

# Forests and

# climate change

5 APRIL, 2019

TROPICAL RAINFOREST  
CONSERVATION  
& RESEARCH CENTRE





# Forests and People

## Solutions to tackle climate change

5 APRIL, 2019

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## In this session

- 1) **Why** is the climate changing?
- 2) What are the **impacts** of climate change?
- 3) What is **Climate Vulnerability**?
- 4) What is the relationship between **Forests and Climate Change**?
- 5) How can we **respond** to climate change?



# Weather or climate?

## Weather: Short Timescales

“hours, days”



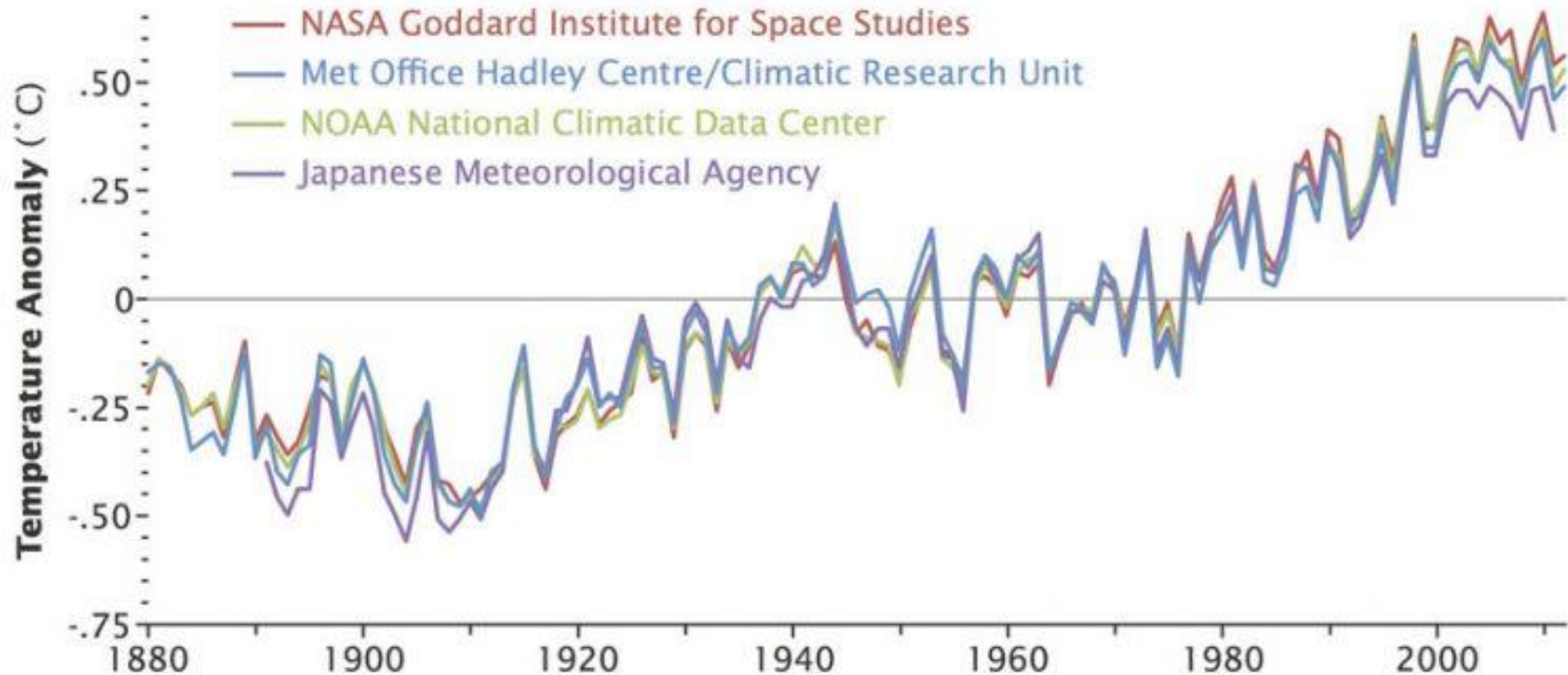
## Climate: Long Timescales

“average over the past 30 years”



# The World is Warming

97% of publications by climate scientists in peer-reviewed scientific journals agree that climate change is happening

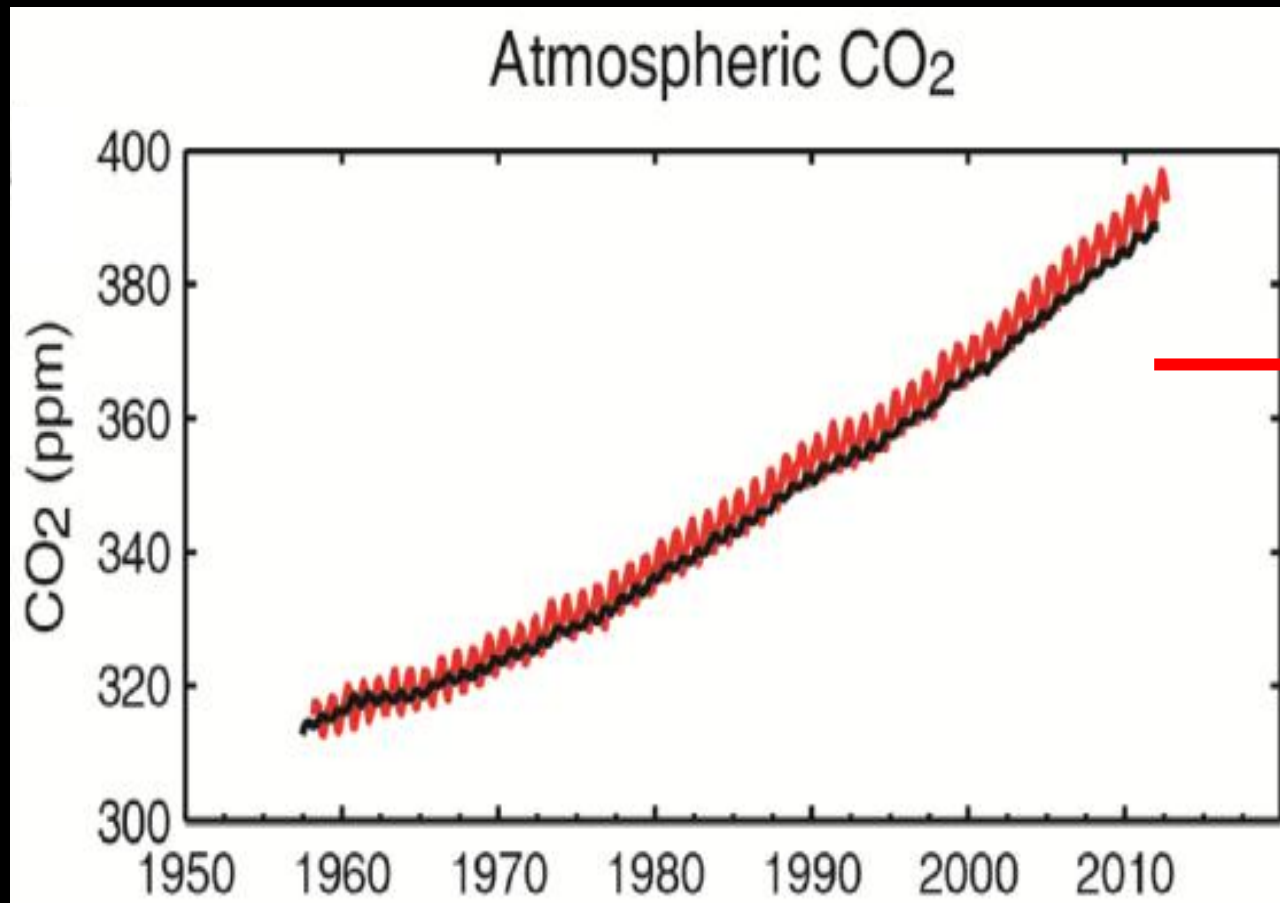


Temperature data from 1880 to 2020 from four international science institutions.

