Health impacts of climate change and Health benefits of climate change mitigation and adaptation

Dr. Jeff Ritterman

Richmond City Council

Contact me at Jeffritterman@yahoo.com


NOAA, Todd Heitkamp Wikimedia Commons


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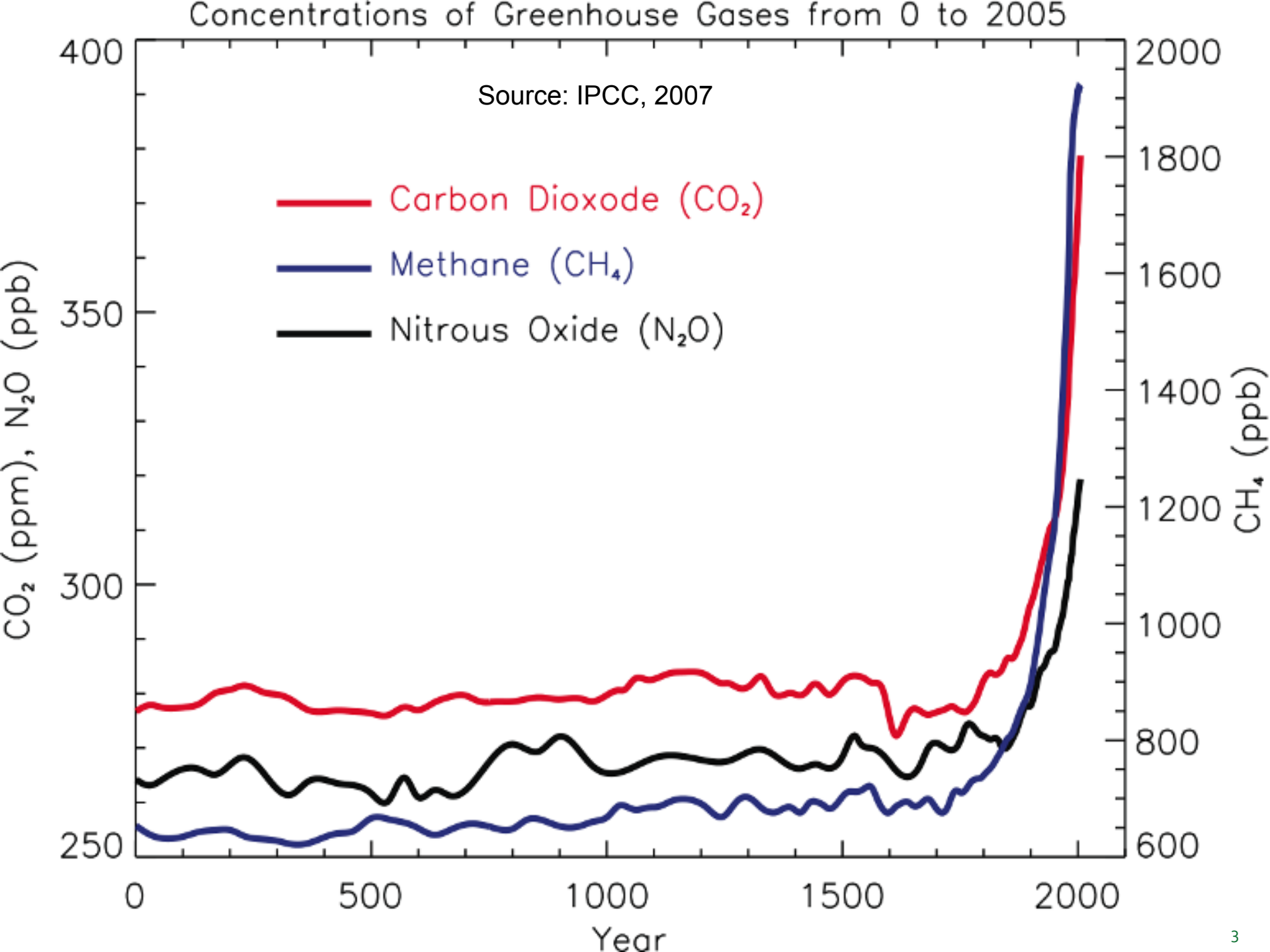
"Climate change is the **biggest global health threat** of the 21st century… The impacts will be felt all around the world – and not just in some distant future but in our lifetimes and those of our children."

