

# **The Implications of Climate Change and Loss of Biodiversity: Why Action is Needed Now**

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Tokyo, Japan

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# Summary of the Presentation

- Policy framework
- Human-induced climate change
- Loss of biodiversity and degradation of ecosystem services
- Implications of human induced climate change and loss of biodiversity for the UN sustainable development goals

# Policy Framework

- Paris climate agreement
- 20 Convention on Biodiversity Aichi goals and targets
- 17 United Nations Sustainable Development Goals

The large majority of Governments have signed these three global agreements

# Elements of the 2015 Paris Agreement

**Article 2:** Limit the global temperature increase to below 2°C, and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

**Article 4:** Global emissions of greenhouse gases should peak as soon as possible, and anthropogenic emissions by sources and removal by sinks should balance by the second half of this century

**Article 4.2:** Each Party must prepare Nationally Determined Contributions (NDCs)

**Article 7:** A recognition that there is a significant need for adaptation

**Article 9:** Developed countries will provide financial resources to assist developing countries with respect to mitigation and adaptation, with a floor of US\$100B per year

**Articles 4.9/14:** A global stock take will take place every 5 years, starting in 2023

# Strategic Plan for Biodiversity 2011-2020

## VISION

*By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.*

## MISSION

*Take effective and urgent action to halt the loss of biodiversity...*

### STRATEGIC GOAL A

*Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*

### STRATEGIC GOAL B

*Reduce the direct pressures on biodiversity and promote sustainable use*

### STRATEGIC GOAL C

*Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*

### STRATEGIC GOAL D

*Enhance the benefits to all from biodiversity and ecosystem services*

### STRATEGIC GOAL E

*Enhance implementation through participatory planning, knowledge management and capacity building*

## IMPLEMENTATION SUPPORT MECHANISMS

# The Aichi Biodiversity Targets

## Goal A

Mainstreaming



## Goal B

Direct drivers



## Goal C

Improved status



## Goal D

Enhance benefits



## Goal E

Implementation





# SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

**1** NO POVERTY



**2** ZERO HUNGER



**3** GOOD HEALTH AND WELL-BEING



**4** QUALITY EDUCATION



**5** GENDER EQUALITY



**6** CLEAN WATER AND SANITATION



**7** AFFORDABLE AND CLEAN ENERGY



**8** DECENT WORK AND ECONOMIC GROWTH



**9** INDUSTRY, INNOVATION AND INFRASTRUCTURE



**10** REDUCED INEQUALITIES



**11** SUSTAINABLE CITIES AND COMMUNITIES



**12** RESPONSIBLE CONSUMPTION AND PRODUCTION



**13** CLIMATE ACTION



**14** LIFE BELOW WATER



**15** LIFE ON LAND



**16** PEACE, JUSTICE AND STRONG INSTITUTIONS



**17** PARTNERSHIPS FOR THE GOALS



# **Climate Change**



# Climate Change is one of the Greatest Threats to Human Well-Being

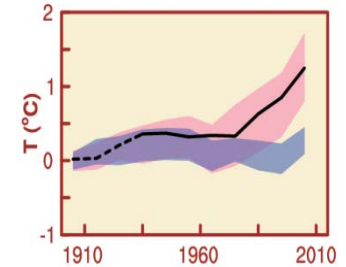
- There is no doubt that human activities are changing the Earth's climate, warmer temperatures, more extreme weather events and sea level rise
- Most of the impacts of climate change are harmful, especially in developing countries, and will undermine the ability of many countries to achieve the 17 UN Sustainable Development Goals (SDGs)
- All countries need to transition to a low-carbon economy to limit human-induced climate change as soon as possible, using cost-effective low-carbon technologies, which are currently available
- The current Paris Agreement Pledges are inadequate to limit climate change to 2°C, let alone the aspirational target of 1.5°C, hence they need to be strengthened
- The time for action is now – we need to both reduce the emissions of greenhouse gases and adapt to a changing climate

# Observed and Simulated Trends in Temperature

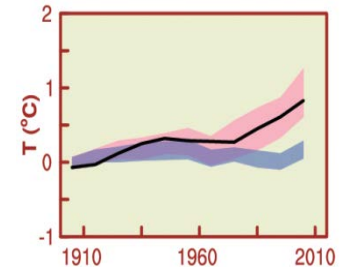
All Figures © IPCC 2013

Global averages

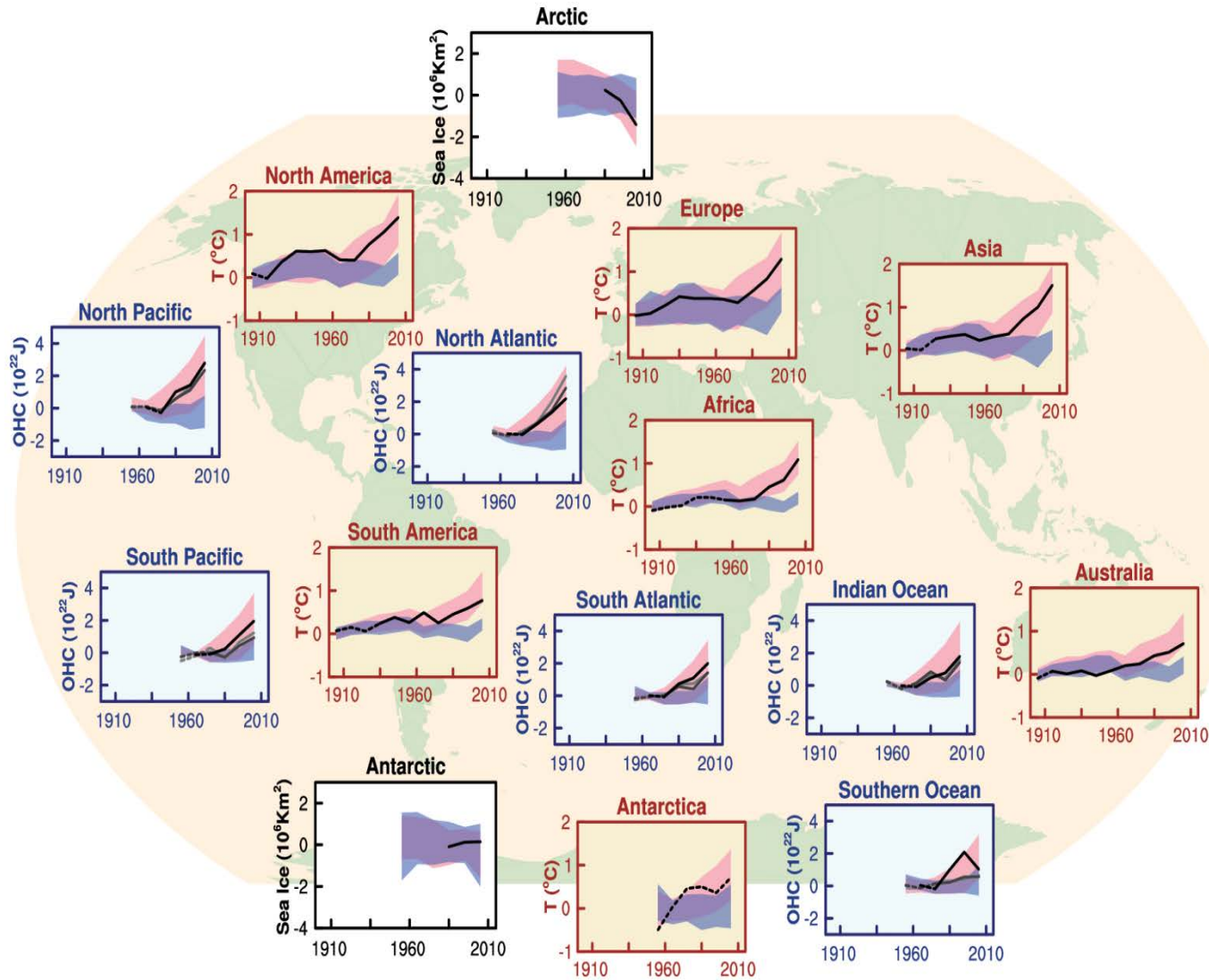
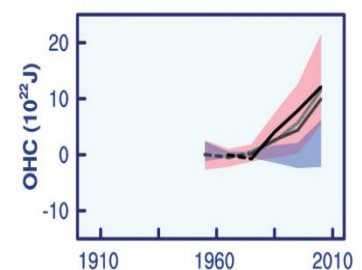
Land surface