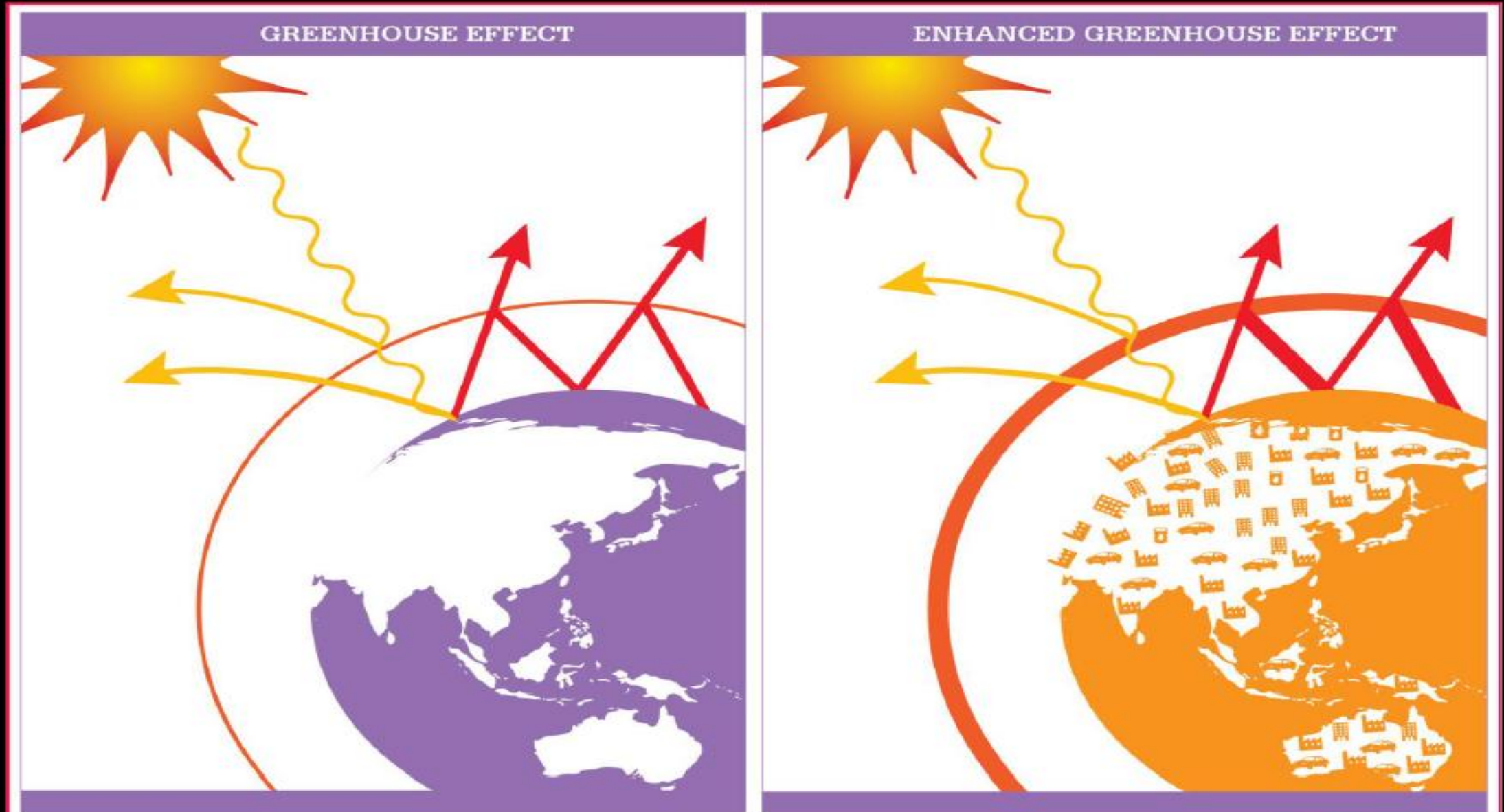


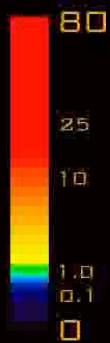
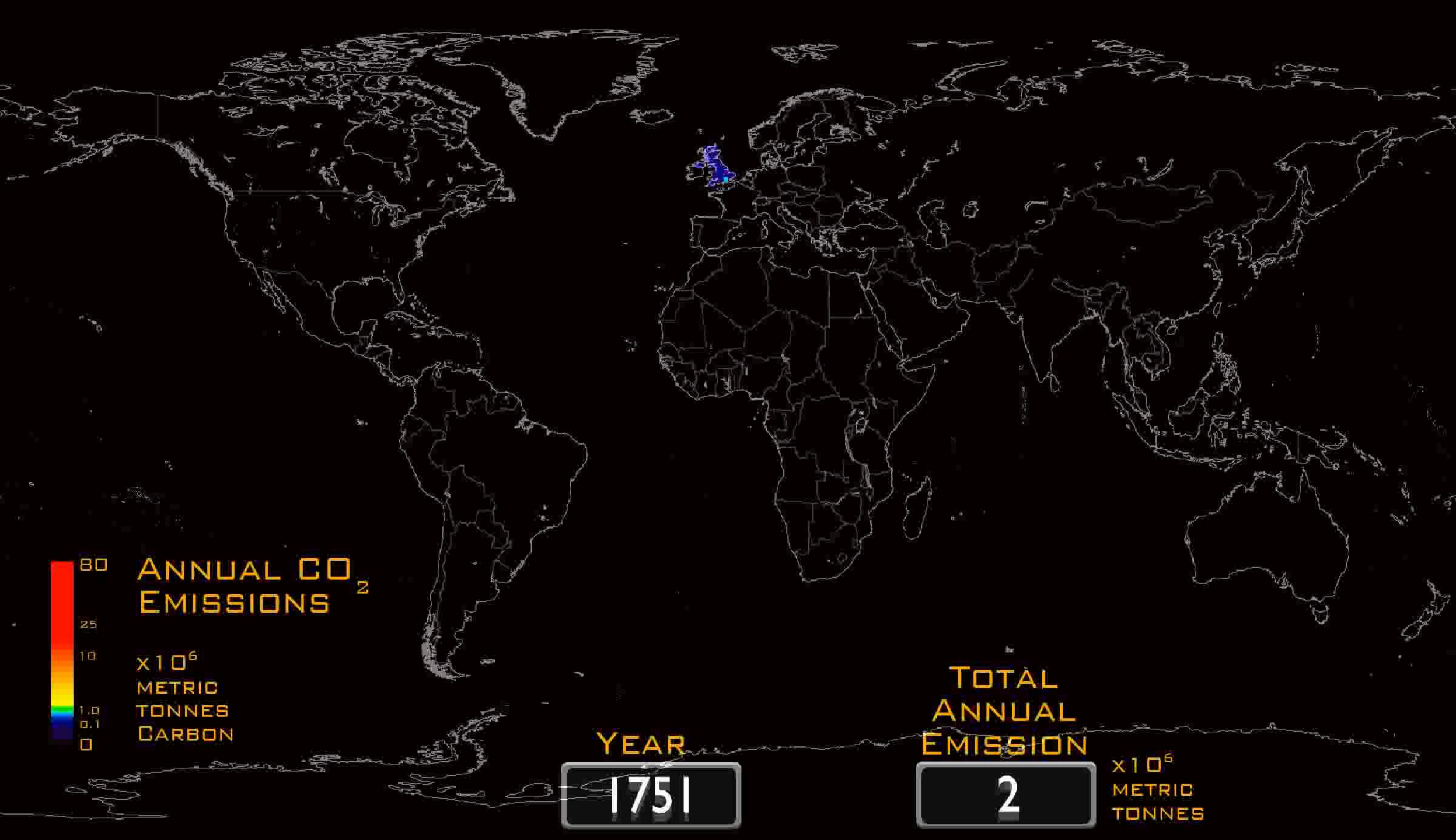
# Why is it getting warmer?

