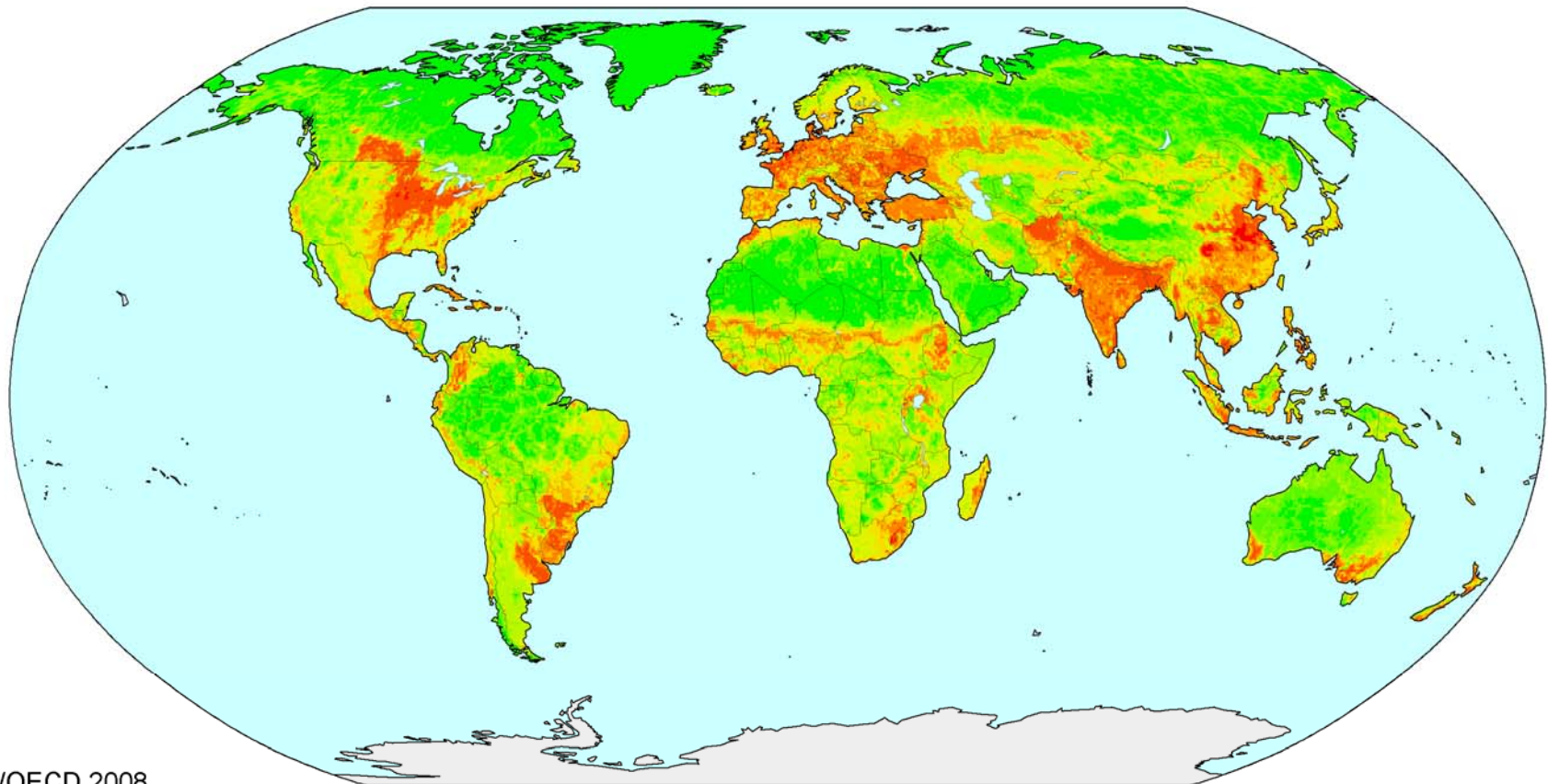