Land and ocean surface



Ocean heat content



≡ Observations

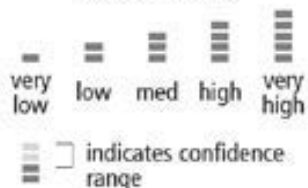
■ Models using only natural forcings

■ Models using both natural and anthropogenic forcings

# Observed Impacts Due to Climate Change



Confidence in attribution to climate change



Observed impacts attributed to climate change for

## Physical Systems



## Biological Systems



## Human & Managed Systems



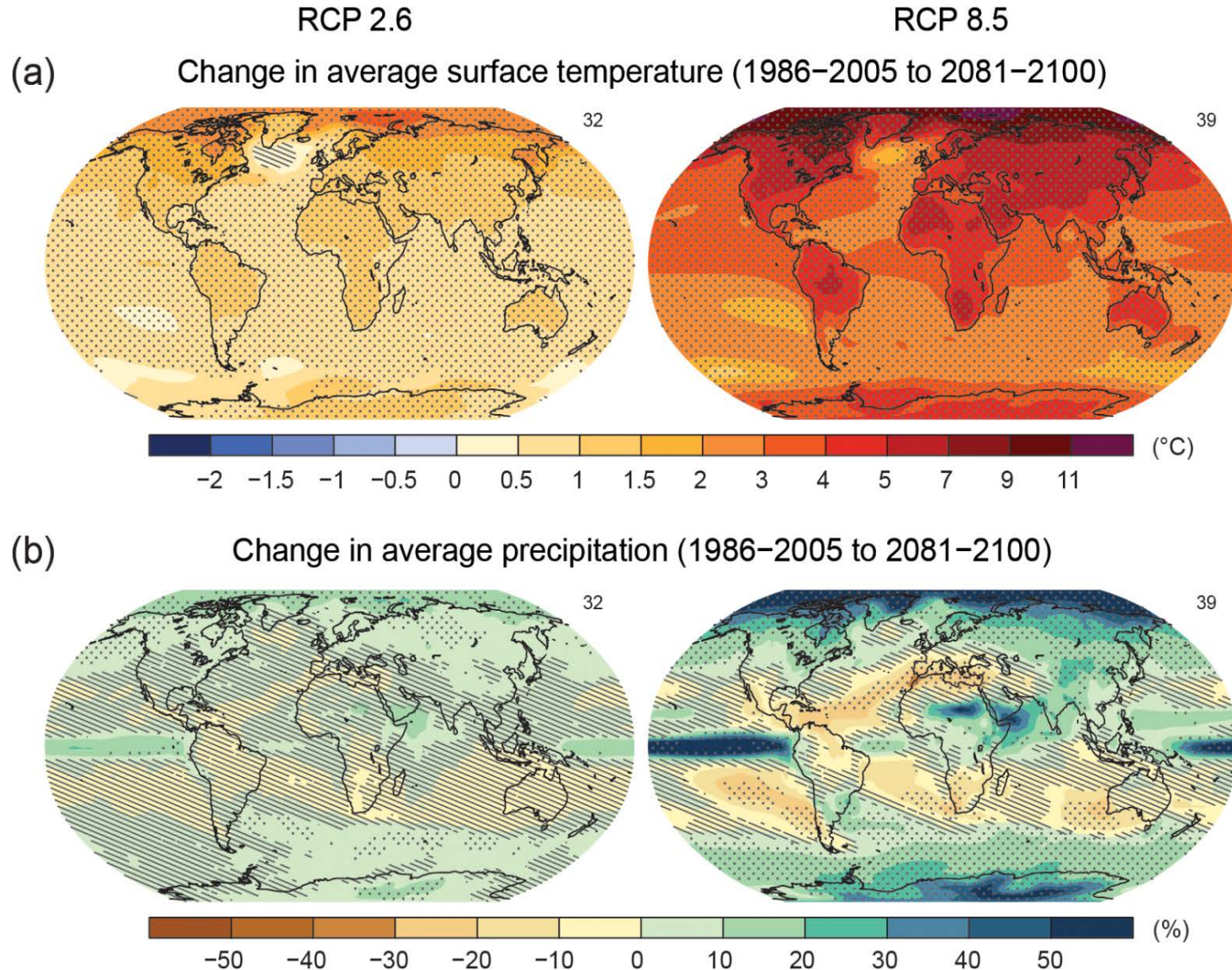
Unfilled Symbols = Minor contribution of climate change  
Filled Symbols = Major contribution of climate change



# Projections of Temperature and Precipitation

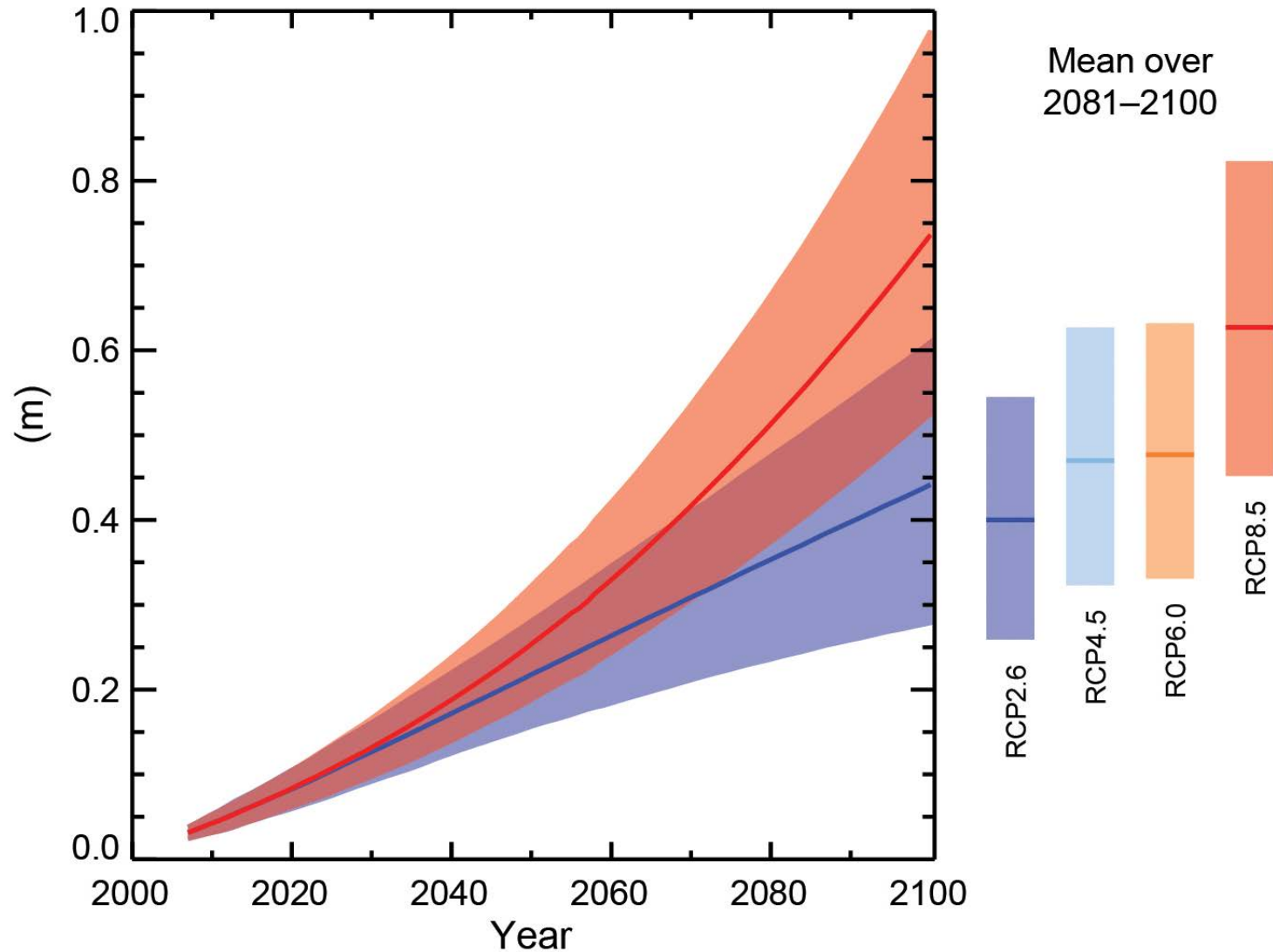
## Maps of CMIP5 multi-model mean results