Greenhouse gases are acting as a blanket around the earth



# Enhanced Greenhouse Effect





ANNUAL CO<sub>2</sub>  
EMISSIONS

x10<sup>6</sup>  
METRIC  
TONNES  
CARBON

YEAR

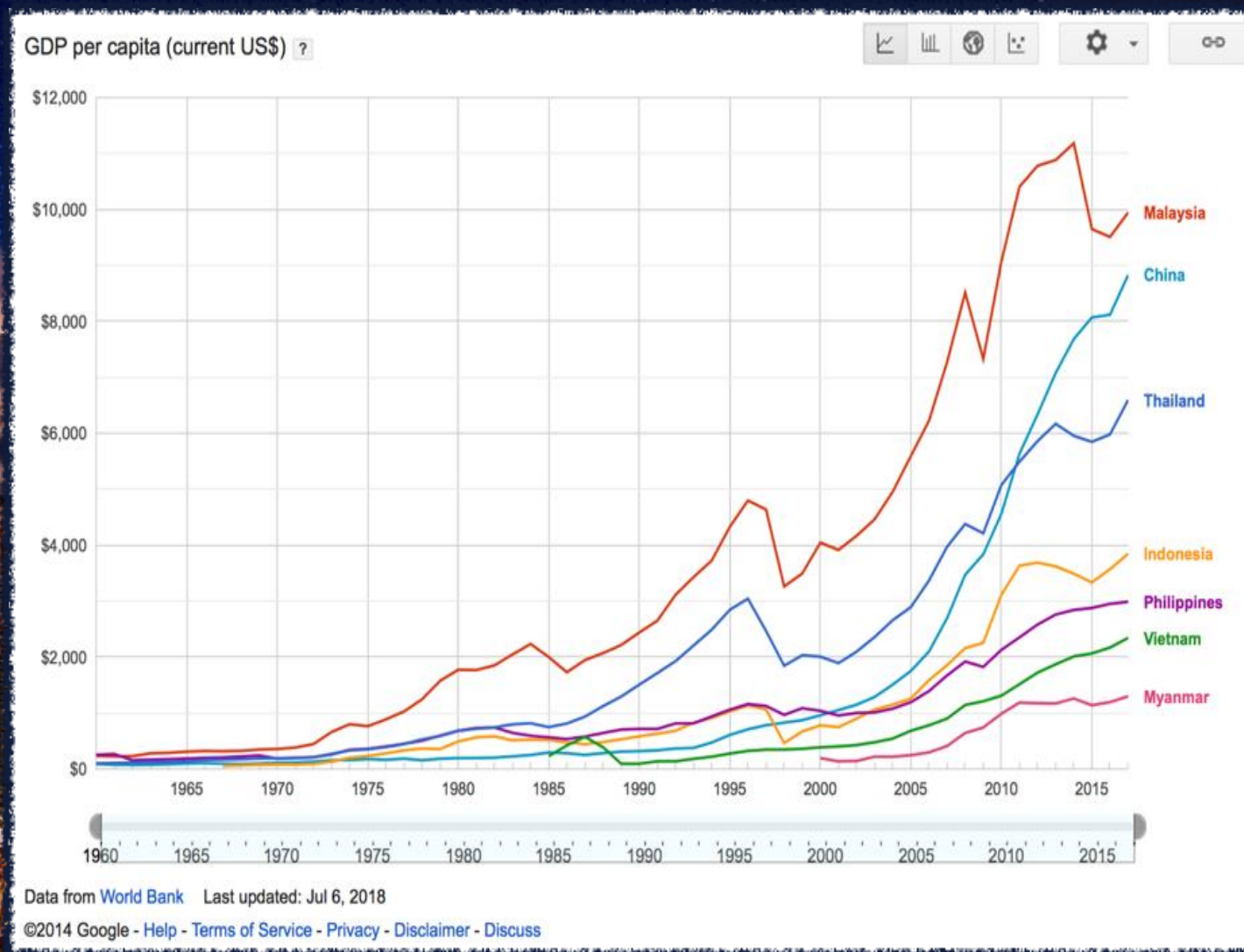
1751

TOTAL  
ANNUAL  
EMISSION

2

x10<sup>6</sup>  
METRIC  
TONNES





**Breathtaking economic development in Malaysia**



**ENERGY**



**FOREST CLEARANCE**



**TRANSPORT**



**FOOD PRODUCTION**





#RICHER&HOTTER



# The earth is getting warmer – what does this mean?



**Rising temperatures, heat waves**



**Sea level rise**



**Melting ice**



**Ocean acidification**



**Changing rainfall patterns**



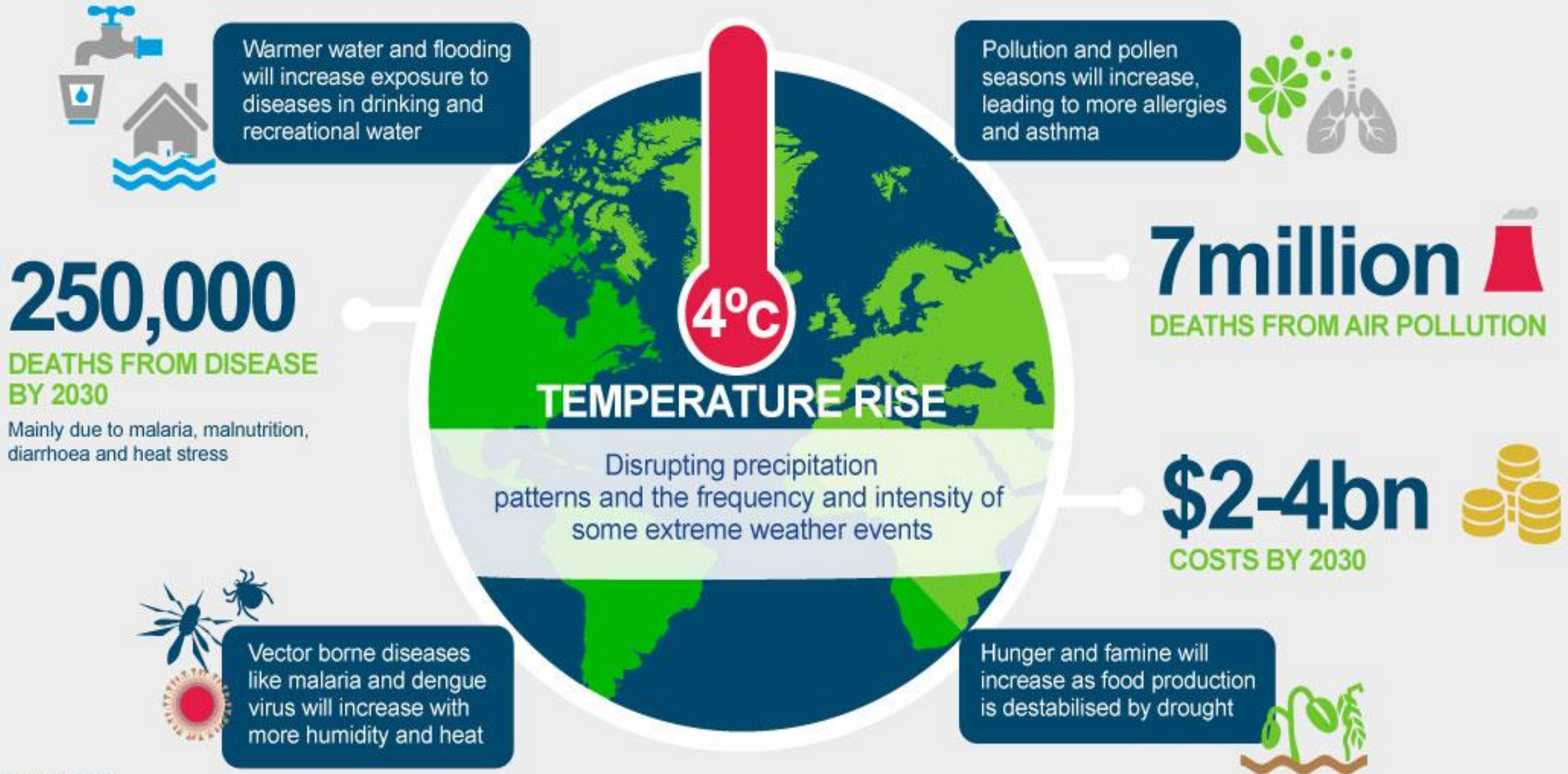
**Changes in extreme events**

**Scientists very sure**

**Less clear, and  
regional differences**



# How climate change could impact the world

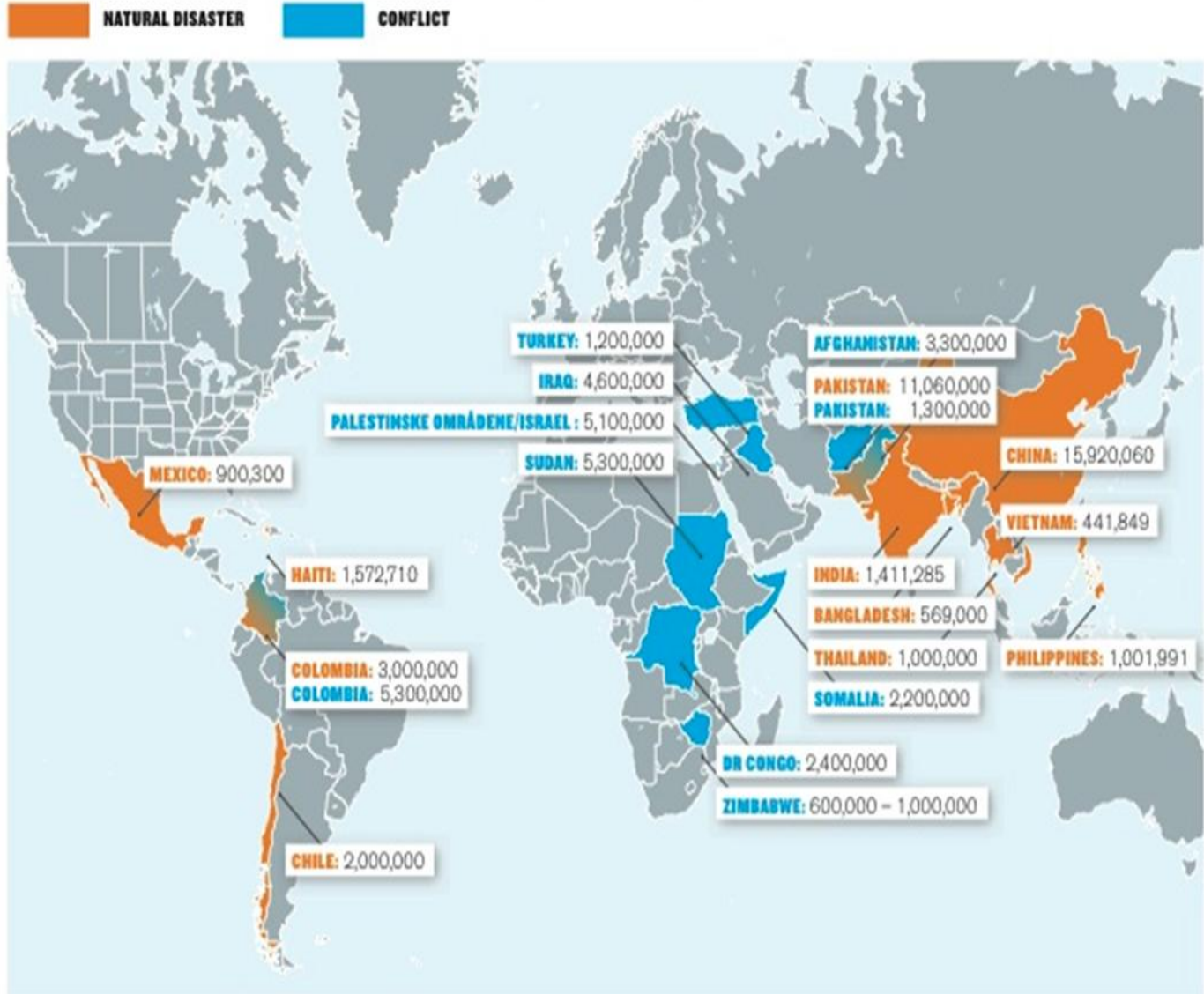


Source: WHO

Credit: Rebecca Robinson/LSHTM

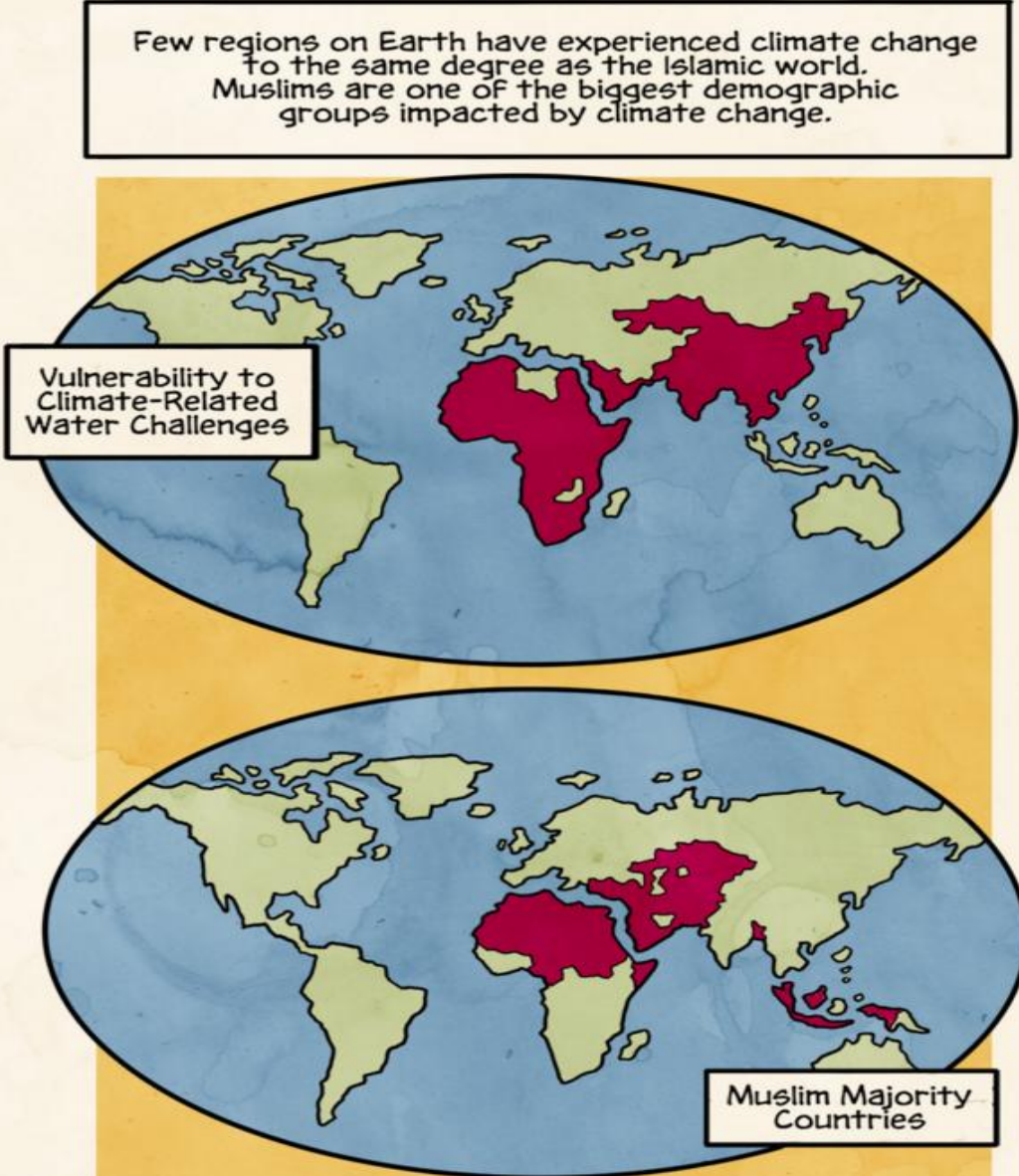


# TEN WORST HUMANITARIAN CRISES CAUSED BY (1) NATURAL DISASTERS AND (2) CONFLICT, 2010



The number of people displaced by conflict are cumulative figures, numbers of displaced by natural disasters are, on the other hand, newly displaced in 2010. All statistics regarding the number of people displaced by war and armed conflict in 2010 are approximate. Final numbers of conflict-induced displacement will be published at the end of June by UNHCR/NRC.

# Global climate vulnerability





# What does this mean to Malaysians?



Discussion:

How are your daily activities and lifestyle affected by climate change?

Also, how do you feel about it?

## Of the world's 100 most polluted cities, 99 are in Asia

The world's filthiest air is in India, but weighted by population it's worse in Bangladesh. China's notoriously unbreathable air is improving, while Jakarta is in danger of out-smogging Beijing, data from air monitoring stations all over the world has revealed.



Smog enveloping India's capital, New Delhi. Image: Shutterstock

## Air pollution killing more people than smoking, say scientists



A city skyline is covered in fine dust and mist in downtown Seoul, South Korea, 12 March 2019. The air quality was rated as very unhealthy with fine particulate matter (PM2.5) measuring over 89 micrograms per cubic meter, according to data from the Korea Environment Corporation (KECO). EPA

By Reuters - March 12, 2019 @ 6:54pm

LONDON: Air pollution is killing more people every year than smoking, according to research published on Tuesday that called for urgent action to stop burning fossil fuels.

Researchers in Germany and Cyprus estimated that air pollution caused 8.8 million extra deaths in 2015 - almost double the previously estimated 4.5 million.