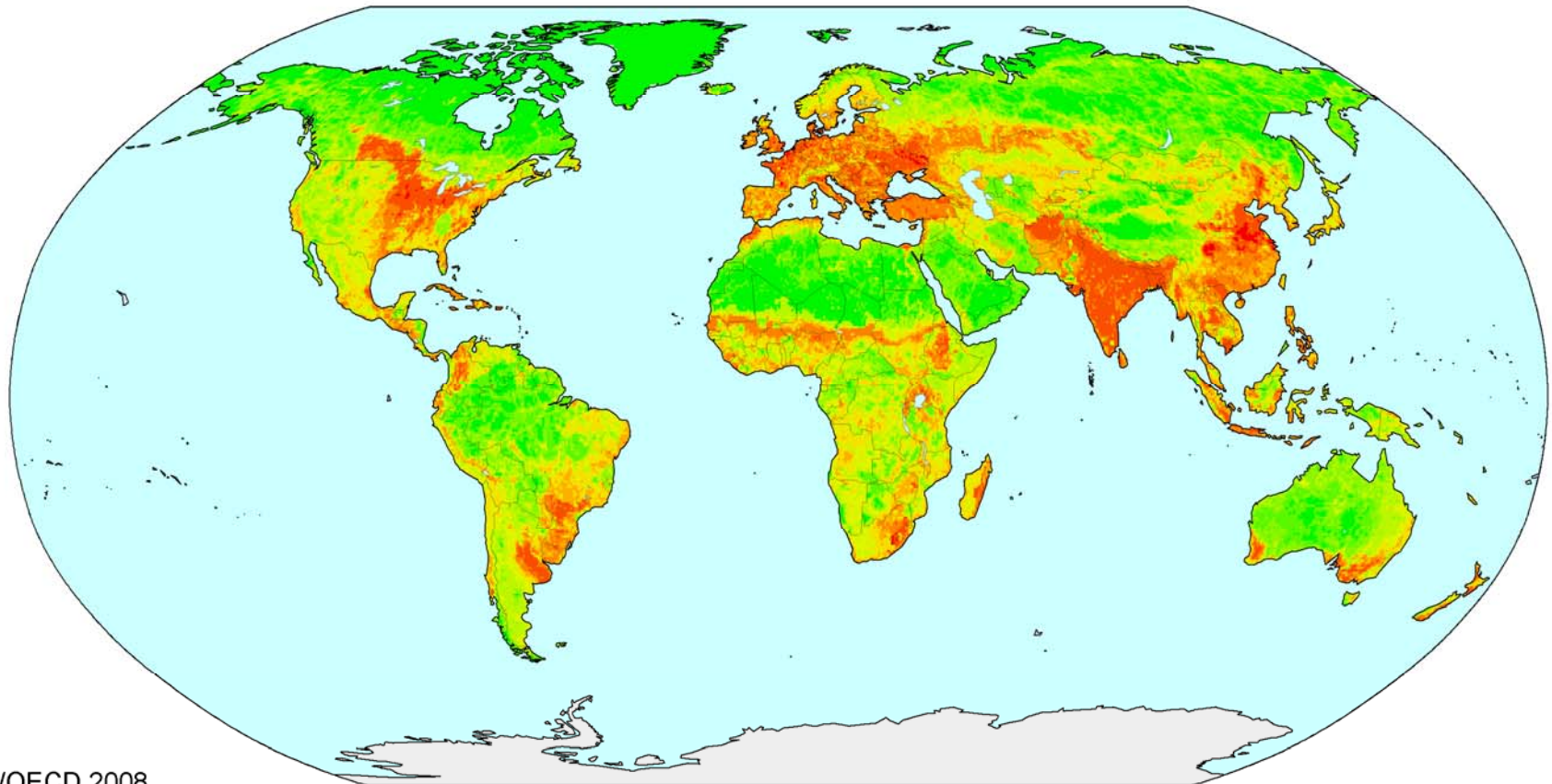
## Biodiversity in 2000 (MSA)



