TOPIC 9: ECONOMICS OF CLIMATE CHANGE

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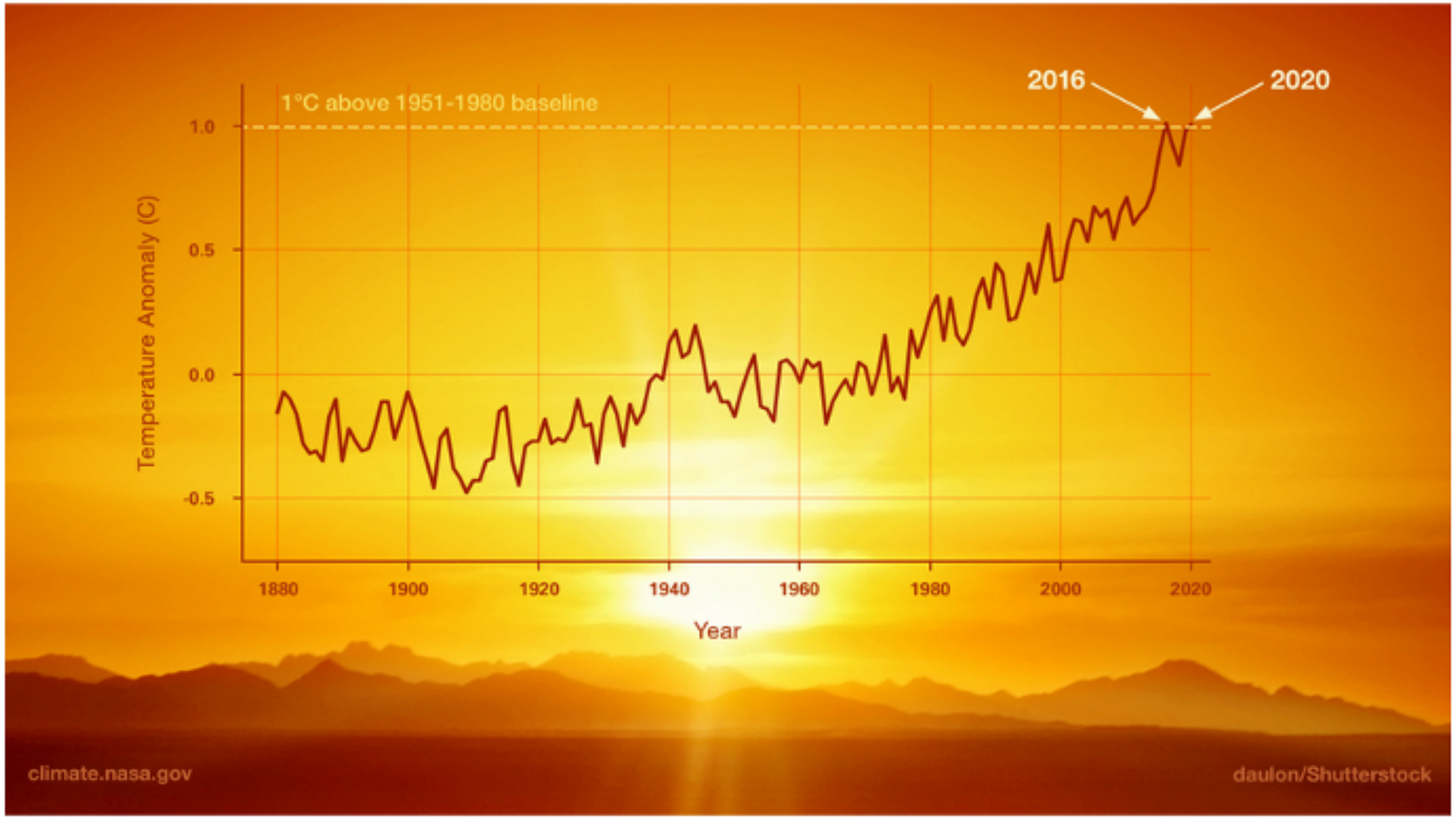
What is climate change?

Climate Change or Global warming

“a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.”

(by the United Nations Framework Convention on Climate Change (UNFCCC).

Global warming = the rise in global temperatures due mainly to the greenhouse gases produced by human activities



This graph illustrates the change in global surface temperature relative to 1951-1980 average temperatures, with the year 2020 tying with 2016 for warmest on record (Source: NASA's Goddard Institute for Space Studies). Learn more about global surface temperature here. Credit: NASA/JPL-Caltech

Source: https://climate.nasa.gov/resources/global-warming-vs-climate-change/

Causes of Climate Change

FOSSIL FUELS

The massive use of fossil fuels is obviously the first source of global warming, as burning coal, oil and gas produces carbon dioxide - the most important greenhouse gas in the atmosphere - as well as nitrous oxide.

DEFORESTATION

The exploitation of forests has a major role in climate change. Trees help regulate the climate by absorbing

INTENSIVE FARMING

Another cause of global warming is intensive farming, not only with the ever-increasing livestock,

WASTE DISPOSAL

Waste management methods like landfills and incineration emit greenhouse and toxic gases - including methane - that are released into the atmosphere, soil and waterways, contributing to the increase of the greenhouse effect.

MINING

Modern life is highly dependent on the mining and metallurgical industry. Metals and minerals are the raw materials used in the construction, transportation and manufacturing of goods. From extraction to delivery, this market accounts for 5% of all greenhouse gas emissions.

OVERCONSUMPTION

Finally, overconsumption also plays a major role in climate change. In fact, it is responsible for the overexploitation of natural resources and emissions from international freight transport, which both contribute to global warming.

