Climate change: science, scenarios, solutions

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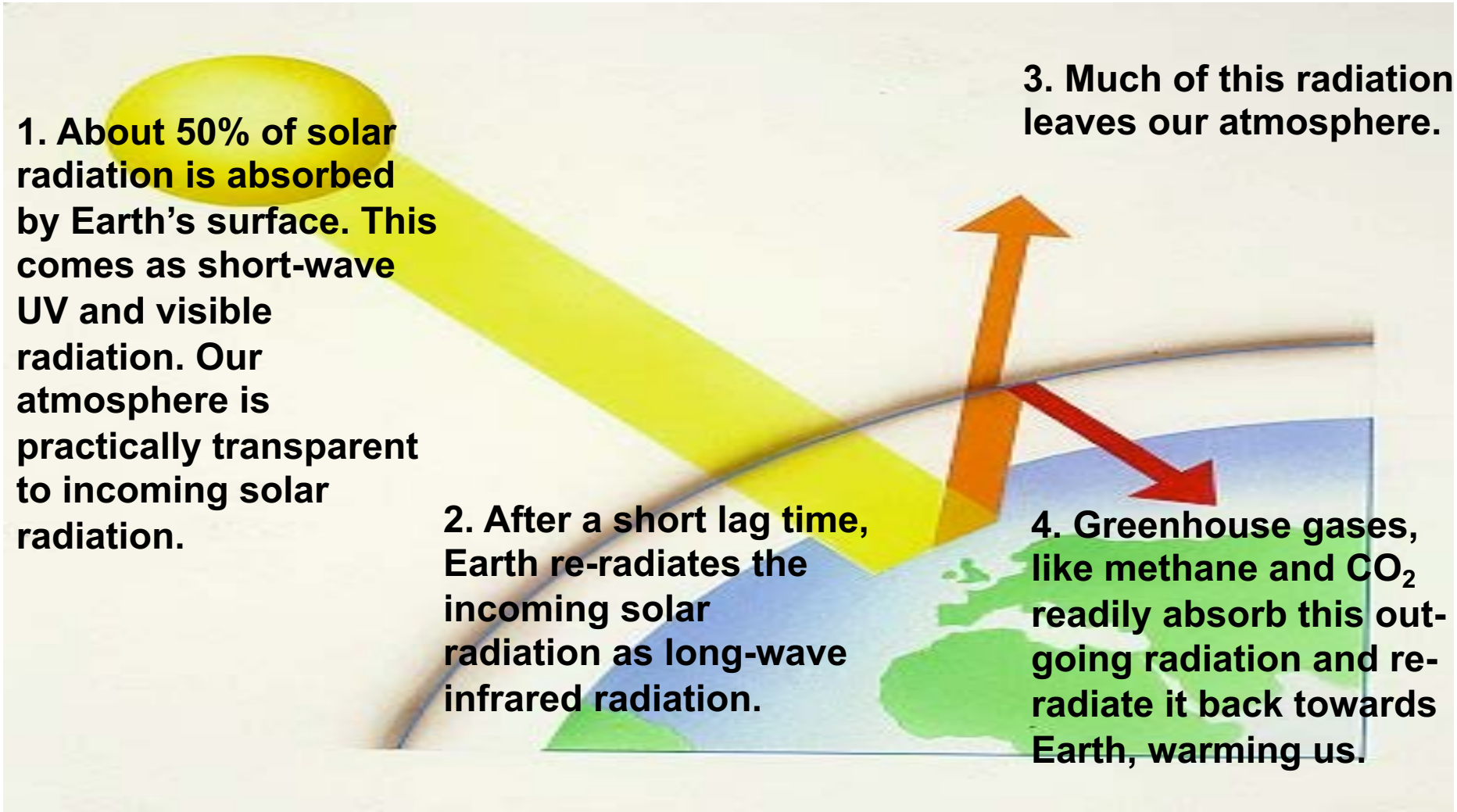
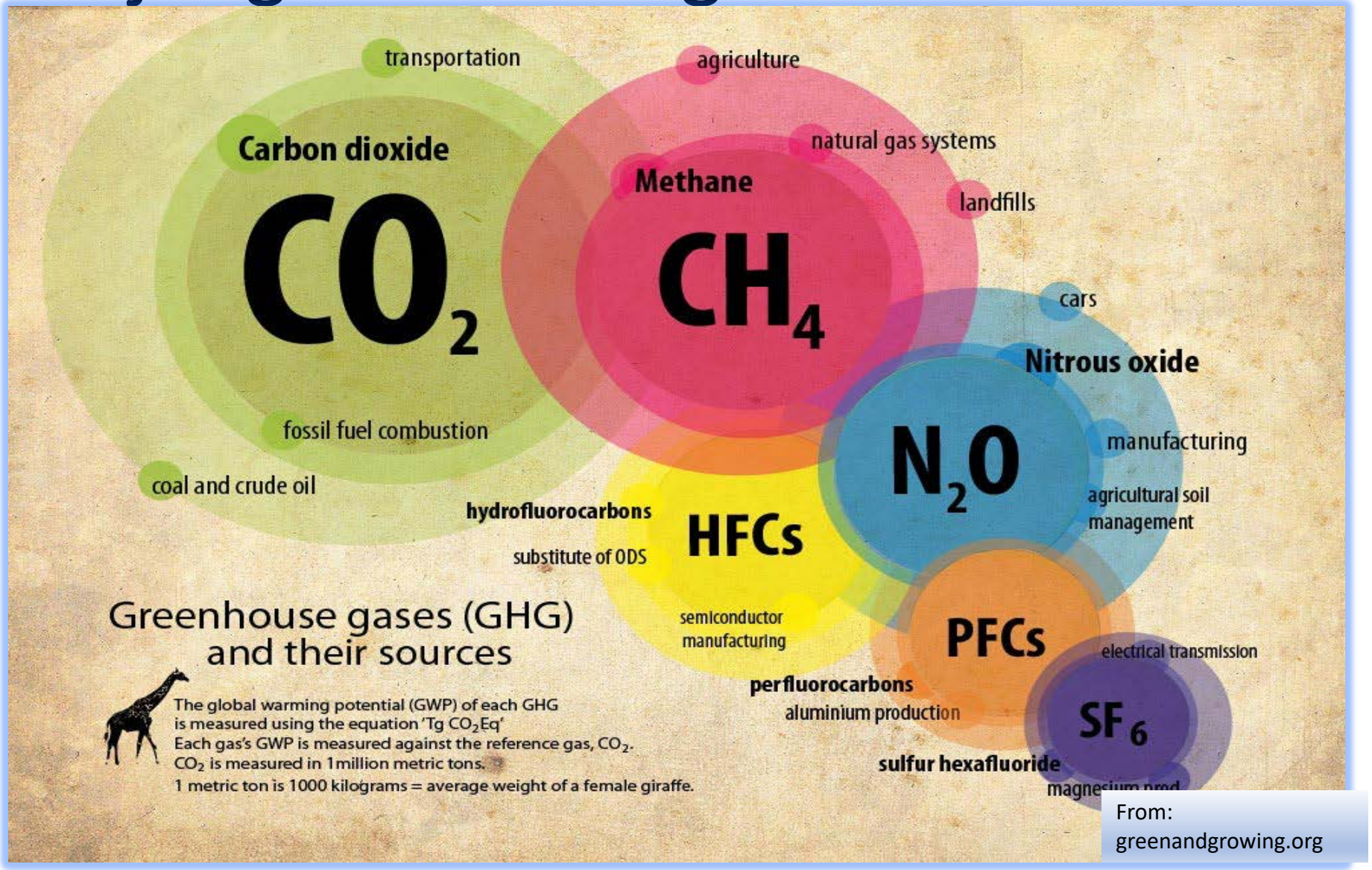
The Greenhouse Effect