The World Health Organization (WHO) estimates smoking kills about 7 million people a year globally.



# Climate-related natural disasters cost Malaysia RM8b in last 20 years

Published 5 months ago on 12 October 2018

By Zurairi AR

KUALA LUMPUR, Oct 12 — Earlier this week, the United Nations' Intergovernmental Panel on Climate Change (IPCC) released [a worrying report](#) on climate change, warning that humanity may have a mere 12 years in order to limit global warming to just 1.5 degrees Celsius.

Currently, the world has already warmed up by 1 degree Celsius since the pre-industrial times. And just like the rest of the globe, the impact on Malaysia from floods, storms, droughts, and other extreme weather events are already apparent.

In the two-decade period between 1998 and August this year, Malaysia experienced 51 natural disaster events — with two floods recorded this year alone.



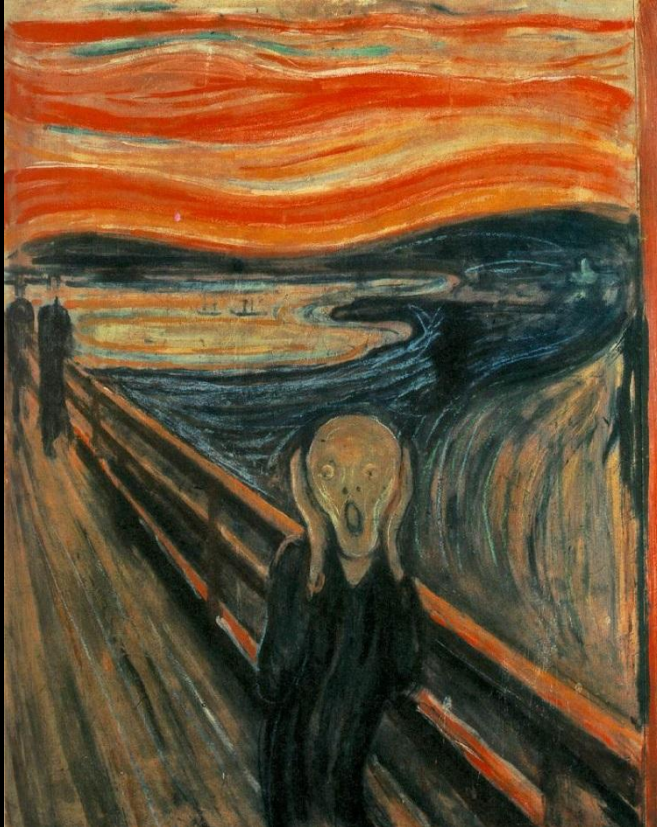
A file picture showing an aerial view of Pasir Mas in Kelantan inundated by flood water December 29, 2014. — Picture by Yusof Mat Isa

# The Soaring Costs Of Climate Change

Extreme weather events and estimated financial losses worldwide (1990–2016)







A [Merdeka Center survey](#) published in 2017 had shown that the majority of Malaysians are concerned about climate change and dissatisfied with the government's efforts in managing it.

The survey showed that 81 per cent of Malaysians expressed worry about climate change after facing 2016 — then the hottest year ever recorded at 1.1 degree Celsius above the pre-industrial revolution average.

The IPCC report has laid out pathways to achieve the goal of maintaining the 1.5 degrees Celsius limit, which basically means drastic cuts in greenhouse gas emissions at a breakneck pace — such as using renewable energy source, and switching over to electricity especially for transport.

With the new Pakatan Harapan government, Minister of Energy, Science, Technology, Environment and Climate Change Yeo Bee Yin [has pledged in July](#) that the global warming will continue be Putrajaya's priority.

Yeo said Putrajaya will introduce an Energy Efficiency Bill next year to help Malaysia cut carbon emissions by 45 per cent by 2030 in compliance with the Paris climate accord.





Destroying nature is destroying life.

[robinwood.de/stop-forest-fires](http://robinwood.de/stop-forest-fires)

ROBINWOOD



Destroying nature is destroying life.

[robinwood.de/stop-deforestation](http://robinwood.de/stop-deforestation)

ROBIN WOOD





Destroying nature is destroying life.

[robinwood.de/stop-melting-ice-caps](http://robinwood.de/stop-melting-ice-caps)