All Figures © IPCC 2013



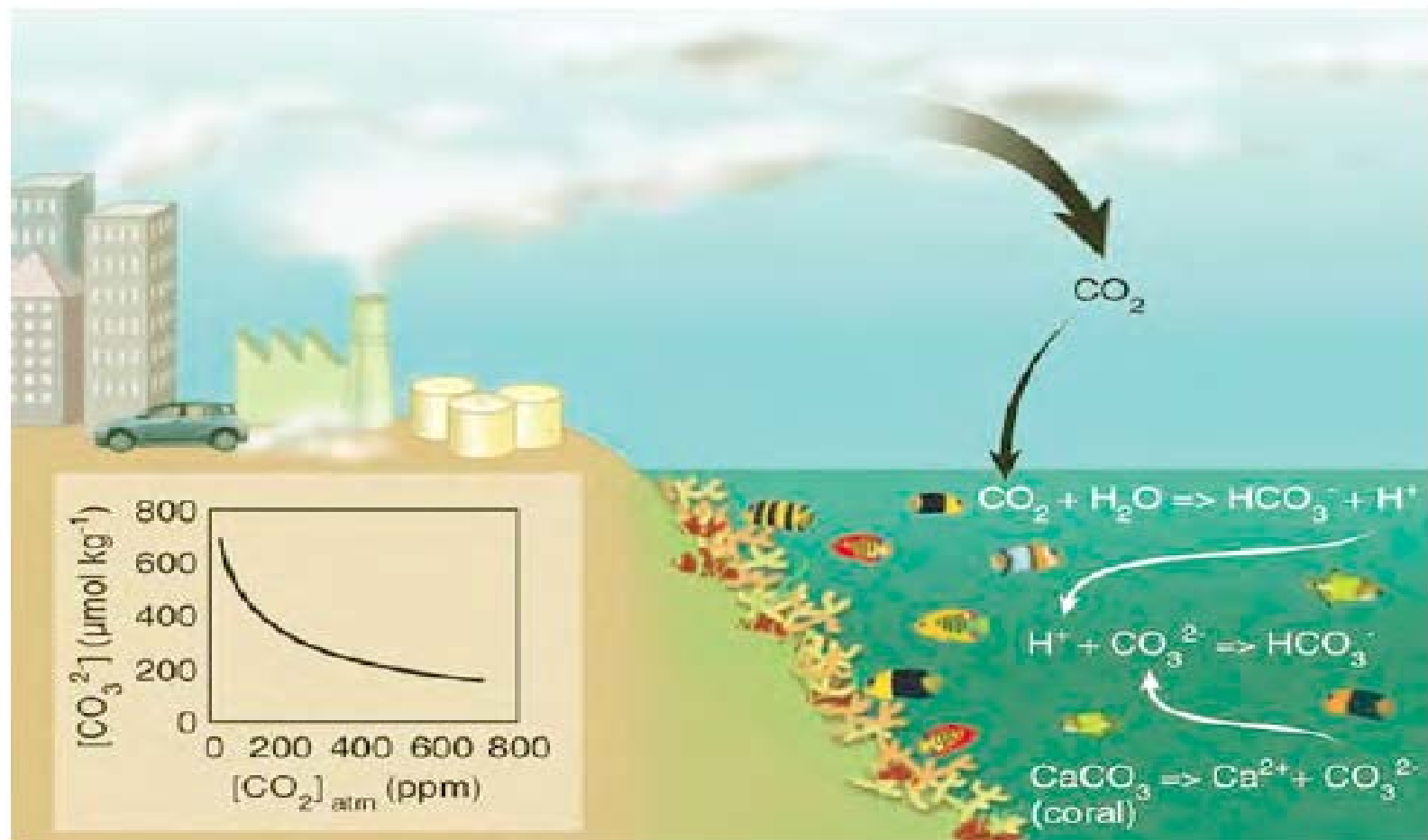
# Global mean sea level rise

All Figures © IPCC 2013



# Ocean acidification

Figure 18. Linkages between the buildup of atmospheric  $\text{CO}_2$ , the increase in ocean acidity and the decrease in carbonate ion concentration.



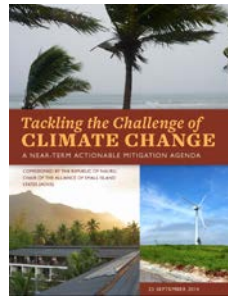
Approximately 25% of the  $\text{CO}_2$  emitted by humans in the period 2000 to 2006 was taken up by the ocean where it combined with water to produce carbonic acid, which releases a proton that combines with a carbonate ion. This decreases the concentration of carbonate, making it unavailable to marine organisms that form calcium carbonate shells. (Source: Hoegh-Guldberg et al. 2007)

# Projected Impacts of Climate Change

- Higher temperatures and more variable precipitation (resulting in an increase in floods and droughts), coupled with an increase in extreme events, e.g., intense cyclones, will adversely impact **agriculture and water resources** (quality and quantity)
- An increase in heavy precipitation events, will increase **soil erosion** with the potential of increase siltation of reservoirs and **landslides**
- Sea level rise will impact **coastal infrastructure and local communities**, including salt water intrusion impacting **water quality and agriculture**
- Ocean acidification will adversely impact on **fisheries and coral reefs**
- Increased incidence of **hunger, heat stress mortality, vector and water-borne diseases**
- Warmer temperatures, extreme weather events, and more variable precipitation will adversely impact on **biodiversity and ecosystems**

**Poor people and developing countries are the most vulnerable**

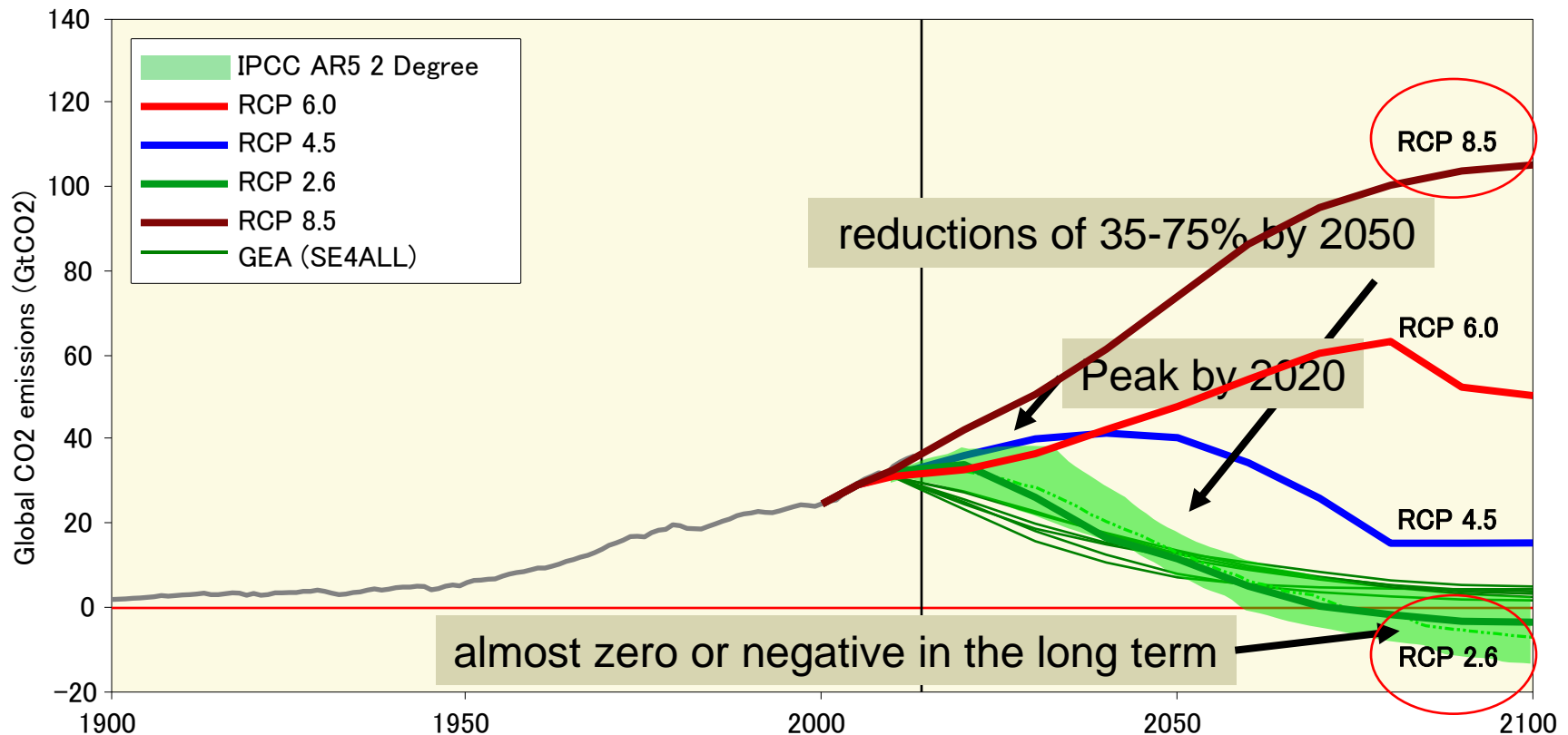
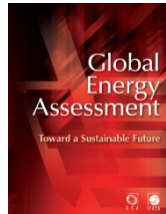
# Tackling the Challenge of Climate Change – a near-term actionable agenda