The **greenhouse effect** – the process by which gases in the atmosphere trap heat and warm the Earth

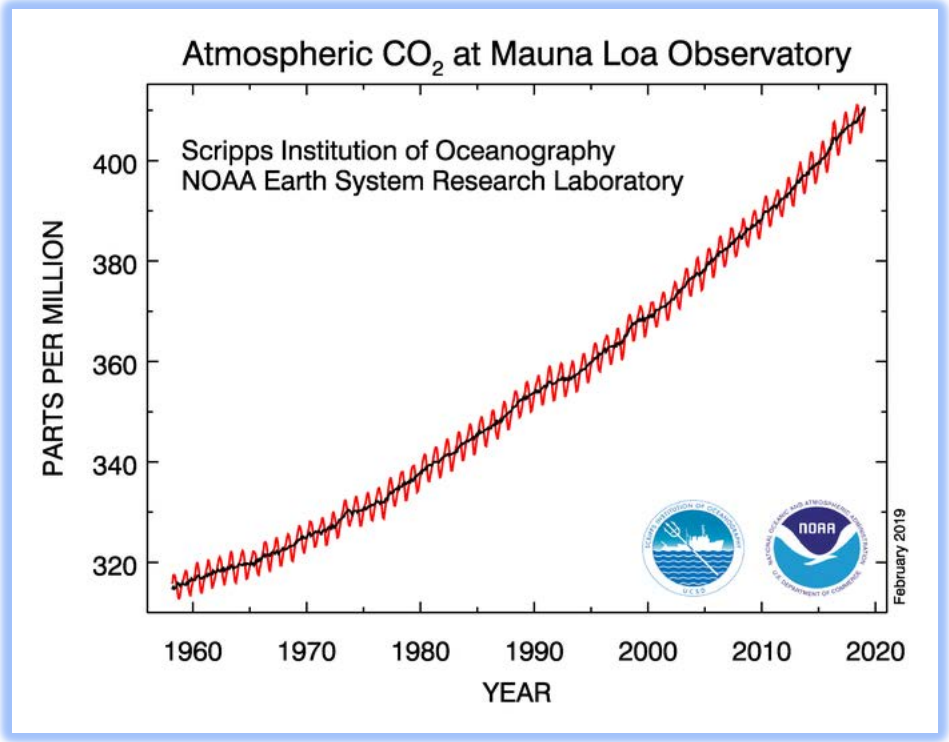


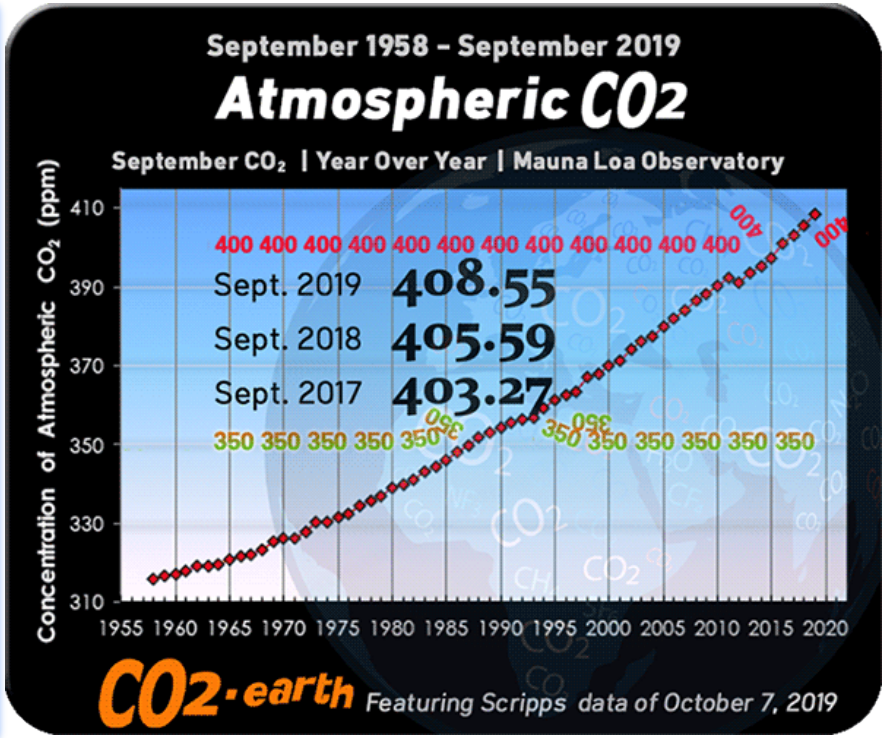