## Biodiversity in 2030 (MSA)

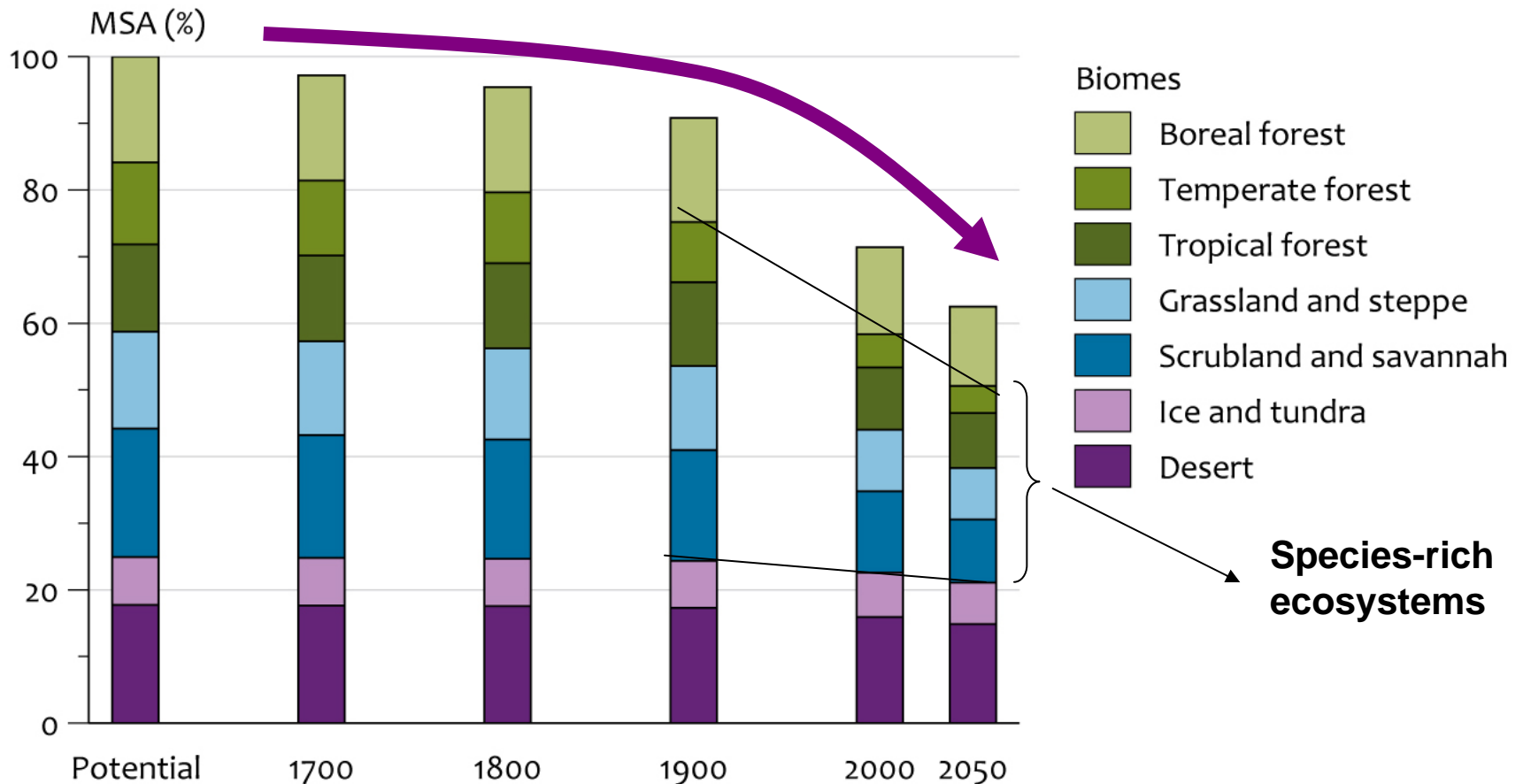


## Biodiversity in 2050 (MSA)



# Baseline: 10% loss MSA 2000 - 2050

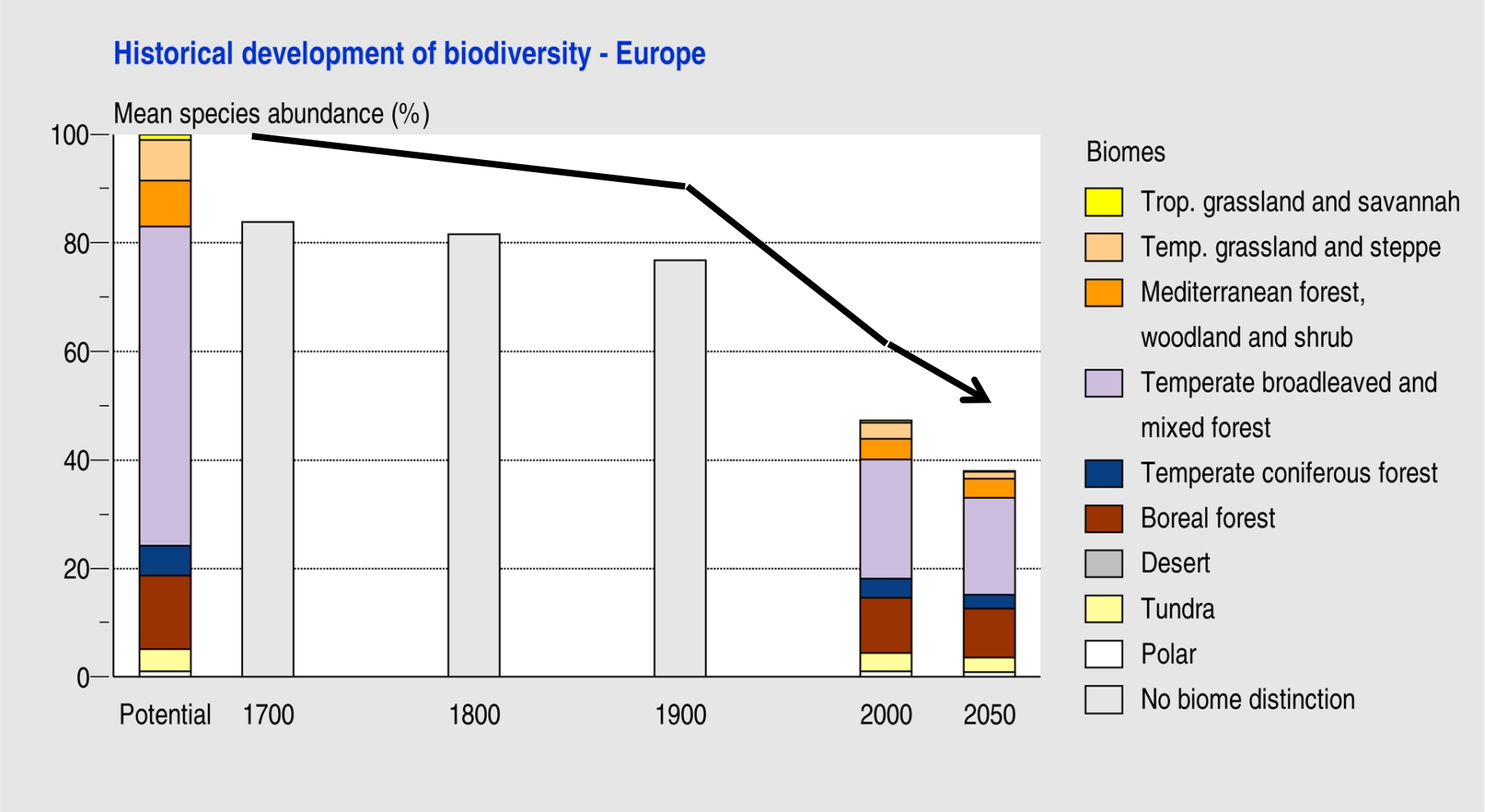
## Global MSA in baseline scenario



Target not met

Loss = 1.5 x USA

# Zooming in on Europe: loss not halted



# Zooming in on the Netherlands

High biodiversity footprint

