Lecture 8 – Responding to Climate Change

Material used

https://www.explainingclimatechange.com/lesson9/lesson9.html.

Ghosh starts the lecture being concerned about the attendance

Key Idea 1: Our Children's World

Although it is impossible to predict exactly what will happen in the future, the decisions we make today will affect the world we will grow old in - the same world we will pass on to our children and grandchildren.

Even if the emission of carbon dioxide and other greenhouse gases is effectively reduced around the world, we are already committed to a significant degree of climate change.

By reducing emissions now the worst consequences of climate change may be avoided, but Earth's inhabitants must still somehow adapt to the changes that are already taking place in our environment.

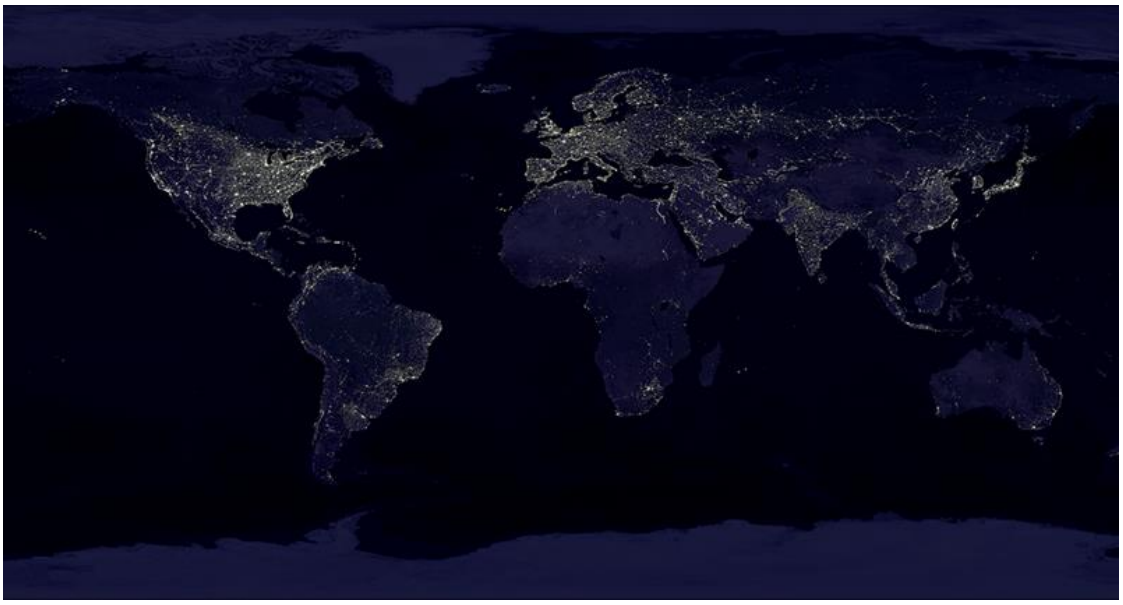
Two types of adaptation:

1. Autonomous adaptation: Non-conscious adaptation triggered by ecological changes in natural systems and by market or welfare changes in human systems. E.g. organisms move to higher latitudes or altitudes due to a warming climate
2. Planned adaptation: Result of deliberate policy decisions, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state. E.g. skiing industries by making their own snow, moving their ski slopes to higher altitudes and using white plastic sheets to guard against glacial melt.

"Manish I am okay" x2 – Ghosh 6:18

Apparently, the TAs know whether the professor is okay or the lecture should be continued or ended (this happened on 21st June during exam demo)