The major greenhouse gases



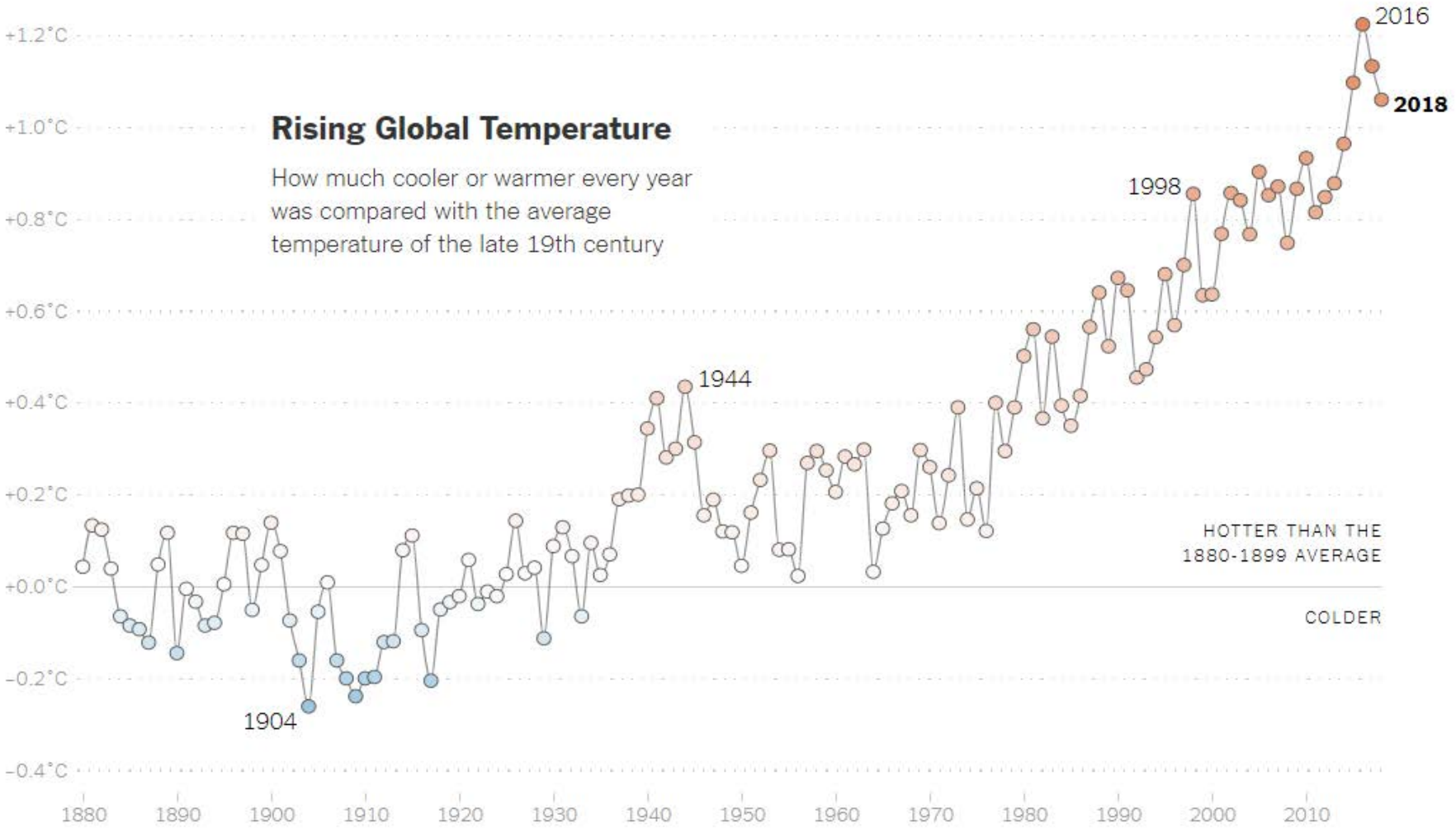
From: greenandgrowing.org

Atmospheric CO_2 as of Sept. 2019 (May 2019- 415 ppm)