- Significant cost-effective potential to **rapidly increase energy efficiency** in all sectors with existing commercially available technologies
- Significant scope for the early **deployment of renewable energy technologies** (wind, solar and possibly modern biomass), if supported with appropriate policies and increased public and private sector financing
- An effective **price on carbon** to reflect the health and environmental costs of emissions
- A systems-wide transformation towards a low-carbon economy requires **policies to catalyze behavioural change** across societies
- The least efficient coal plants should be retired and **no more coal plants without carbon capture and storage should be built**



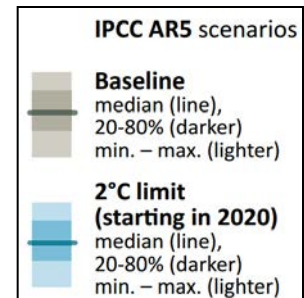
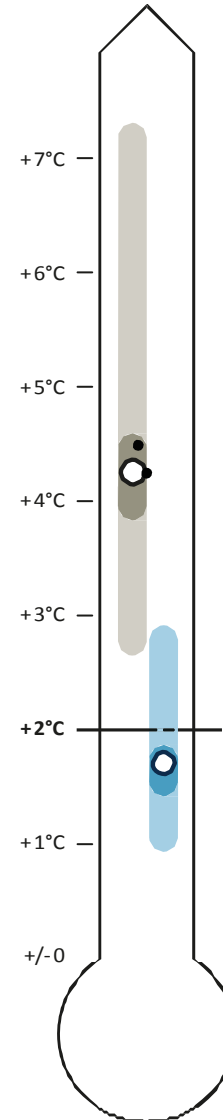
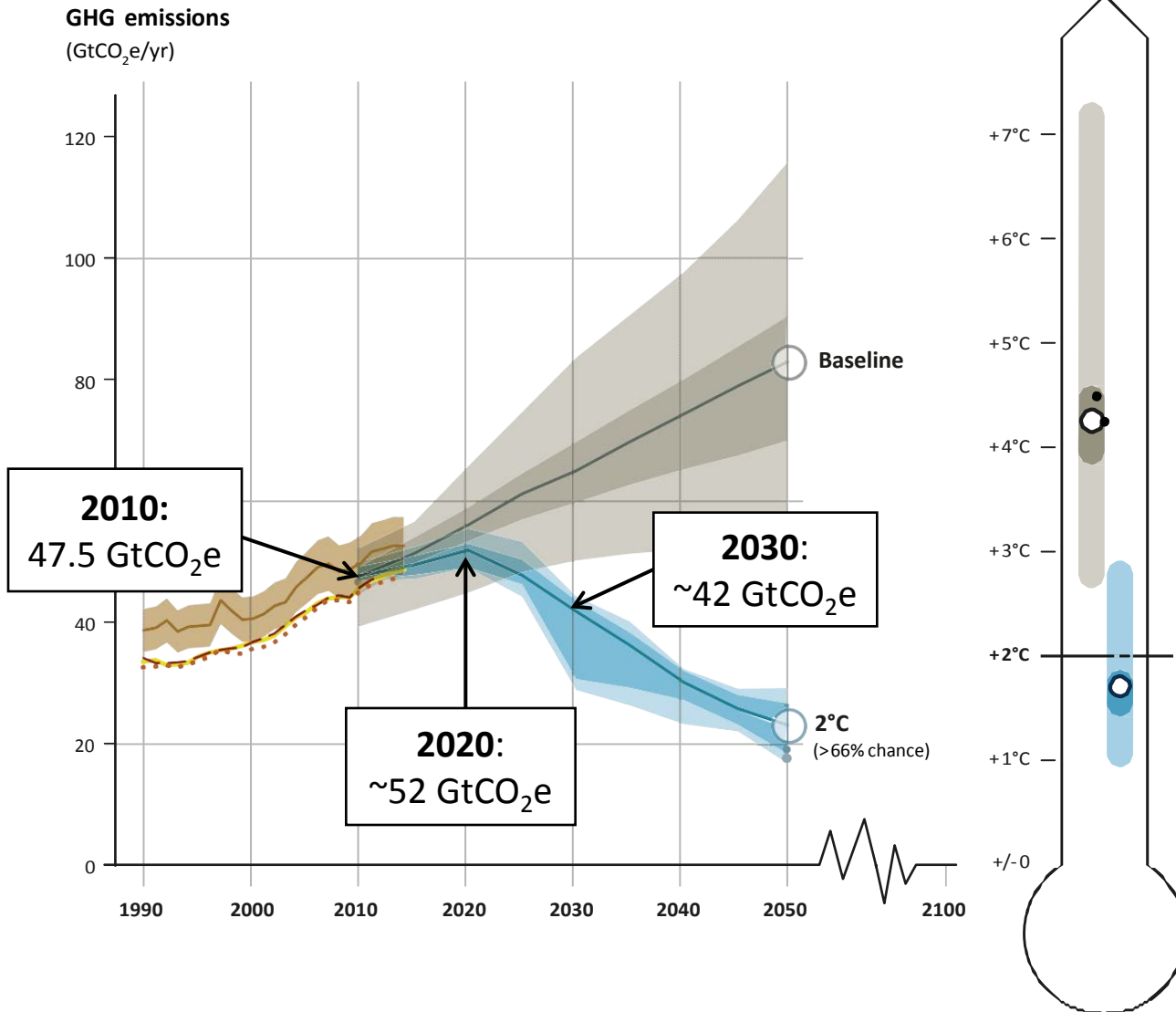
# Global CO<sub>2</sub> Emissions