ROBIN WOOD

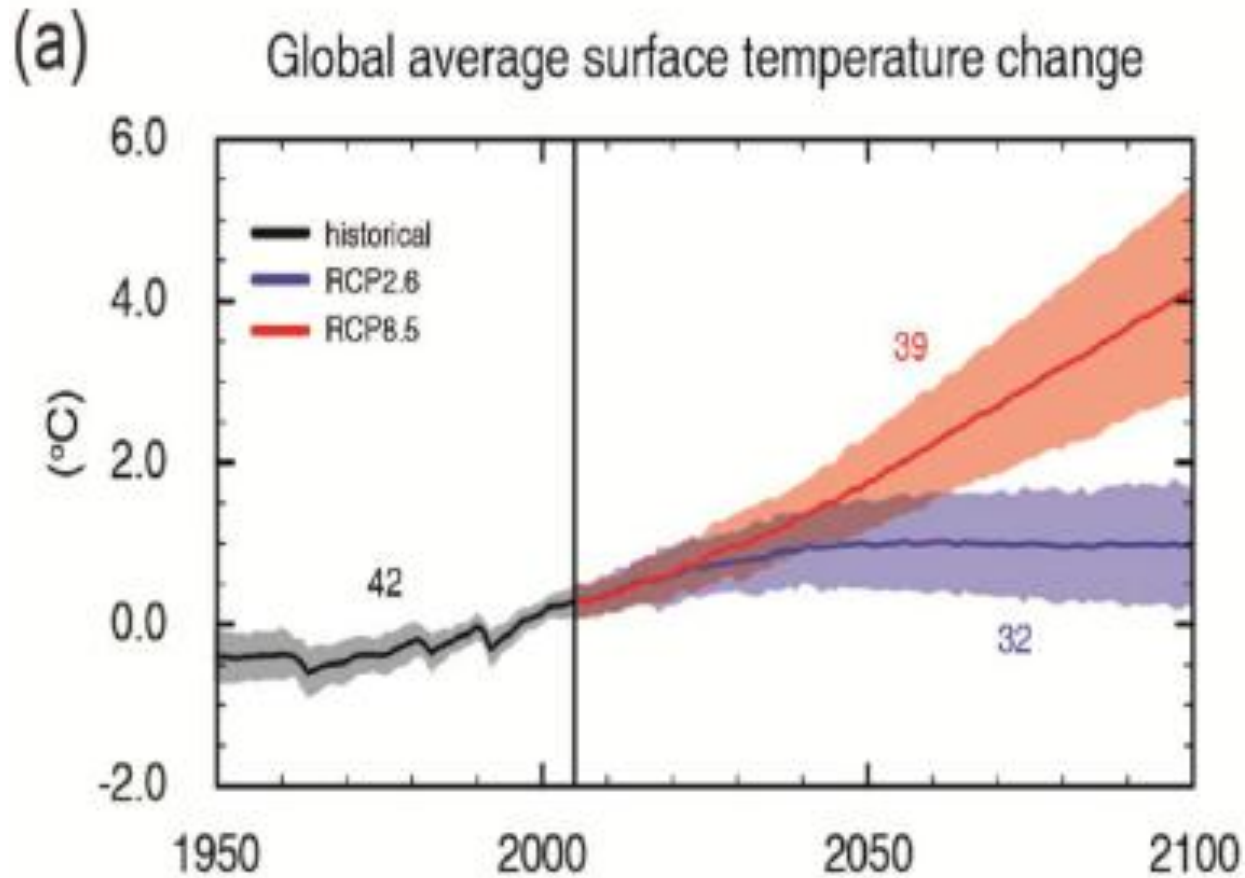


What do you think would happen if we stopped emitting CO<sub>2</sub> today?



#RICHER&HOTTER

# Warming will continue, but **how much** is our choice



**In the next few decades, temperatures will continue to rise, even if we almost completely stop emissions of GHGs today (blue line)**

This is because GHGs, especially CO<sub>2</sub>, stay in the atmosphere for a long time. Therefore, we have further climate change “in the pipeline” because of the emissions already in the atmosphere.



## Scientist warnings are clear:

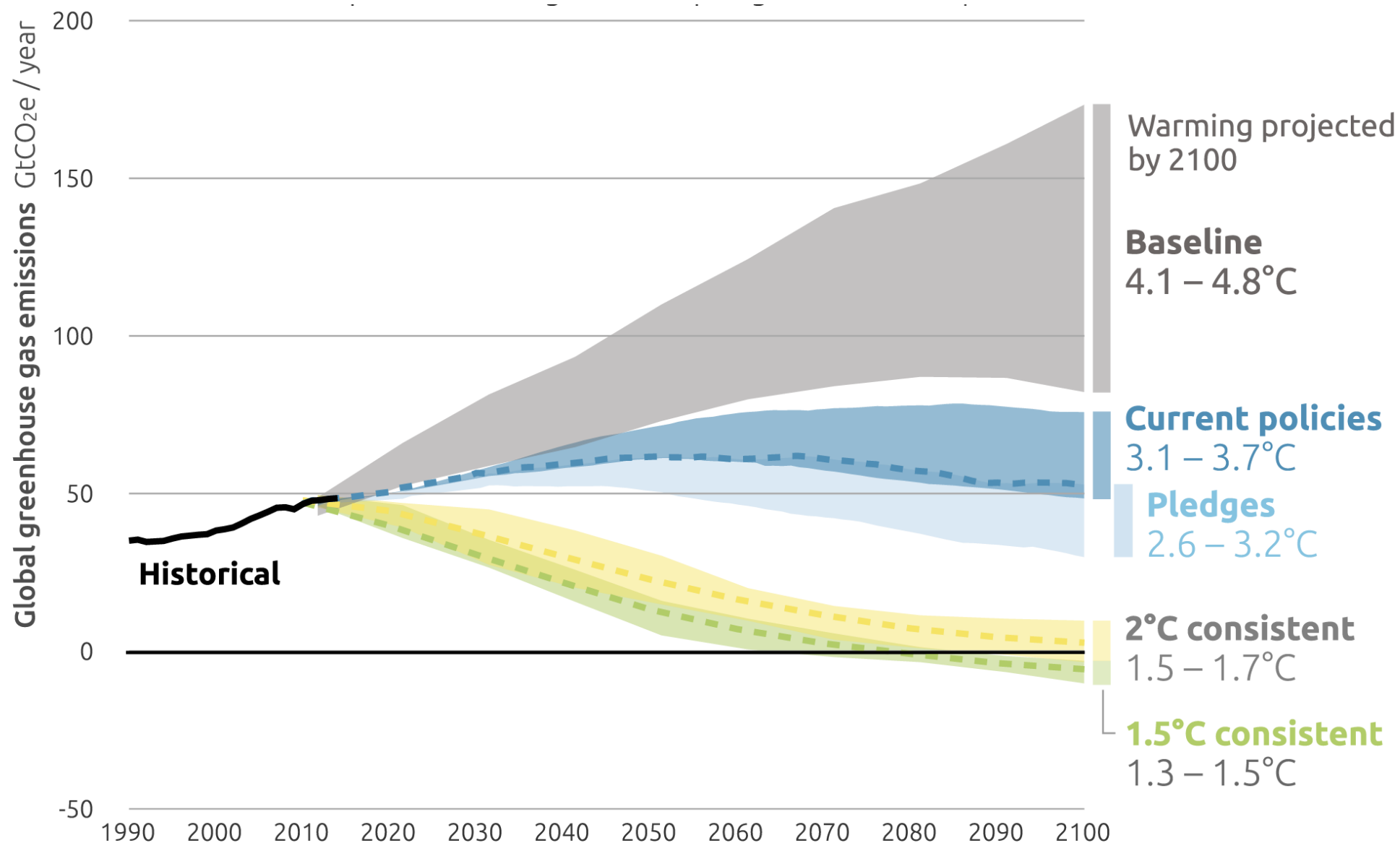
We should **avoid** more than a 2°Celsius **temperature rise** in the coming century

A 2012 World Bank report summarizes the potential effects of a 4° warmer world: **it's urgent** to limit GHG emissions

The **more we limit** GHG emissions now, the **less need for adaption** to a future wilder weather