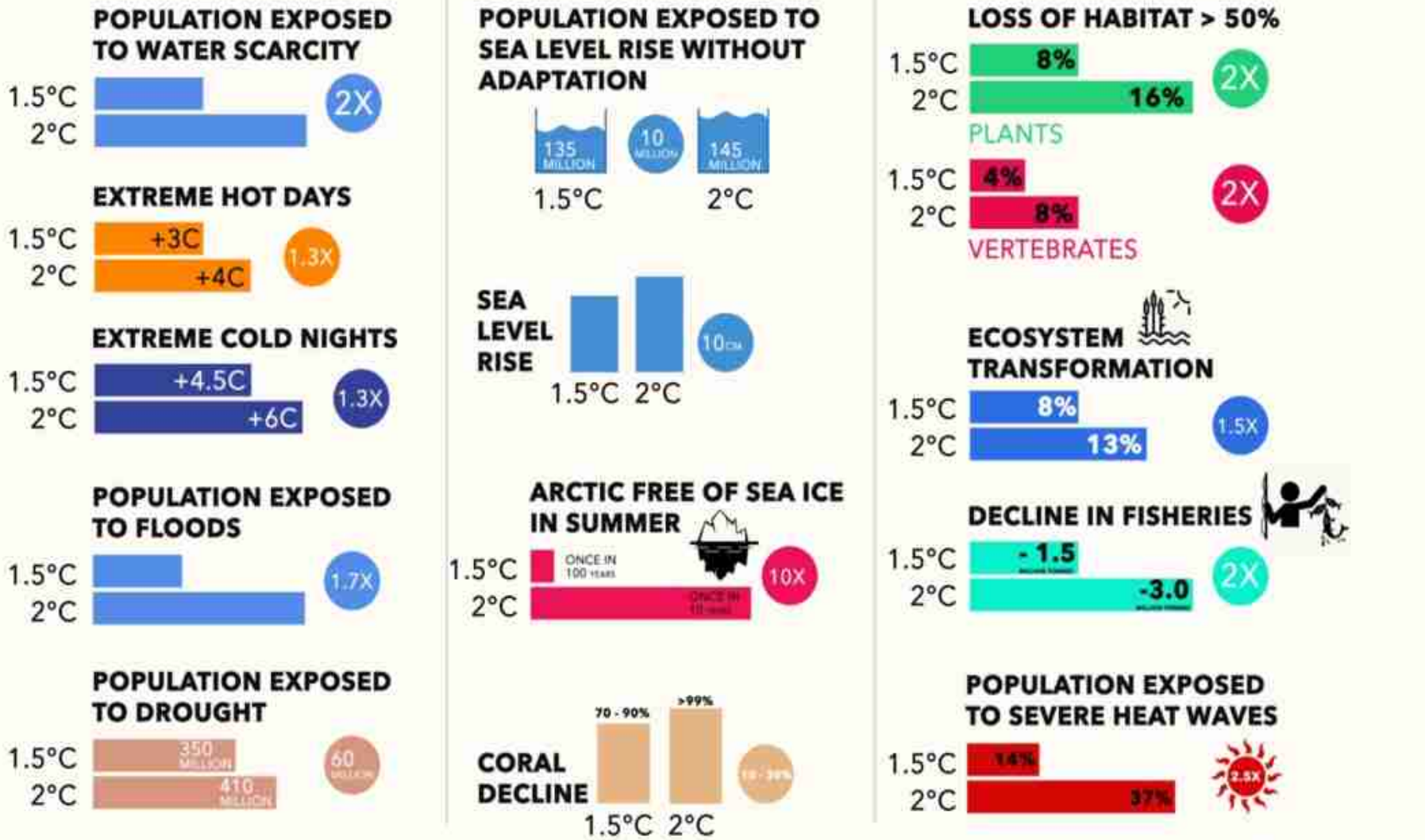




The five last years have been the hottest on record- 18 of the last 19 have been the hottest