# Staying within the 2°C target



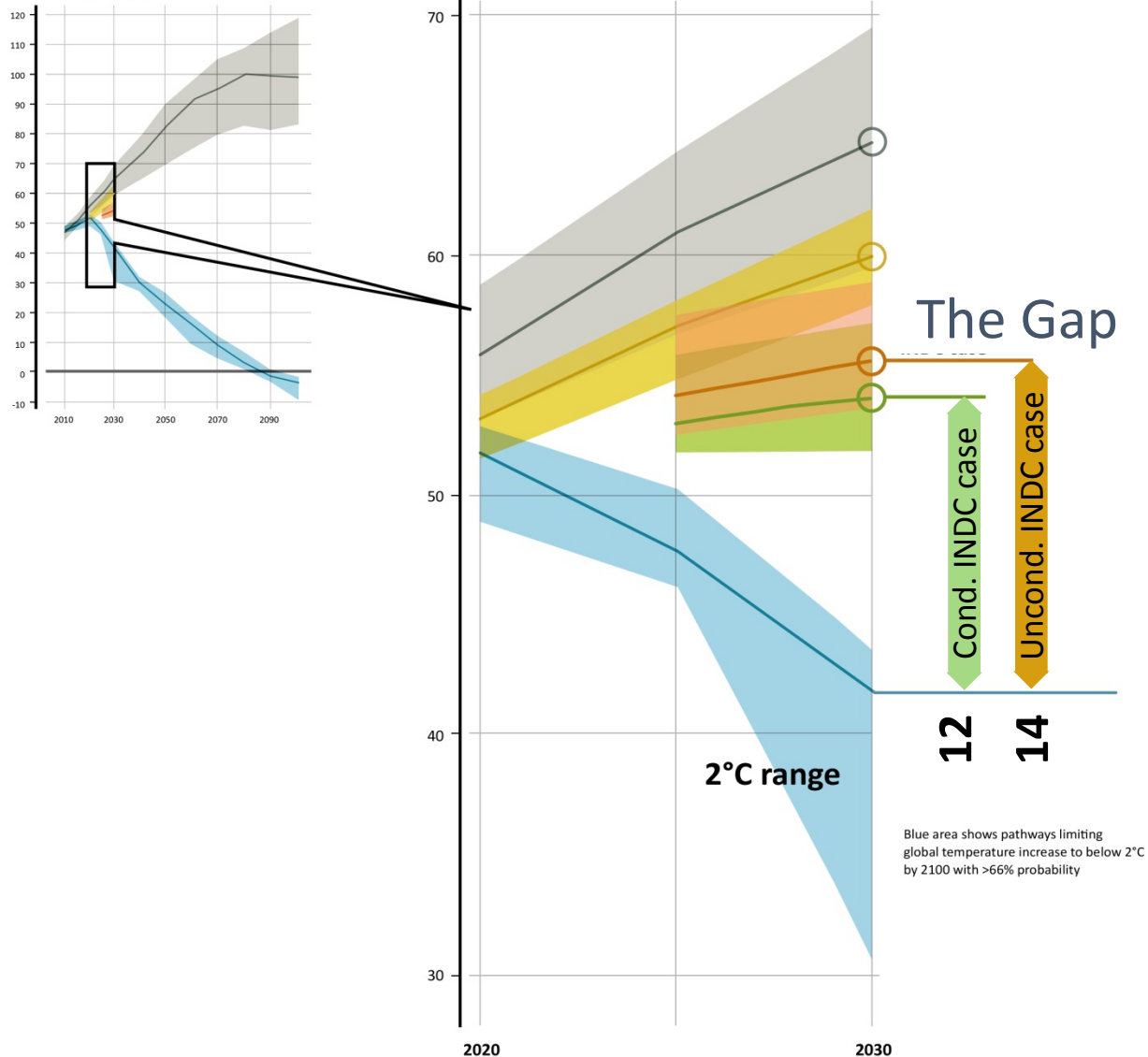
Estimated  
global  
warming by  
**2100**  
(° C rel.  
1850-1900)



Credit: UNEP, 2015 [https://www.dropbox.com/sh/vk018yr6h5xulnc/AAB-ISJFv\\_Xy7BFF4uBKIUVWa?dl=0](https://www.dropbox.com/sh/vk018yr6h5xulnc/AAB-ISJFv_Xy7BFF4uBKIUVWa?dl=0)

# INDC contributions and the emissions gap

Annual Global Total Greenhouse Gas Emissions (GtCO<sub>2</sub>e)



**Unconditional INDC case**

Gap= 14 GtCO<sub>2</sub>e

**Conditional INDC case**

Gap= 12 GtCO<sub>2</sub>e

The INDCs present a real increase in the ambition level compared to a projection of current policies.

The emissions gap in both 2025 and 2030 will be very significant and ambitions will need to be enhanced urgently.

# The Truth about the Paris Agreement

While the Paris Agreement is an **important step** to limit human-induced climate change, **the pledges by 189 nations are inadequate** to achieve the 2°C target - what is needed is a doubling or tripling of efforts

Global Temperature Could Reach the **2°C Threshold by 2050-2060** and the **1.5°C aspirational target by the early 2030s**

Without additional actions to reduce greenhouse gas emissions we are on **pathway to 3-4°C**

# **Biodiversity and Ecosystem Services**

# What is biodiversity?

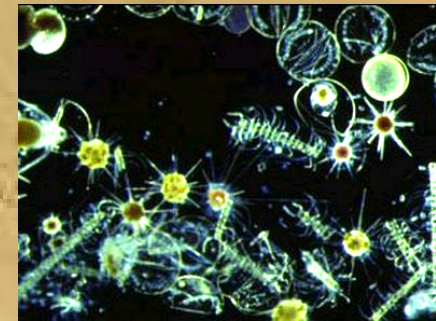
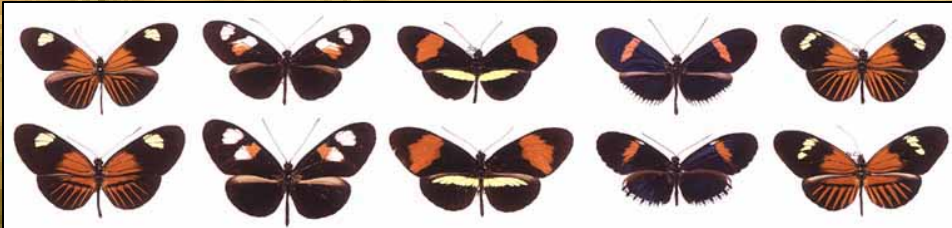
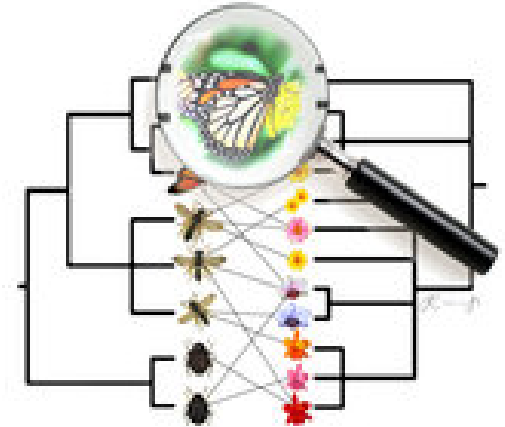
## The variety of life

at all levels...

.... genes, populations, species and ecosystems...

.... land, water and air.

.... and the interactions between living things



# What are ecosystem services?

The benefits people derive from ecosystems

Ecosystem service type	Final ecosystem services ( <i>example of goods</i> )	Intermediate ecosystem services and processes
Provisioning	Crops, livestock, fish ( <b>food</b> ) Trees, standing vegetation, peat ( <b>fibre, energy, carbon seq.</b> ) Water supply ( <b>domestic and industrial water</b> ) Wild species diversity ( <b>Recreation, food, disease/pest control</b> )	
Cultural	Meaningful places ( <b>Recreation, tourism, Spiritual/religious</b> ) Socially valued land/waterscapes ( <b>Recreation, tourism, spiritual/religious</b> )	
Regulating	Climate regulation ( <b>equable climate</b> ) Pollination Hazard regulation ( <b>erosion control, flood control</b> ) Noise regulation ( <b>noise control</b> ) Waste detoxification and purification ( <b>pollution control</b> ) Disease and pest regulation ( <b>disease and pest control</b> )	Pollination