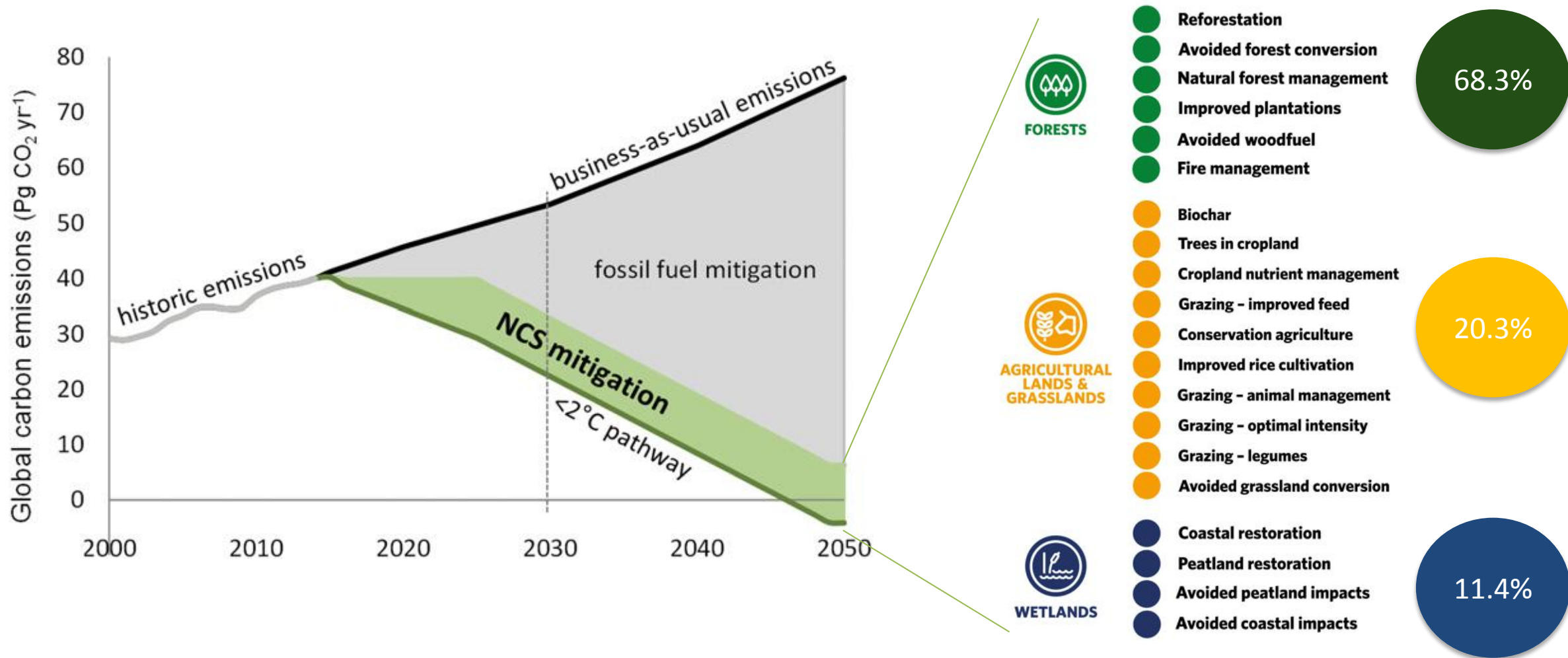


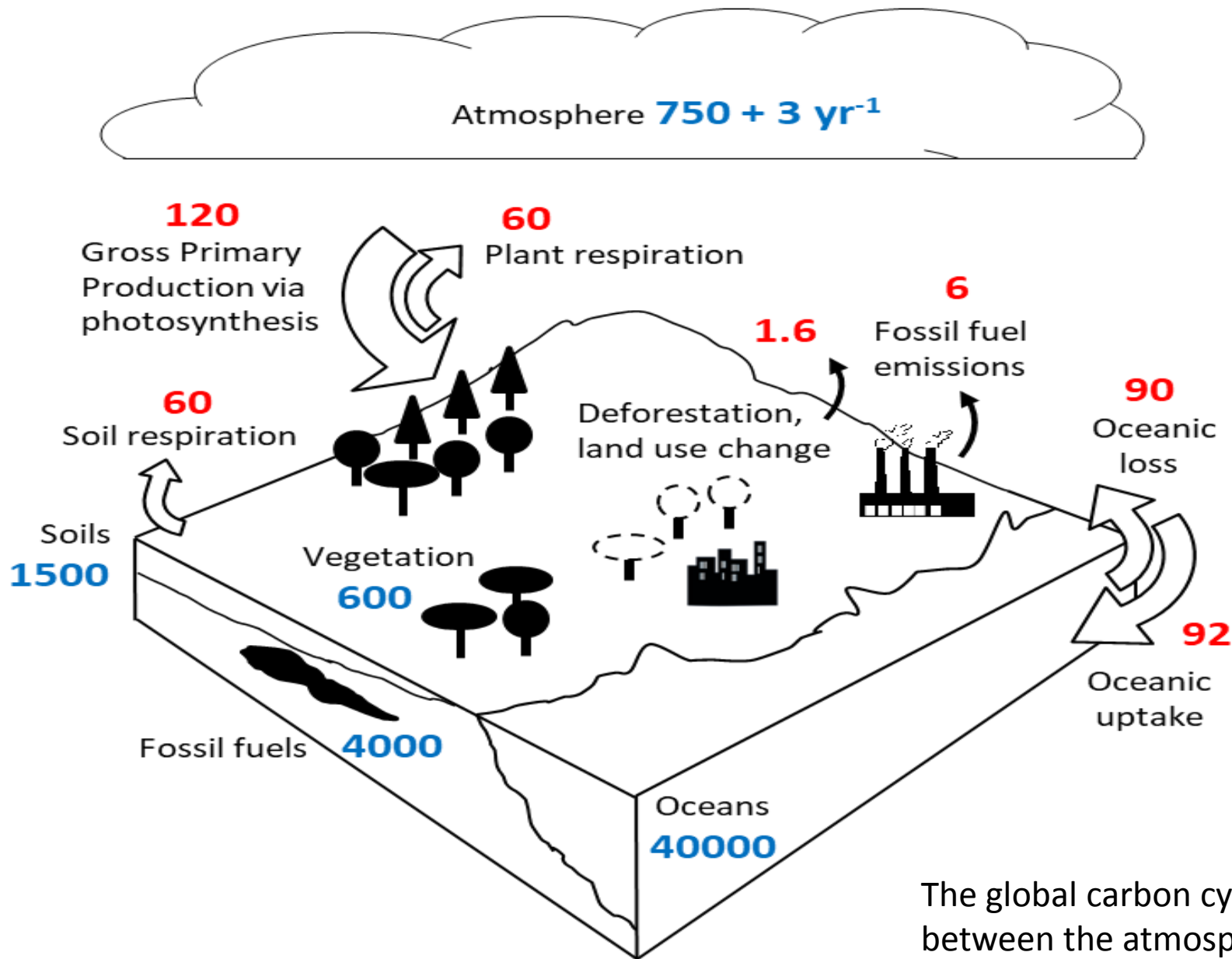
# Current Warming Projections





# Natural Climate Solutions can provide over 30% of emissions reductions required by 2030





## Forests in carbon cycle:

- Forests take up carbon in new growth
- Forests store carbon in their biomass and soils
- Forests release carbon dioxide through respiration, decay and when they are burned

The global carbon cycle illustrates the movement of carbon between the atmosphere, land and oceans.

Annual fluxes (Gt C per year) are shown in red and cumulative storages are shown in blue.



# Trees and Mitigation of climate change

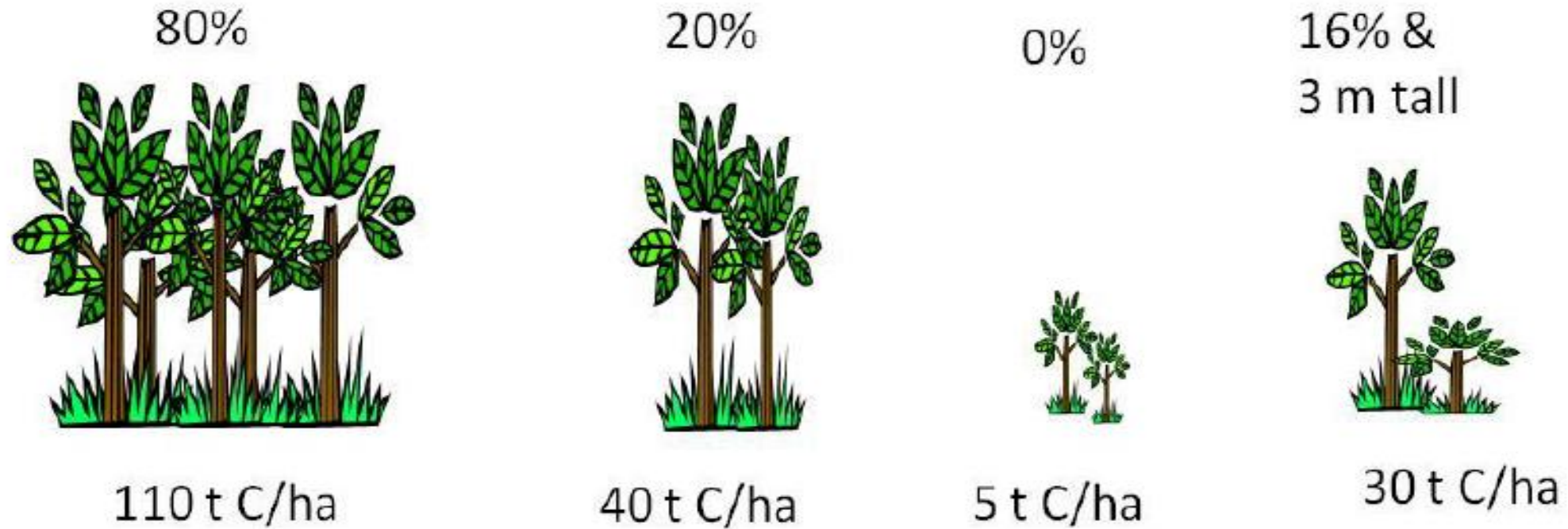
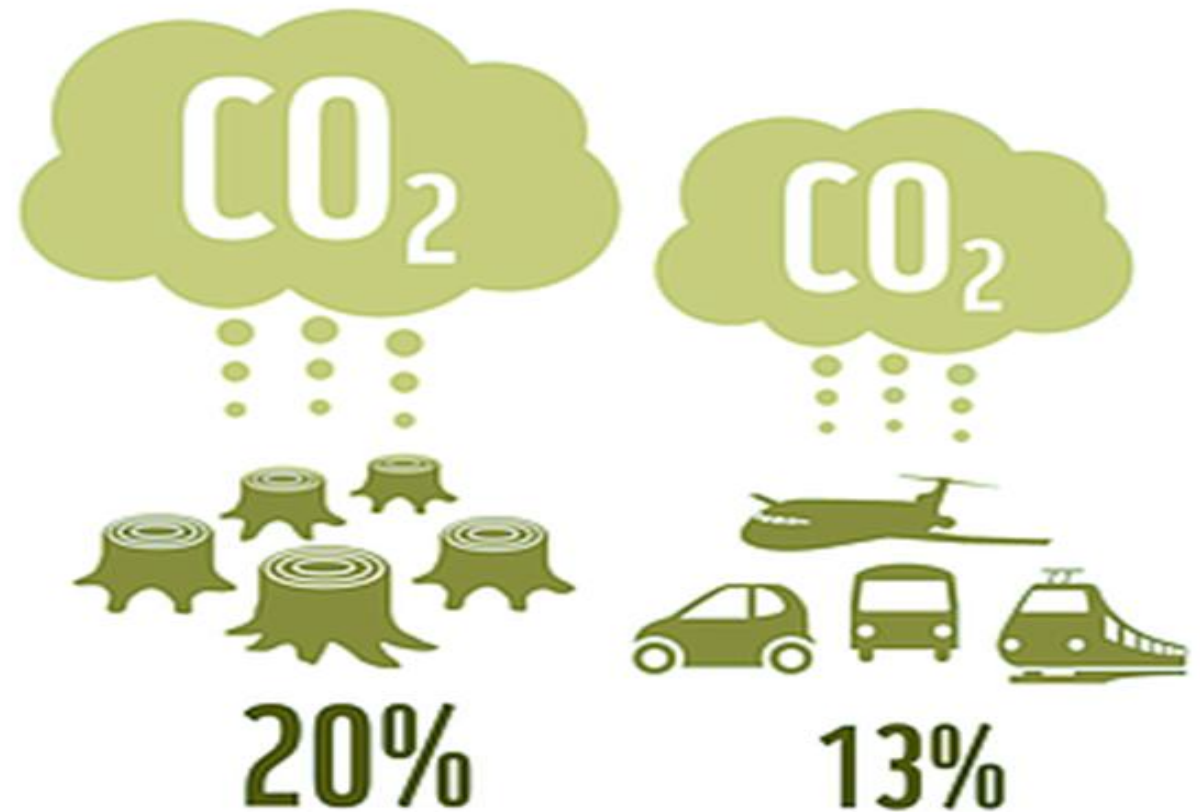


Illustration of various changes in forest cover, and corresponding emissions and removals of carbon