INCREASING IMPACTS FROM 1.5°C TO 2°C



Source: IPCC Special Report on Global Warming of 1.5°C

Tipping Points:
Positive Feedback Loops —–> Abrupt Climate Change

ALBEDO LOSS AND MELTING ICE

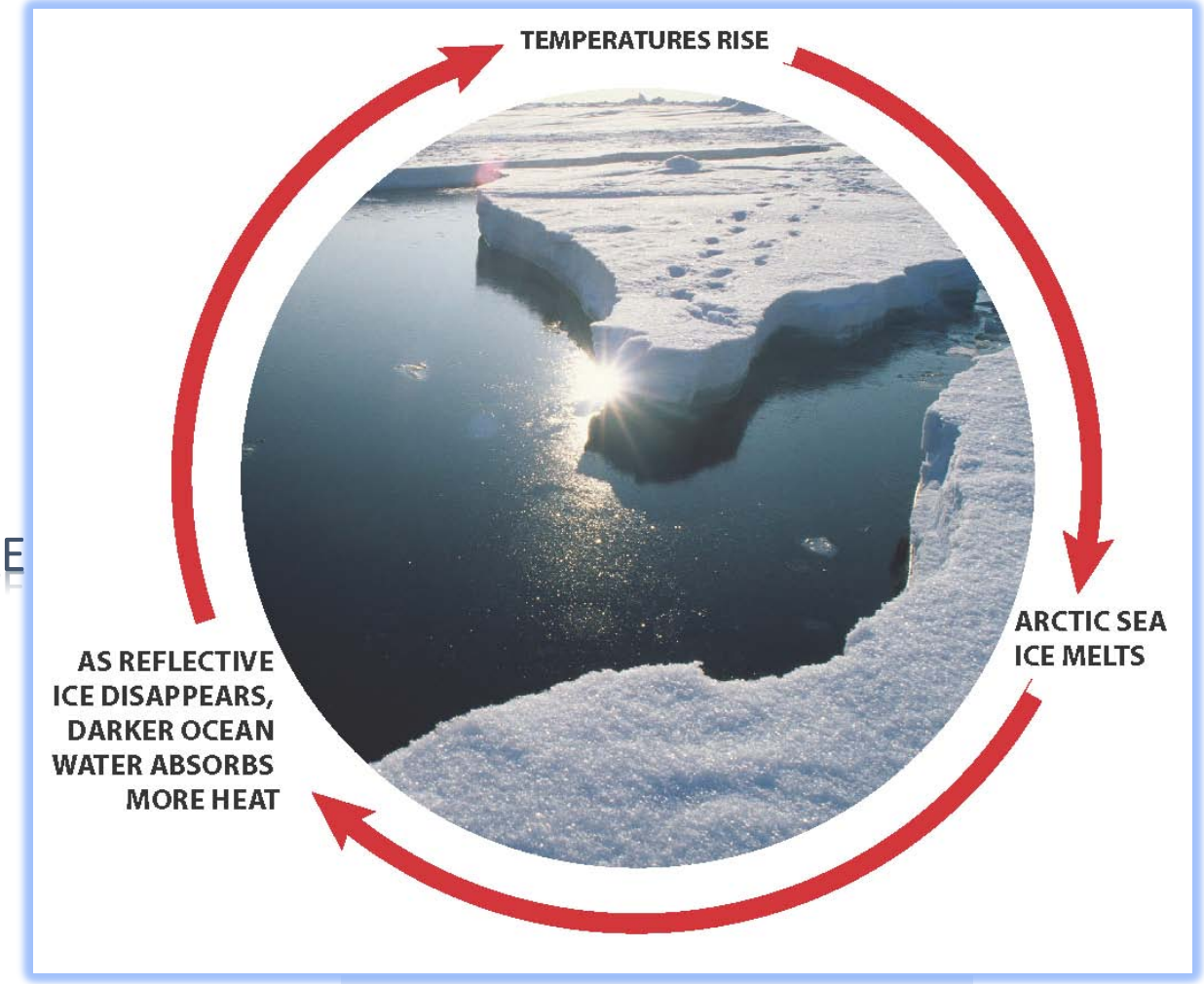
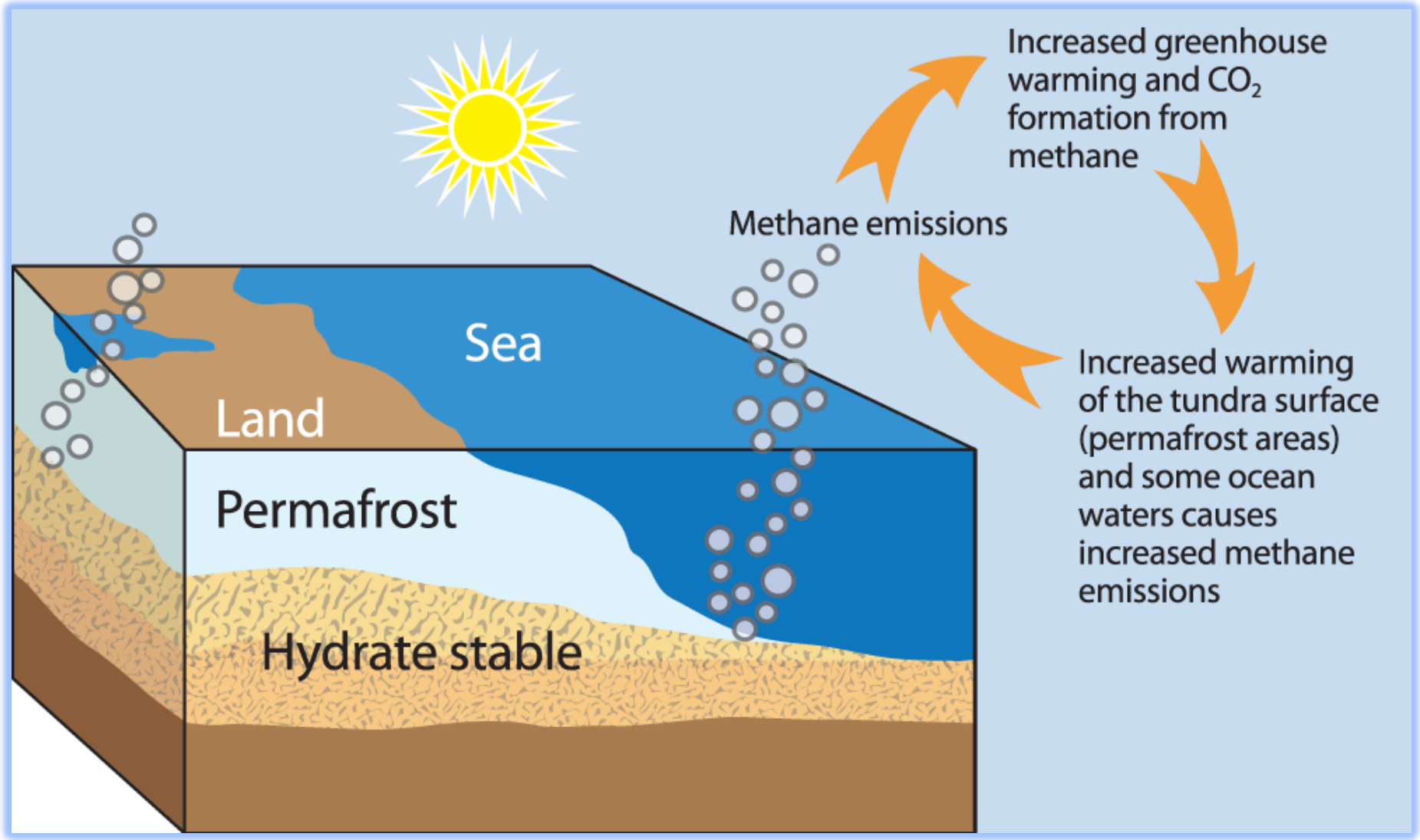