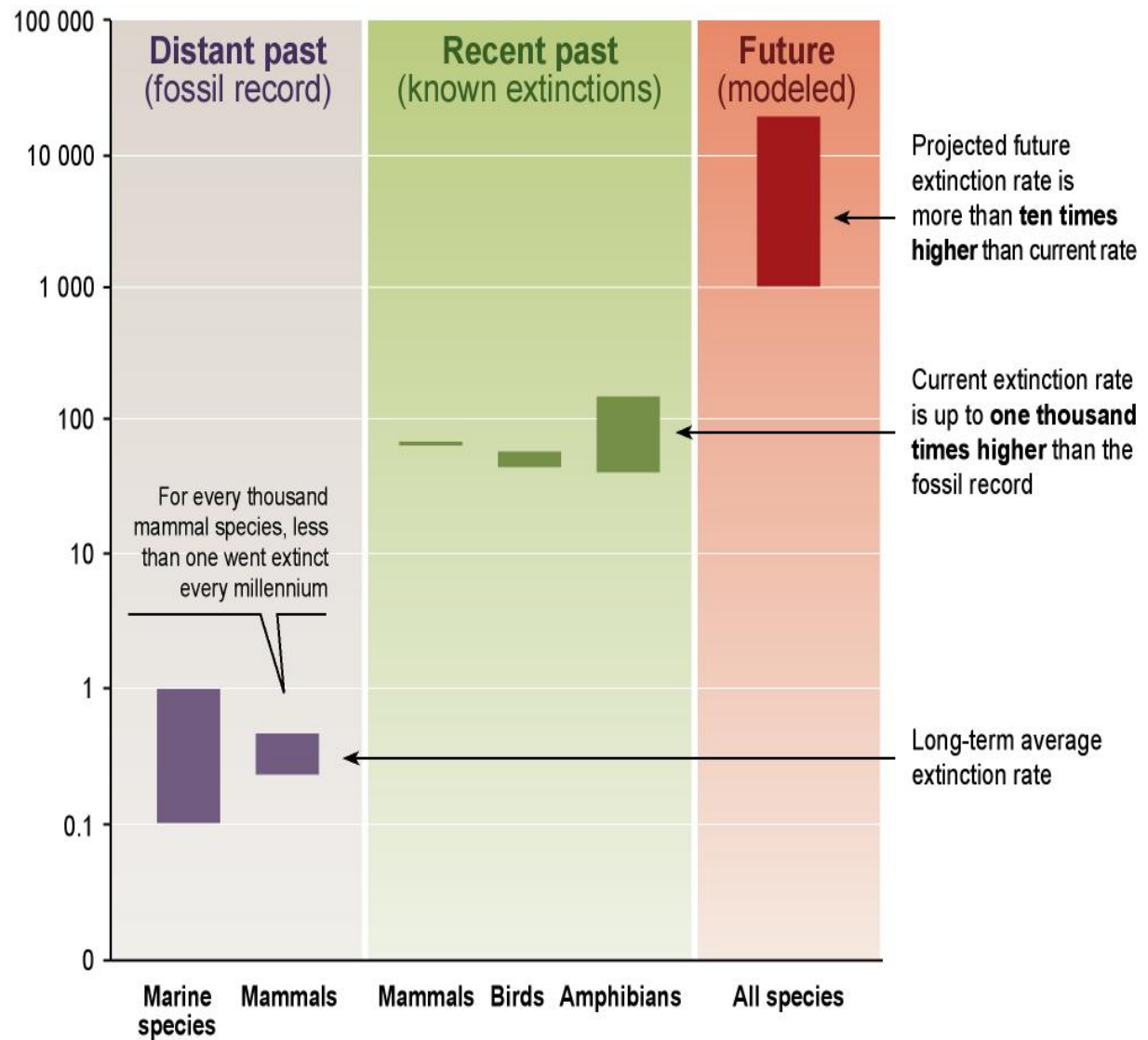


# Species extinctions

Human activities have taken the planet to the edge of a massive wave of species extinctions, further threatening our own well-being



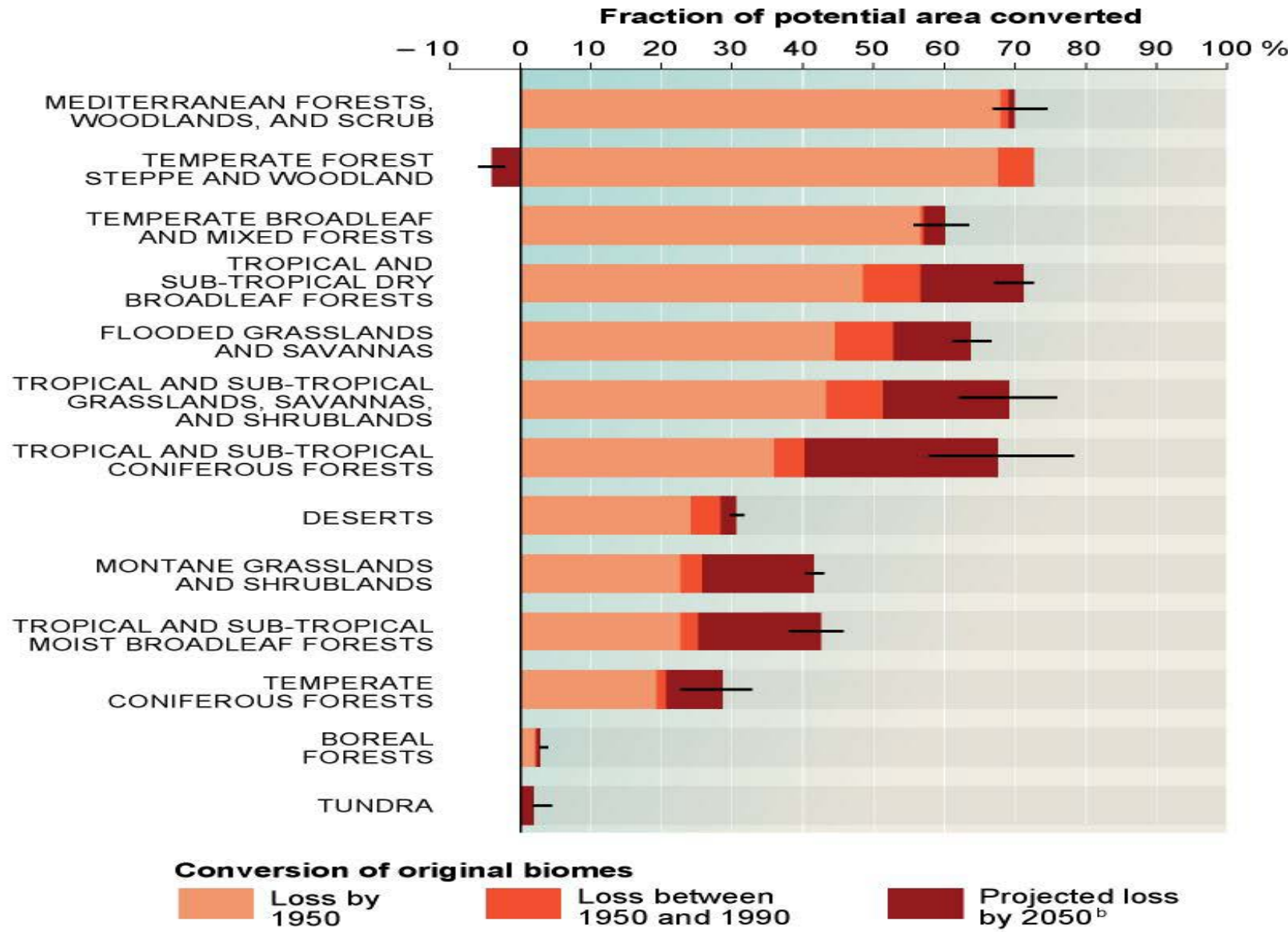
Extinctions per thousand species per millennium