Key Idea 2: A Mosaic of Solutions

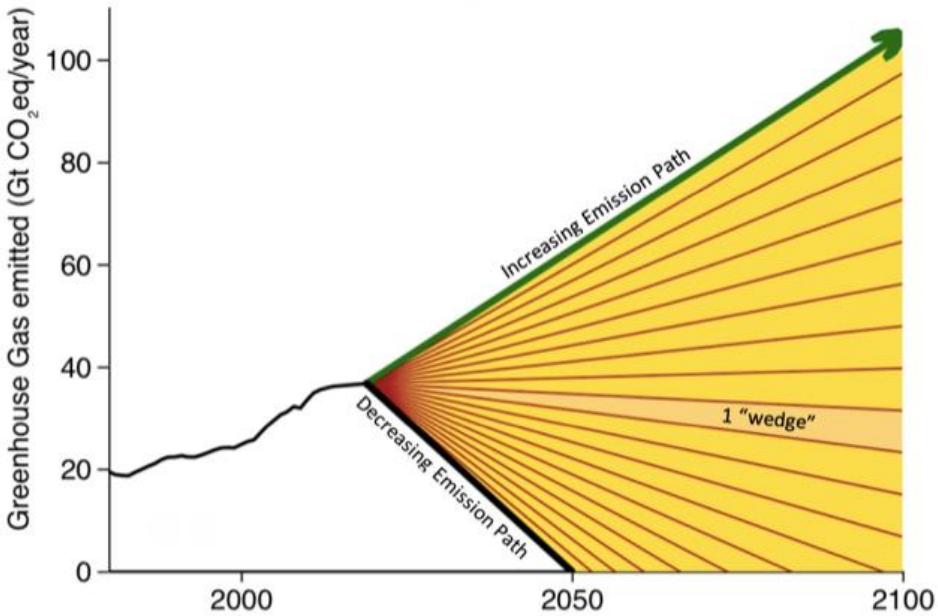


Picture of the world at night, Image by Craig Mayhew and Robert Simmon, **NASA** GSFC

NASA clicked this picture (no kidding) *India during Diwali by NASA nostalgia hits hard*

The nations consuming more power are more lit up (Russia and China are dark probably because NASA clicked it). More power => more emission of greenhouse gases

Design Our Climate (DOCs)



Currently, about 55 Gt **$CO_{2\,eq}$** are released into the atmosphere each year as a result of human activity

The 2015 **Paris Agreement** has the central aim of keeping the global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and ideally limit this increase to 1.5 degrees Celsius. To maintain the Paris agreement greenhouse gas emissions need to reach **net zero** by mid century. Both scenarios are approximated in the graph below.

1. Increasing scenario : Emission of **100 Gt $CO_{2\,eq}$ per year** by 2100, from 2000-2100 surface air temperature rise 3.5-5°C, sea level rise 2m
2. Following Paris Agreement: Reduced Greenhouse gas emission to 0 by 2050 and maintaining it till 2100. From 2000-2100 surface air temperature rise 1.5°C, sea level rise 50cm

Design our climate simulation tool:
https://applets.kcvs.ca/DesignOurClimate/DesignOurClimateSim.html

This is a very interesting applet, how it works is common sense but it is a very good simulation! I suggest giving 5-10 minutes to explore it. It's fun.

Key Idea 3: The Human Element

1992 – **United Nations Framework Convention on Climate Change (UNFCCC)**, a treaty signed by 195 countries. Does not include any agreements to reduce carbon dioxide emissions

1997- Discussions within the UNFCCC treaty gave rise to a major international agreement on climate change, the 1997 **Kyoto Accord**, in which 37 developed nations committed to reducing greenhouse gas emissions. Some important nations have not signed the treaty, some dropped out and there are changes in the level of emissions by some countries

2015 – **The Paris Agreement**. Under this agreement, nations are responsible for creating their own plans to mitigate greenhouse gas emissions. Some notable nations (Doland Tremp) have dropped out

and there are significant concerns that promises made by member nations will have little effect on the climate

“We have borrowed the climate from our children and this is their faces” – Ranendu Ghosh

"I am convinced that this [climate] challenge, and what we do with it, will define us, our era and ultimately our global legacy...We all need to shoulder this responsibility not just for ourselves, but for our children and their children. Will succeeding generations have to ask why we failed to do the right thing and left them to suffer the consequences?"

-Ban Ki-moon, United Nations Secretary-General from 2007 to 2016.