Image Source: National Academies of Sciences

Tipping Points:
Positive Feedback Loops —–> Abrupt Climate Change

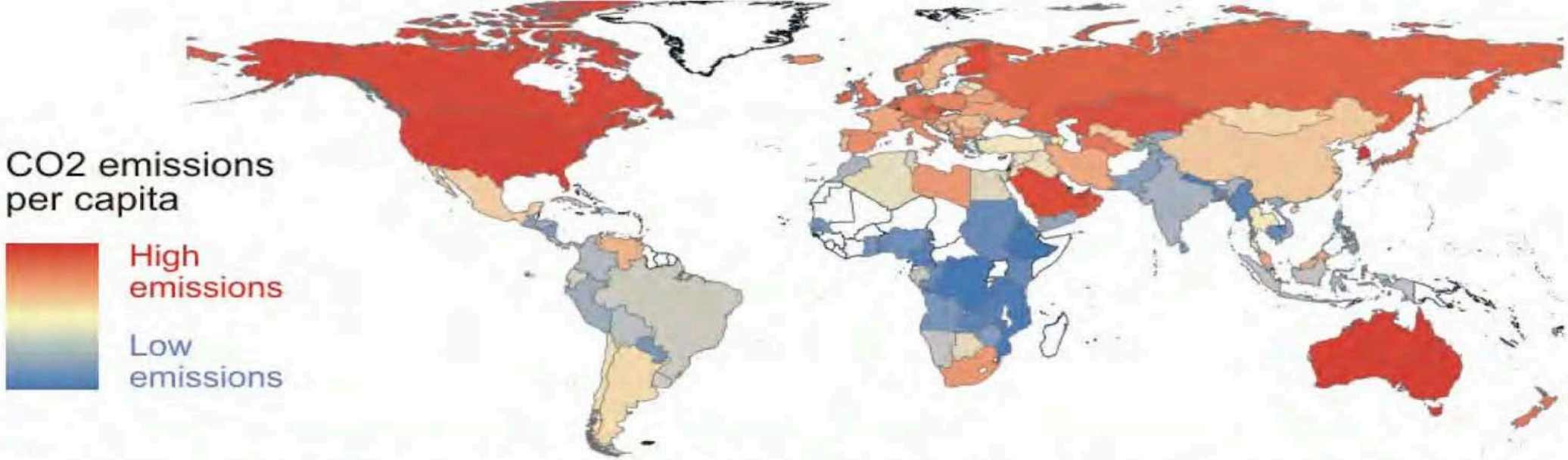


Some impacts of climate change

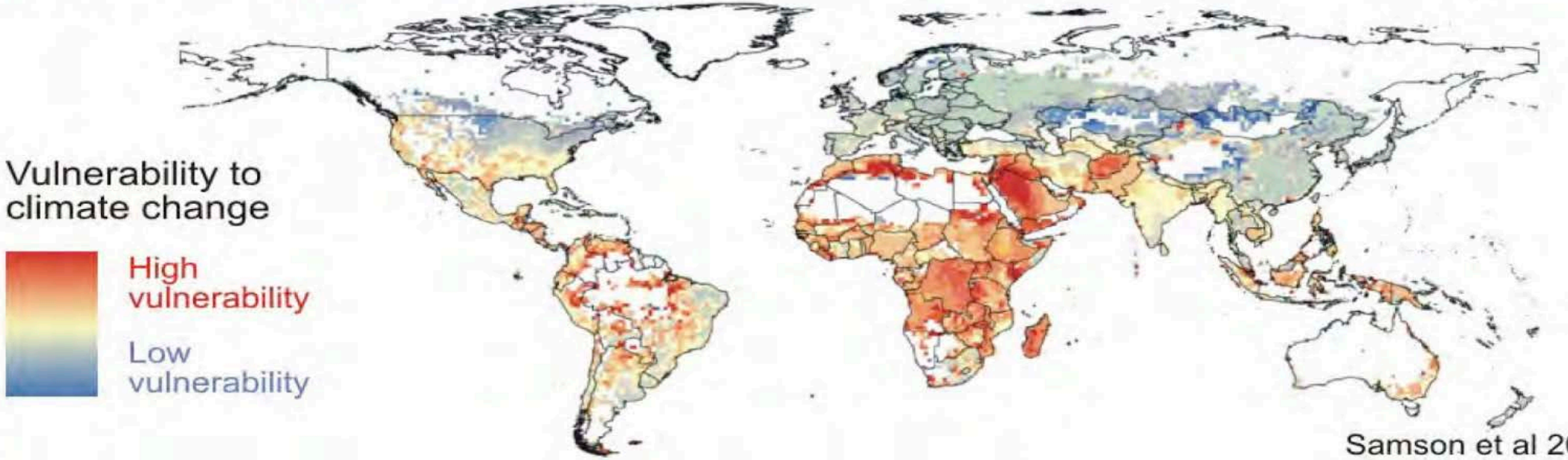
- US economy contracts by 10%
- Sea level rise- 1-2 meters by 2100, and 3-7 m after 2100
- Droughts, food security, malnutrition
- Violence and conflict
- Health impacts of extreme heat and poor air quality
- Impacts on fisheries, biodiversity