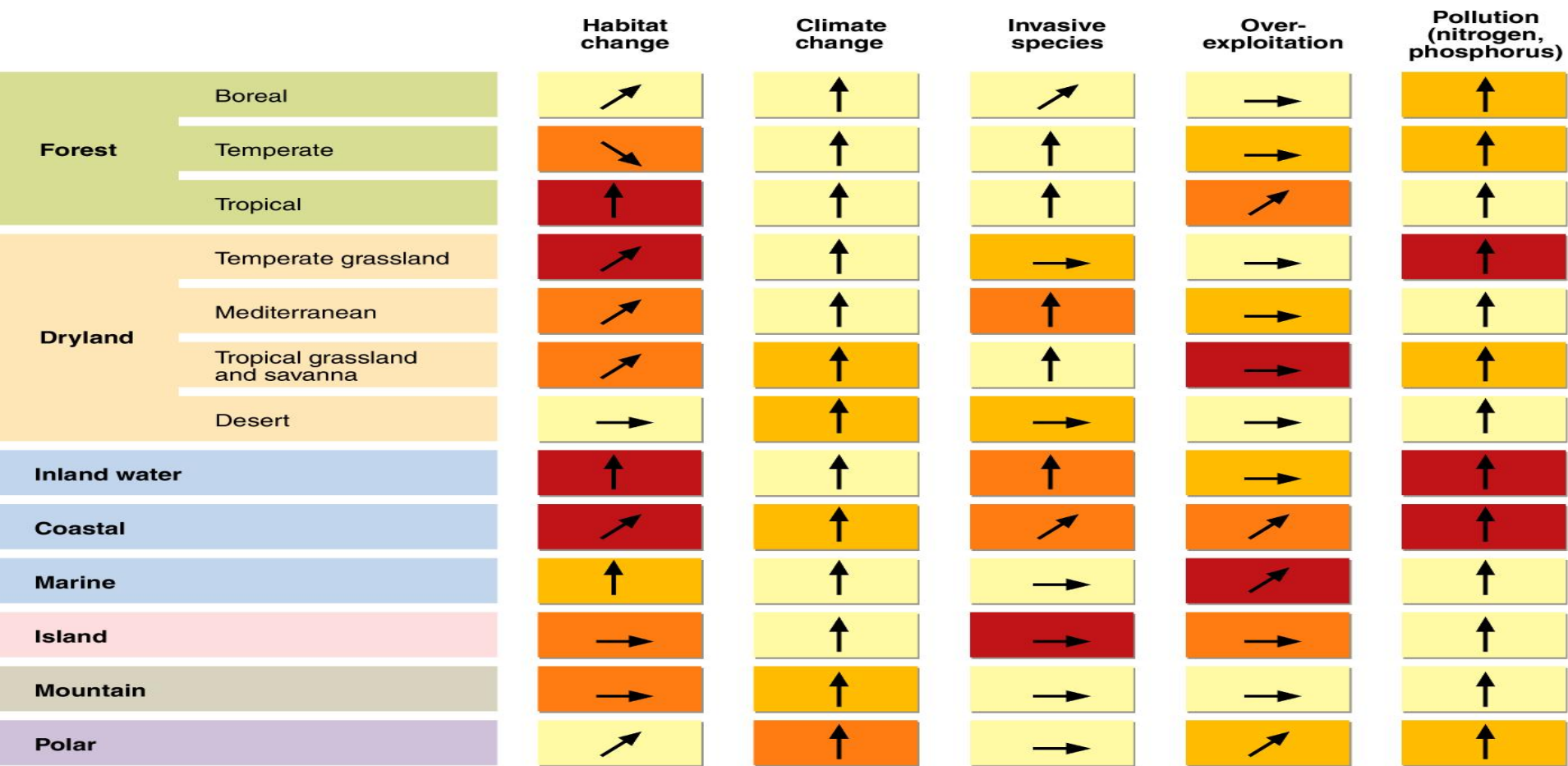
Source: Millennium Ecosystem Assessment



# Unprecedented change: Ecosystems

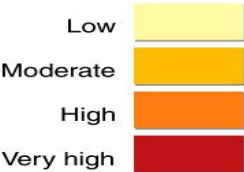


# Drivers of biodiversity loss growing



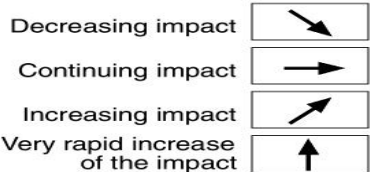
## RESULT OF PAST EVOLUTION

Driver’s impact on biodiversity over the last century



## WHAT HAPPENS TODAY

Driver’s actual trends



Source: Millennium Ecosystem Assessment

# 2020 Aichi Targets

## Mainstreaming

1. Aware of values of biodiversity
2. Biodiversity values integrated into national accounting
3. Eliminate subsidies and promote subsidies to protect biodiversity
4. Implement sustainable production and consumption plans

## Direct drivers

1. Half the loss of natural habitats
2. Marine species harvested sustainably
3. Agriculture, forestry and aquaculture managed sustainably
4. Pollution levels reduced to avoid impacts on biodiversity
5. Invasive alien species under control
6. Minimize impacts of climate change and ocean acidification on coral reefs

## Improved status

1. Terrestrial (17%) and marine (10%) protected areas
2. Prevent extinction of threatened species
3. Maintain genetic diversity of cultivated plants, wild relatives maintained

## Enhanced benefits

1. Restore ecosystem services – water, health, livelihoods and well-being
2. Enhance carbon storage
3. Implement equitable sharing of benefits – Nagoya Protocol

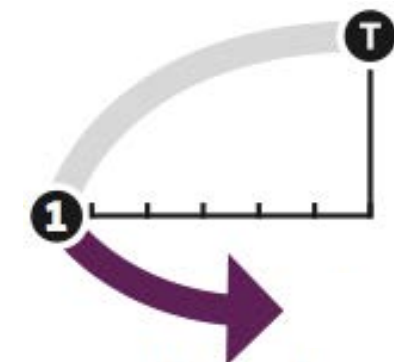
## Implementation

1. National actionable biodiversity plans developed and implemented
2. ILK respected
3. Improved scientific understanding
4. Mobilize financial resources