**Pop quiz:  
How much does deforestation  
contribute to GHG that**

- A. 5%**
- B. 15%**
- C. 20%**
- D. 40%**



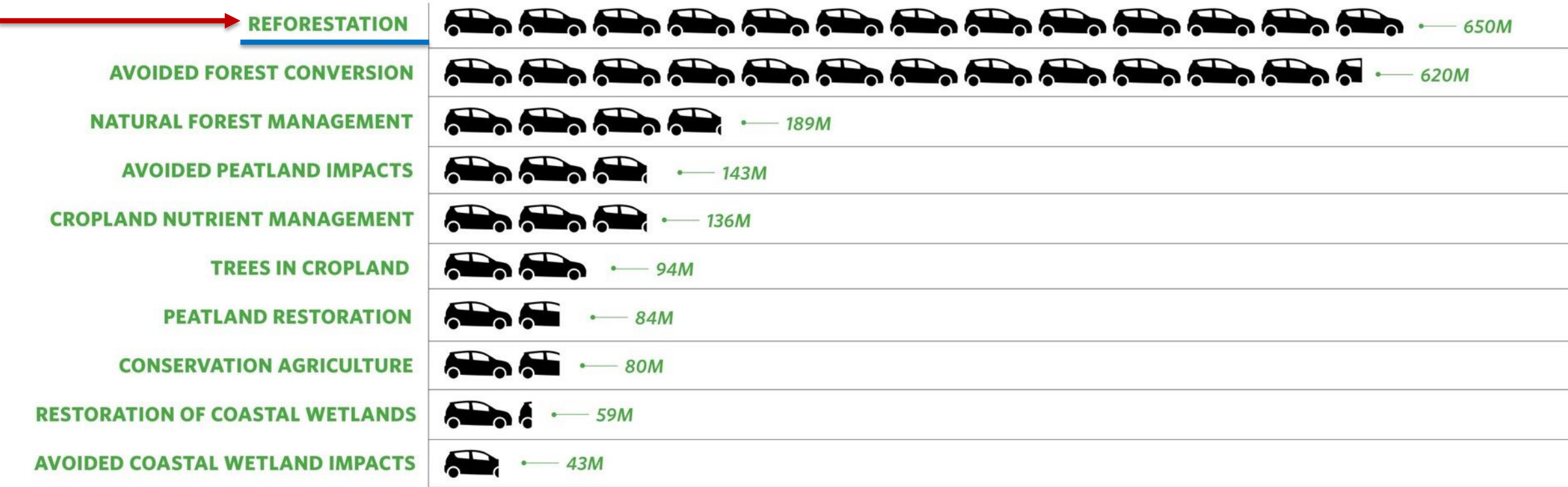
**DEFORESTATION AND FOREST DEGRADATION  
REPRESENT UP TO 20% OF GLOBAL  
ANTHROPOGENIC CO<sub>2</sub> EMISSIONS,  
MORE THAN THE ENTIRE GLOBAL TRANSPORT  
SECTOR (WHICH ACCOUNTS FOR 13%).**



# NATURAL CLIMATE SOLUTIONS

## TOP 10 MITIGATION PATHWAYS<sup>1</sup> WITH CO-BENEFITS

*Natural Climate Solutions have the same impact on emissions as taking millions of cars off the road*



Global Mitigation Potential: Approximate Number of Cars Removed Each Year in Millions

 = 50M cars

<sup>1</sup>Cost-Effective



Forest pathways offer about half of the lowest-cost climate  
opportunities



# Forests and their Ecosystem Services

## **PROVISIONAL SERVICES**

- FOOD
- RAW MATERIALS
- FRESH WATER
- MEDICINAL PLANTS



## **HABITAT SERVICES**

- BIOLOGICAL DIVERSITY
- GENETIC DIVERSITY

## **CULTURAL SERVICES**

- RECREATION
- TOURISM
- SPIRITUAL
- AESTHETICS

## **REGULATING SERVICES**

- CLIMATE REGULATION
- CARBON CAPTURING
- SOIL EROSION
- WASTE WATER TREATMENT
- POLLINATION
- BIOLOGICAL CONTROL



# Forests and People

Solutions to tackle climate change



## Malaysia to draft Climate Change Act, formulate national adaptation and mitigation plan



🕒 PUBLISHED DEC 12, 2018, 9:20 AM SGT

PETALING JAYA (THE STAR/ASIA NEWS NETWORK) - Malaysia will start drafting a Climate Change Act and aims to complete and announce a national climate change adaptation and mitigation plan by the end of next year, Energy, Science, Technology, Environment and Climate Change Minister Yeo Bee Yin said.

- increase our renewable energy in electricity generation mix from 2% to 20%.
- introduce net energy metering policy and solar leasing policy to allow zero up-front cost of solar PV installation
- introduce e-bidding to maximise the potential of renewable energy funds
- table the first draft of Energy Efficiency and Conservation Act
- double up our public transport usage from 20% to 40% by 2030.



# Xavier: Reforestation is the way forward

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**NATION**

Sunday, 19 Aug 2018

**PUTRAJAYA:** A massive reforestation programme, including to rehabilitate land left barren by logging, is expected to be introduced, says Dr Xavier Jayakumar.

- He said that three states – Kedah, Pahang and Kelantan – were undergoing rapid deforestation due to logging.

- “The states will say that it is their only source of revenue,” he said, adding that illegal logging was not much of a problem now compared to before as they had drones to monitor forests.

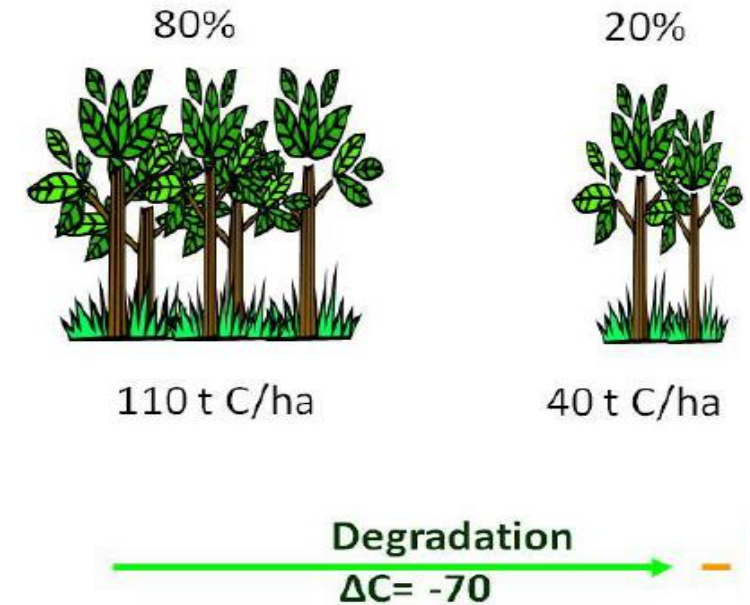
He said in terms of permit values, the logging could be worth RM500mil a year to the states, but the industries could be 10 times the amount.

“We can tell them you cannot log anymore, we have to preserve the water basins. There are dams built and water retention areas built.

“So they turn around and tell you if don’t want us to log, give us compensation. How do you calculate the value? It’s not sustainable that way,” he said.

# REDD+ as a vehicle to financially reward developing countries for Sustainable Forest Management

Reduced  
Emissions from  
Deforestation and forest  
Degradation  
+ Fostering conservation, sustainable management of forests, and enhancement of forest carbon stocks



# Norway starts payments to Indonesia for cutting forest emissions

Michael Taylor, Thomson Reuters Foundation

4 MIN READ



KUALA LUMPUR, Feb 18 (Thomson Reuters Foundation) - Almost a decade after Norway signed a \$1-billion deal with Indonesia to help protect its tropical forests, the first payment for reduced emissions will be made after deforestation rates fell, environmentalists and government officials said.

Indonesia imposed a moratorium on forest-clearing under the 2010 climate deal, with payments linked to the Southeast Asian nation's progress on lowering planet-warming emissions from felling trees, which release carbon when they rot or are burned.

Indonesian Environment and Forestry Minister Siti Nurbaya Bakar and Norwegian Climate and Environment Minister Ola Elvestuen agreed the first payments would be made after deforestation rates dropped in 2017, according to a statement issued on Saturday by the Norwegian embassy in Jakarta.



Some Muslim leaders see their religion as a means to advocate for action around climate change. Their holy book the Koran contains more than 1,500 verses relating to the environment.

**"Waste not in excess... And squander not in wantonness."**

**"Corruption doth appear on land and sea because of (the evil) which men's hands have done."**

**"Do not commit abuse on the earth, spreading corruption."**



# Green project sees blooming success

METRO NEWS

Tuesday, 25 Dec 2018



Dr Xavier (third from right) being briefed by FRIM officer Dr Ang Lai Hoe (second from right) during a tour of Bukit Aeon following the handover ceremony in Dengkil, Selangor. With them is Shinobu (right).

# Sustainability and Climate Change

## Helping clients become future-proof

### How we can help you

The sustainability and climate change agenda is fast becoming the lens through which a business is judged by its consumers, workforce, society and even its investors.

We help organisations to look at the bigger picture, by striking a balance between staying competitive, driving innovation and preserving our environment.

We can help you understand which areas pose the greatest sustainability and climate change risks to your business, form strategies to address them, and support you through the necessary organisational changes and reporting processes.



4/4/2019



| Malaysia



# Bill Gates, Jeff Bezos, and other influential billionaires are investing in these 6 companies to prevent a worst-case climate scenario

Aria Bendix, Business Insider US

March 27, 2019

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TROPICAL RAINFOREST  
CONSERVATION  
& RESEARCH CENTRE



**TROPICAL RAINFOREST  
CONSERVATION  
FOR A MORE SUSTAINABLE FUTURE**





## Mission & Core Work

The mission of the Tropical Rainforest Conservation and Research Centre (TRCRC) is to **preserve and protect tropical rainforest plant species**.