Source:
https://solarimpulse.com/global-warming-solutions#

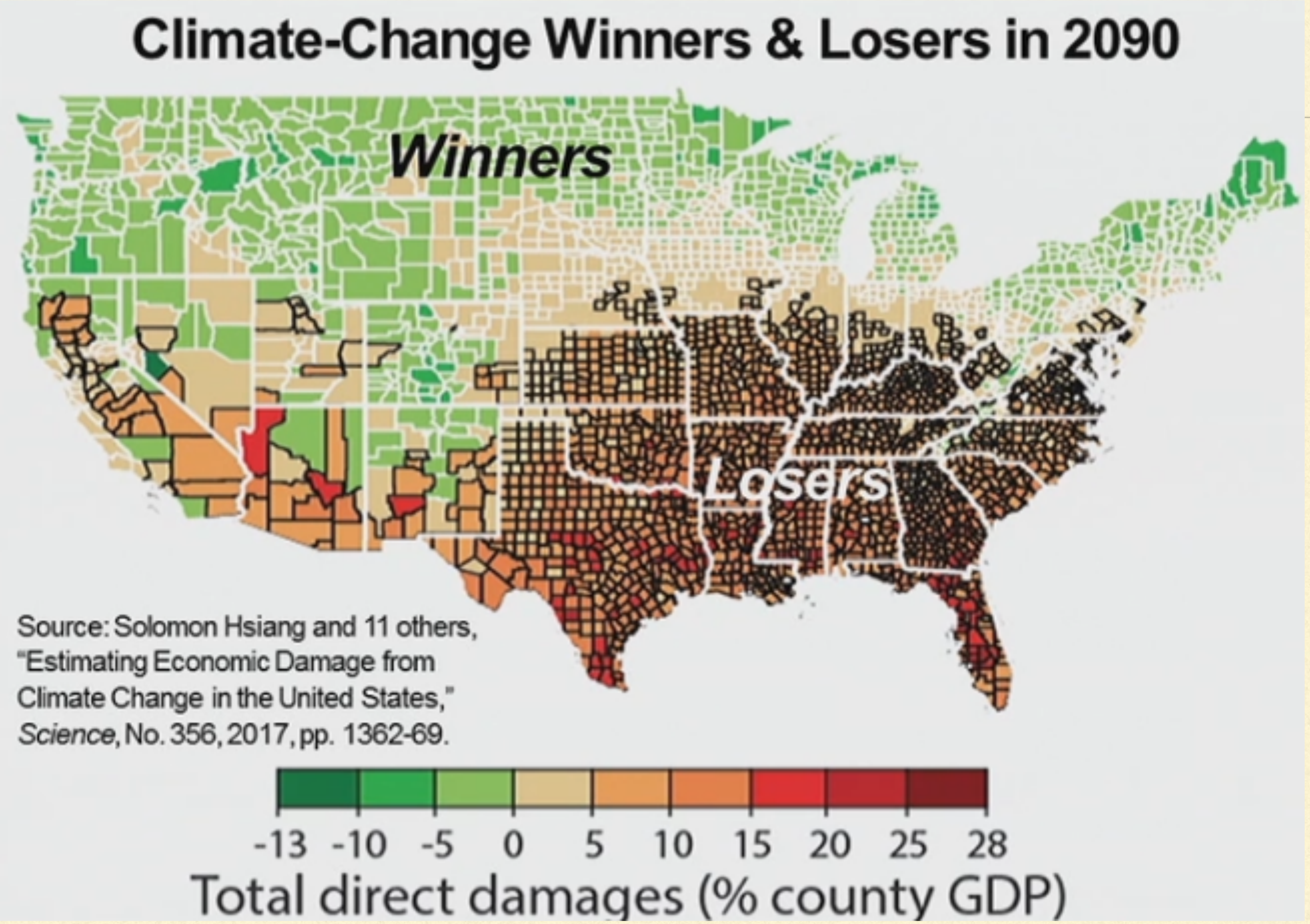
Effects of Climate Change

The potential future effects of global climate change include more frequent wildfires, longer periods of drought in some regions and an increase in the number, duration and intensity of tropical storms. Credit: Left - Mellimage/Shutterstock.com, center - Montree Hanlue/Shutterstock.com.

Source: https://climate.nasa.gov/effects/

- Wildfires
- Drought
- Extreme rainfall
- Storms
- Intense heatwaves
- Sea ice loss, accelerated sea level rise

Economic Impacts of Climate Change



Source: [Emmons (2018)]

To assess the economic impacts of future climate change scenarios, it requires the integration of **natural science** disciplines into **economic analysis**, including:

- Climate change modelling
- Biophysical impact models
- Economic models

See the video of insights from economic impacts of climate change in Europe: https://www.youtube.com/watch?v=Y1RGyfQplo0

Potential long-term damages from climate change

- Increased mortality
- Reduced work in exposed environments
- Reduced yields for grains, cotton, oilseeds
- Increased violent and property crime
- Coastal impacts

An Inconvenient Truth 2: Movie trailer

Two Main Climate Change Policies

Mitigation policies
= to moderate the temperature rise by using strategies designed to reduce emissions or increase the planet's natural capacity to absorb greenhouse gases.

Adaptation policies
= efforts to modify natural or human systems in order to minimize harm from climate change impacts.

Global effort to combat climate change

Paris Agreement: The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 - – for the first time – this agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

- **Goal:** To limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.
- **Climate-neutral target by 2050:** To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.

Link: https://unfccc.int/most-requested/key-aspects-of-the-paris-agreement