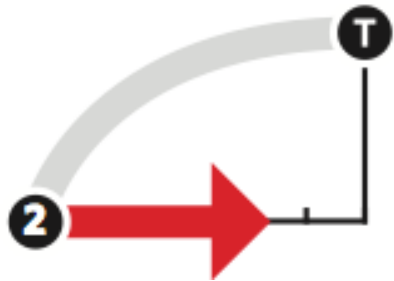


## GBO-4 “dashboard”:

### Assessment of progress towards the Aichi Biodiversity Targets



**Moving  
away from  
Target**



**No progress  
towards  
target**



**Progress  
towards target,  
but not to  
achieve it**



**On track to  
achieve  
Target**



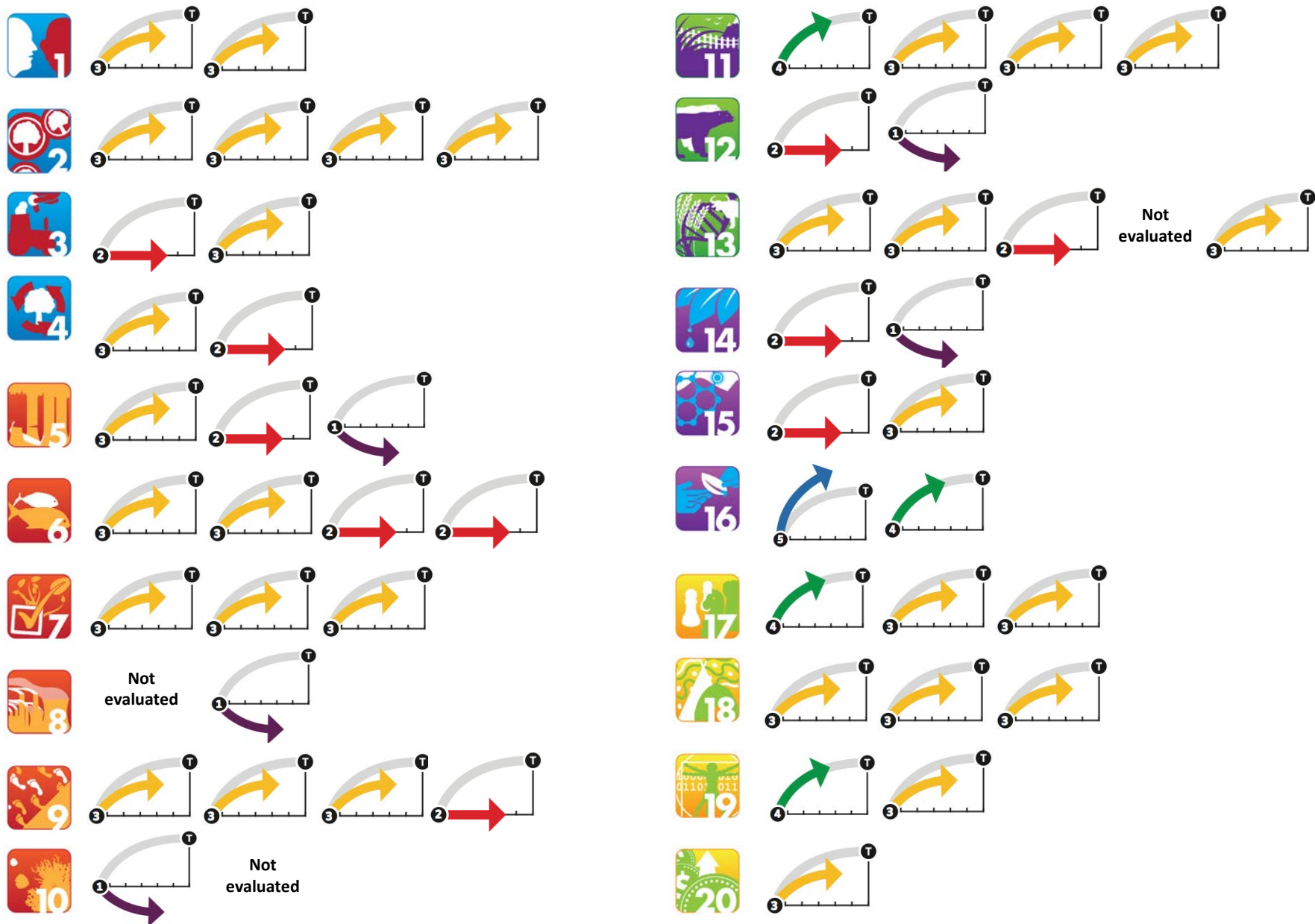
**On track to  
exceed  
Target**

No clear  
evaluation

**Insufficient  
information  
to evaluate  
progress**

# Progress towards the Aichi Biodiversity Targets: 55 Indicators

## GBO-4 Assessment



# SDGs Affected by Climate Change and Loss of Biodiversity

1. End **poverty** in all its forms everywhere
2. End **hunger**, achieve **food security** and promote sustainable agriculture
3. Ensure **healthy lives** and promote well-being for all at all ages
4. Ensure inclusive and equitable quality **education** and promote life-long learning opportunities for all
5. Achieve **gender equality** and empower all women and girls
6. Ensure availability and sustainable management of **water and sanitation** for all
7. Ensure access to affordable, reliable, sustainable, and **modern energy** for all
8. Promote sustained, inclusive and sustainable **economic growth**, full and productive employment and decent work for all
9. Build **resilient infrastructure**, promote inclusive and sustainable industrialization and foster innovation
10. Reduce **inequality** within and among countries
11. Make **cities and human settlements** inclusive, safe, resilient and sustainable
12. Ensure **sustainable consumption and production** patterns
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
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
16. Promote **peaceful and inclusive societies** for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development



# Conclusions

- **The world:**
  - is vulnerable to human-induced climate change and loss of biodiversity
  - has considerable opportunities to **increase the efficient use of energy and to exploit cost-effective renewable energy technologies**, and **conserve and sustainably use biodiversity**
  - must recognize that there is **no dichotomy between economic growth and protecting the environment**, indeed, the old philosophy of pollute now and clean-up later has been completely discredited

**The world is not on course to achieve the Aichi targets or the Paris agreement, hence undermining the SDGs**

**Act now to transition to a low-carbon economy**

**Act now to conserve and protect biodiversity**

**We need to generate new knowledge (e.g., Future Earth) and assess knowledge (IPCC and IPBES) for informed decision-making**

# The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

- **Objective:** Strengthen the science-policy interface by providing policy relevant knowledge on biodiversity and ecosystem services to inform decision making – biodiversity equivalent of IPCC
- Currently 127 Members (Governments)
- Independent intergovernmental body administered by UNEP, serving all biodiversity-related MEAs and relevant UN agencies
- Currently implementing its first Work Programme (2014-2018)



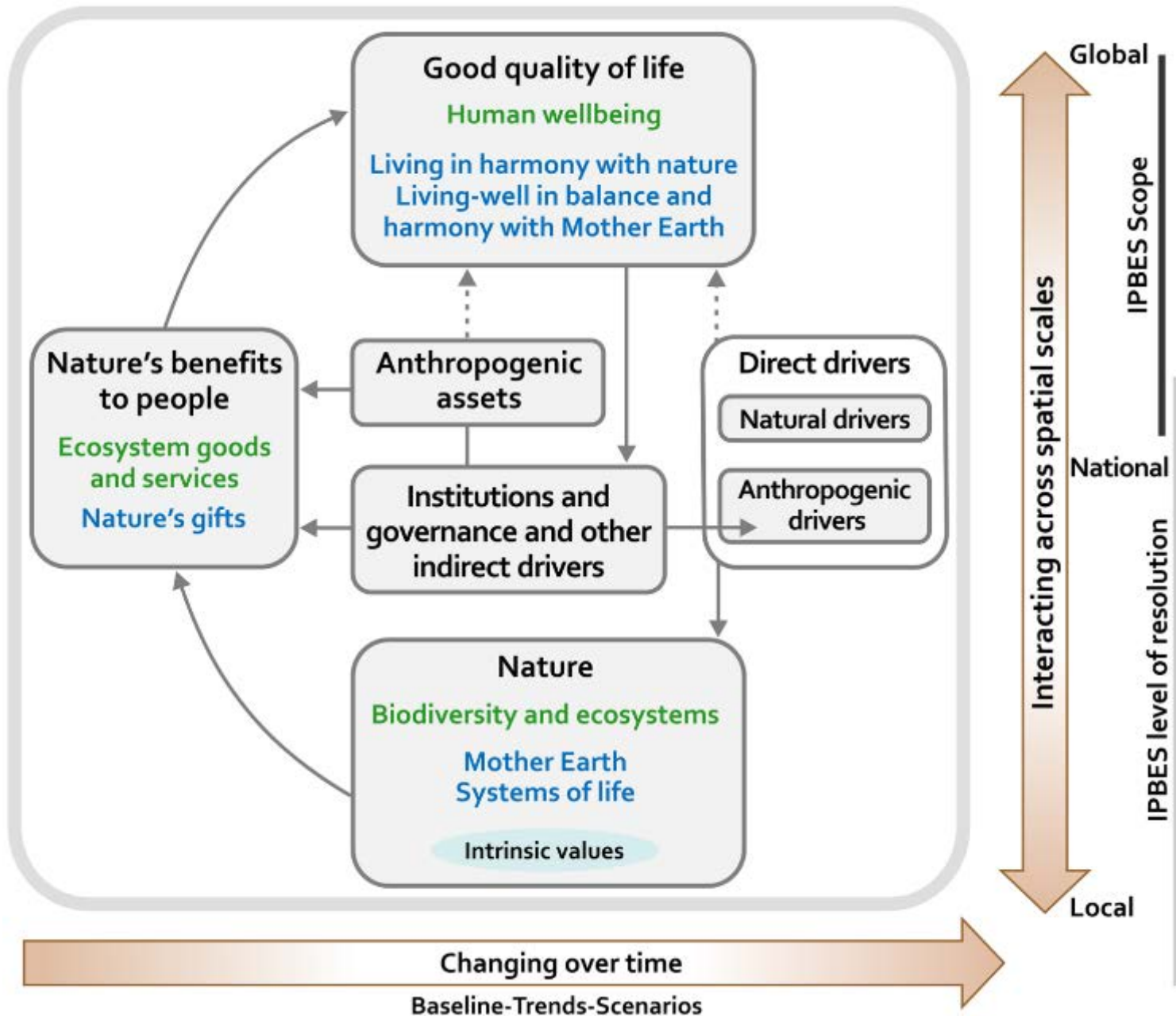


# The 4 functions of IPBES

IPBES was established with four agreed functions – all covered within the first work program (2014-2018) - The budget for the first work programme is about \$40M, plus significant in-kind contributions

<ul style="list-style-type: none"><li>• <b>Assessment</b></li></ul>	Deliver global, regional, thematic and methodological assessments on biodiversity and ecosystem services
<ul style="list-style-type: none"><li>• <b>Knowledge generation catalysis</b></li></ul>	Catalyse efforts to generate new knowledge
<ul style="list-style-type: none"><li>• <b>Policy support tools</b></li></ul>	Identify policy relevant tools/methodologies, facilitate their use, and promote and catalyse their further development
<ul style="list-style-type: none"><li>• <b>Capacity building</b></li></ul>	Prioritize key capacity building needs, and provide and call for financial and other support to address them

# IPBES work follows this Conceptual Framework:



# IPBES Assessments

## **2 full assessments completed and approved by IPBES-4 (Feb 2016)**

- Pollination and pollinators associated with food production
- Scenarios and models of biodiversity & ecosystem services

## **5 assessments initiated in 2015 (to be delivered mid 2018)**

- Land degradation and restoration
- 4 Regional/Subregional assessments
  - Africa
  - Americas
  - Asia-Pacific
  - Europe and Central Asia

## **Global assessment initiated in 2016 (to be delivered mid-2019)**

**THANK YOU**