Climate Change Solutions- Drawdown

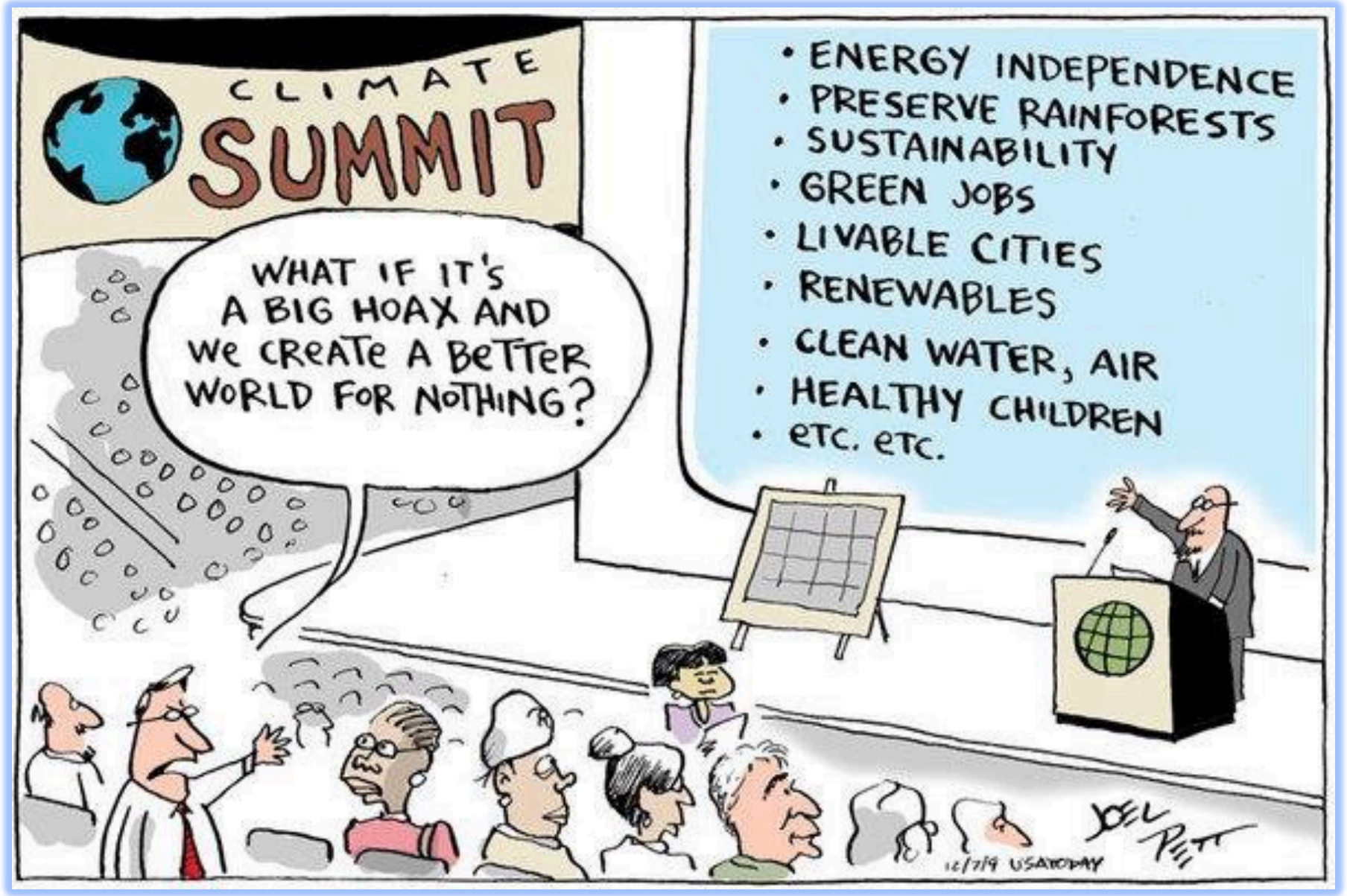
Rank	Solution	Sector	TOTAL ATMOSPHERIC CO2-EQ REDUCTION (GT)	NET COST (BILLIONS US $)	SAVINGS (BILLIONS US $)
1	**Refrigerant Management**	Materials	89.74	N/A	$-902.77
2	**Wind Turbines (Onshore)**	Electricity Generation	84.60	$1,225.37	$7,425.00
3	**Reduced Food Waste**	Food	70.53	N/A	N/A
4	**Plant-Rich Diet**	Food	66.11	N/A	N/A
5	**Tropical Forests**	Land Use	61.23	N/A	N/A
6	**Educating Girls**	Women and Girls	59.60	N/A	N/A
7	**Family Planning**	Women and Girls	59.60	N/A	N/A
8	**Solar Farms**	Electricity Generation	36.90	$-80.60	$5,023.84
9	**Silvopasture**	Food	31.19	$41.59	$699.37
10	**Rooftop Solar**	Electricity Generation	24.60	$453.14	$3,457.63



Those who contribute the least greenhouse gases will be most impacted by climate change



Samson et al 2011


CLIMATE
SUMMIT
WHAT IF IT'S A BIG HOAX AND WE CREATE A BETTER WORLD FOR NOTHING?
• ENERGY INDEPENDENCE
• PRESERVE RAINFORESTS
• SUSTAINABILITY
• GREEN JOBS
• LIVABLE CITIES
• RENEWABLES
• CLEAN WATER, AIR
• HEALTHY CHILDREN
• ETC. ETC.
12/7/19 USATODAY
JOEL PETT