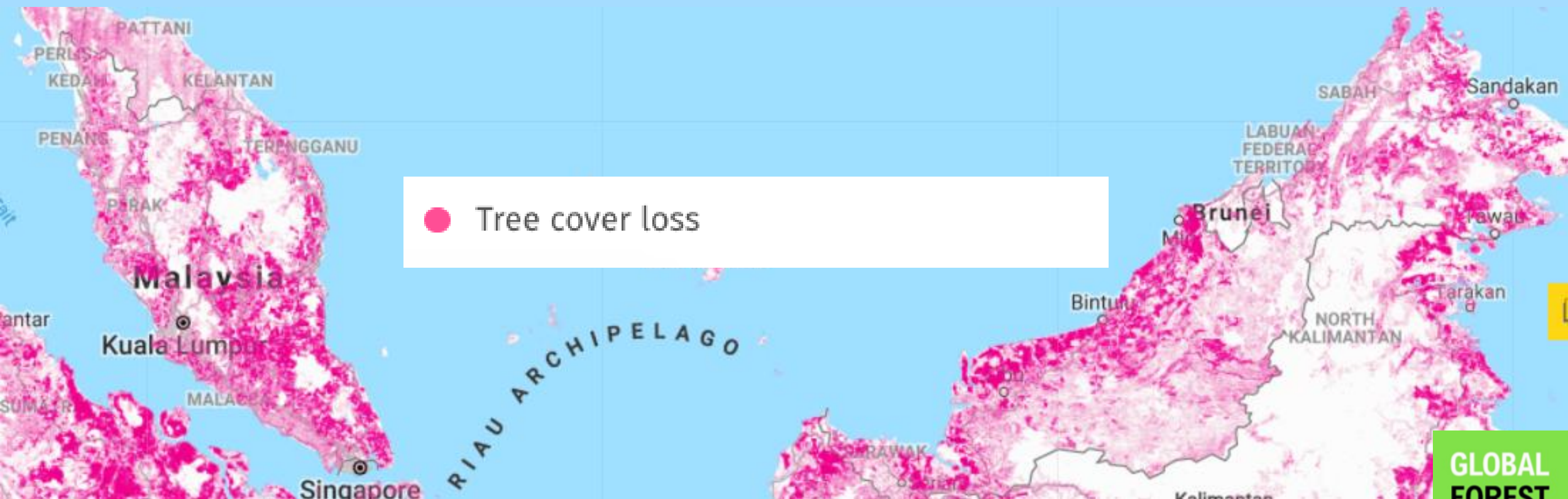
Our work - lead landscape-wide protection and restoration projects throughout Malaysia.

TRCRC has established living seed banks and conservation sites known as Tropical Rainforest Living Collections (TRLCs) in East and West Malaysia. At TRLCs, seeds from threatened plants are collected, germinated, planted, and eventually reintroduced back into their native habitats to restore the region's degraded forests.



# THE PROBLEM

## Malaysia's Tree Cover Loss 7.3 Million Ha 2001- 2017





# Tropical Rainforest Conservation





# Tropical Rainforest Living Collections

## TROPICAL LIVING COLLECTIONS IN PERAK & SABAH





# TROPICAL RAINFOREST LIVING COLLECTION



[WATCH](#)

# Tropical Rainforest Living Collection, Banun

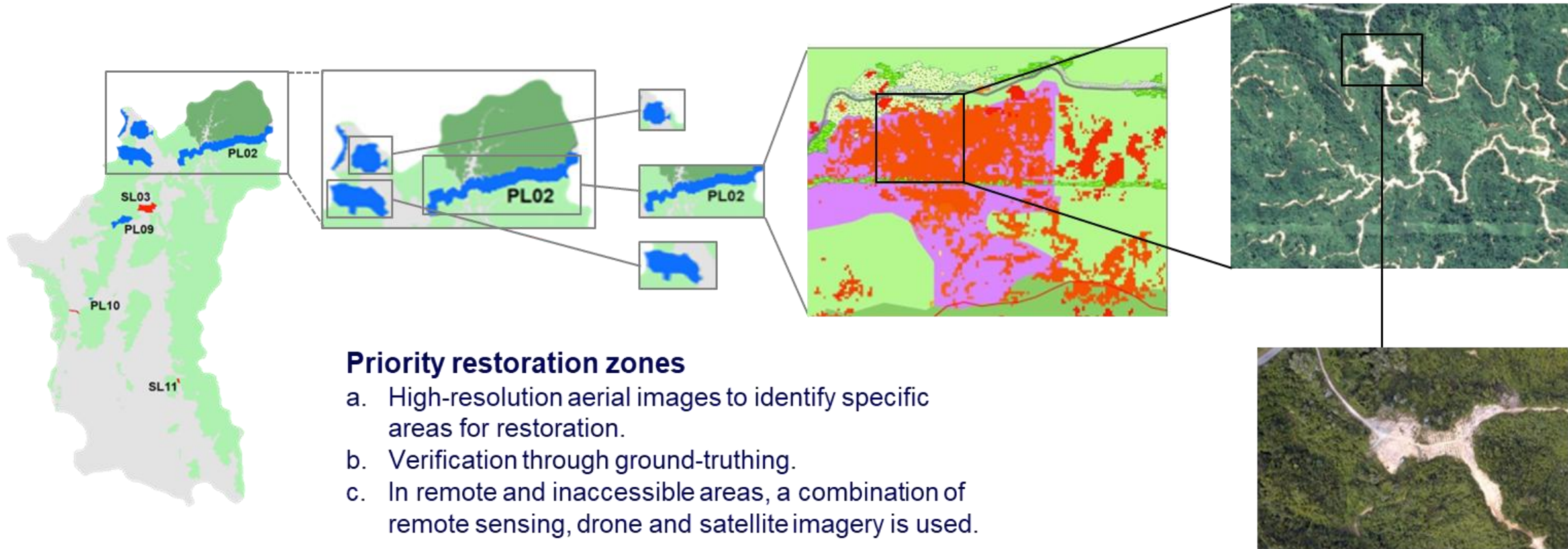
Gerik, Perak





# Scoping Restoration Opportunities in PL-2, CFS Perak

Once key priority areas are identified: remote sensing, satellite imagery, drone surveys and in accessible areas – ground-truthing of degraded areas is implemented to inform restoration.



## Priority restoration zones

- High-resolution aerial images to identify specific areas for restoration.
- Verification through ground-truthing.
- In remote and inaccessible areas, a combination of remote sensing, drone and satellite imagery is used.



## Restoration strategy

- Data & information collected used to develop restoration plans.



# OUTPUTS & RECOMMENDATIONS: Restoration opportunities Perak within PL02 – Compartment 39/40 (550-ha)

Priority areas have been identified for the next steps: developing the restoration strategy and financing mechanisms.



Stage-1 Protection	
Size	110-ha
Capex	RM 16,214
Opex	RM 12,351
Total cost	RM 139,728

Stage-2 Assisted Natural Regeneration	
Size	330-ha
Capex	RM 97,284
Opex	RM 74,108
Total cost	RM 838,365

Stage-3 Framework Species Method	
Size	110-ha
Capex	RM 1,272,172
Total Opex	RM 3,091,836
Total cost	RM 4,364,008

Summary	
Period	10-years
Total cost	RM 5,338,180
Cost/ ha	RM 9,700





Recent site visits show signs of viaduct being used by elephants, barking deer, primates



Perhilitan has an ongoing monitoring program on the wildlife activity in and surrounding the site

Gerik, Perak

Tropical Rainforest Living Collection, Banun



# TRCRC Partners



In Terengganu: Terengganu Forestry Dept, KPKKT, TNB



» [Home](#) » [Get involved](#) » [Monthly Tree Planting 2019](#)

## Monthly Tree Planting 2019

Monthly tree planting at North Selangor Peat Swamp Forest

The 2019 monthly tree planting activity is an annual activity organised to promote the importance of North Selangor Peat Swamp Forest to the public. This activity is aimed at conserving the various species of peat swamp and restoring the deteriorated area to its former glory, retaining the original characteristics of the peat swamp forest. It promotes environmental awareness and the planting activity is designed to attract different interest groups, including children. The tree planting activity is sponsored by the organisers/funders; therefore, there will be no imposed costs on the participants.

The **participation** is on a **first come, first served basis, limited to 100 participants (maximum 40 participants/organisation)** with 400-600 seedlings for each of the planting session — in one hectare area of the forest reserve.

The half day activity is a collaborative effort by the Selangor State Government, Selangor Forestry Department, Friends of North Selangor Peat Swamp Forest and Global Environment Centre. The rehabilitation programme is supported by the HSBC Bank Malaysia Berhad and the Selangor State Government.

The dates are now open for registration:



**What can we do to combat  
climate change?**



**ENERGY**



**FOREST CLEARANCE**



**TRANSPORT**



**FOOD PRODUCTION**



# PERSONAL SUSTAINABILITY & IMPACTS ON THE ENVIRONMENT

- Running tap water for two minutes is equal to 3-5 gallons of water.

- A 5-minute shower is equal to 20-35 gallons of water.

- **Switching from the font 'Arial' to 'Century Gothic' saves 30% ink on printing**

- One recycled bottle saves enough energy to run a 100-watt bulb for 4 hours & causes 20% less air pollution and 50% less water pollution than does making a new bottle.

- If you ensure that just 4 lights around your workspace are switched off every night, each year you could save as much CO2 as produced by 20 car trips from London to Paris.

- **Only 5% of the power drawn by a phone charger is used to charge the phone. The other 95% is wasted when it is left plugged in.**

- Recycling a single 500 ml aluminum soda can saves enough energy to power a TV for over 4 hours

- A PC monitor left on overnight can waste enough electricity to laser print over 500 pages.



# 6 EASY WAYS YOU CAN “START TODAY” WITH GOING GREEN AT WORK



**Turn computers & electronic devices off instead of setting them in standby mode when not in use.**



**Pack your lunch ahead of time with reusable containers.**



**Get into the habit of turning off electricity when it isn't in use.**



**Use reusable water bottles and mugs at work.**



**Be conscious of your printing practices**



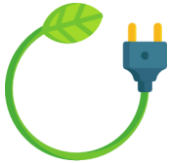
**Make the most of paper you use**



## 6 EASY WAYS YOU CAN “START TODAY” WITH GOING GREEN AT HOME



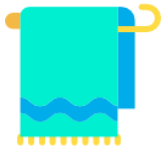
Turn off lights when you leave the room



Unplug unused chargers and appliances



Keep leftovers for next meal



Use cloth instead of kitchen towel



Take shorter showers to reduce water use



Skip the bottled water





# What if climate change is a BIG HOAX?!