The Lancet

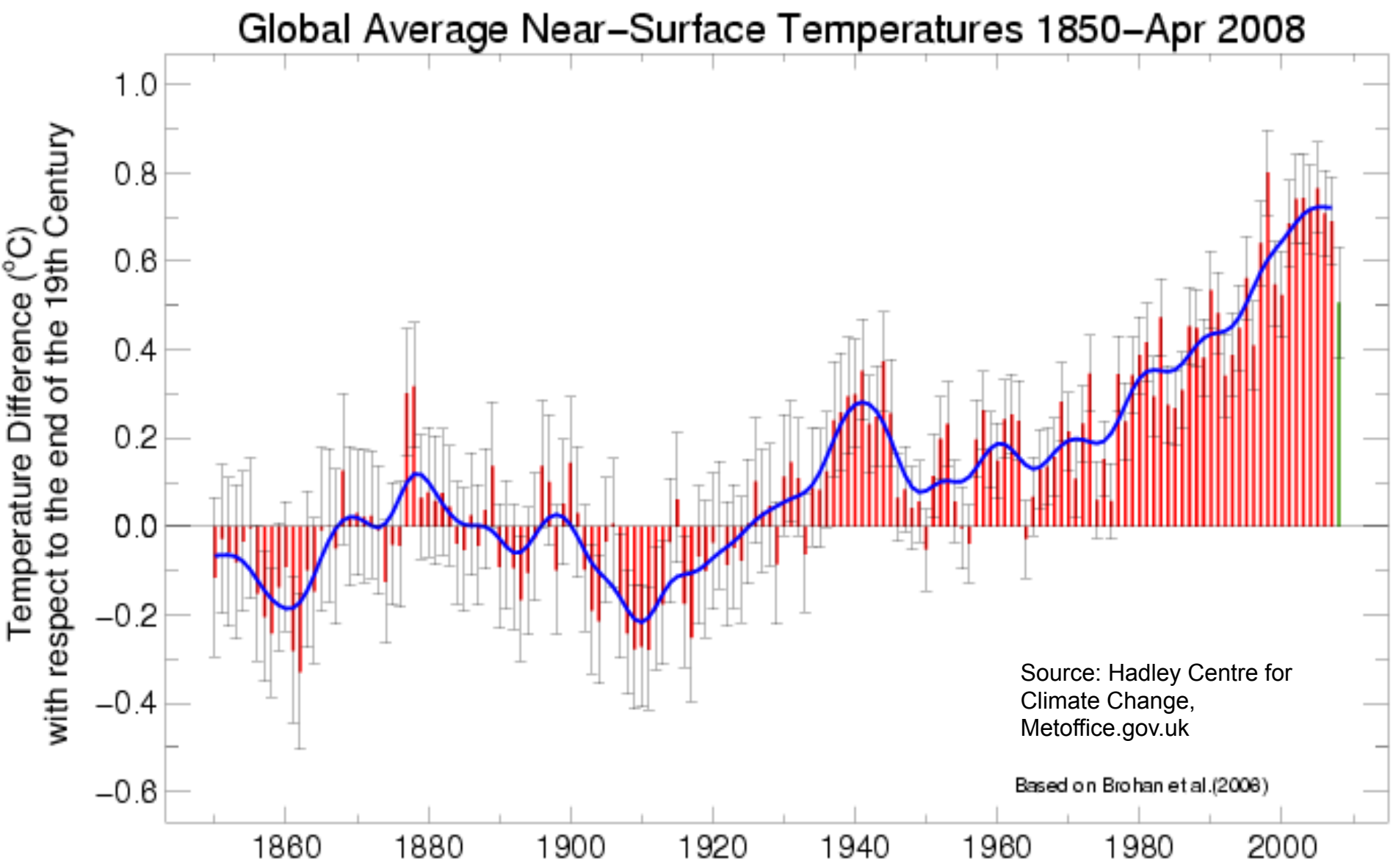

USDA, Wikimedia Commons


NOAA, Wikimedia Commons


Suat Eman, freedigitalphotos.net

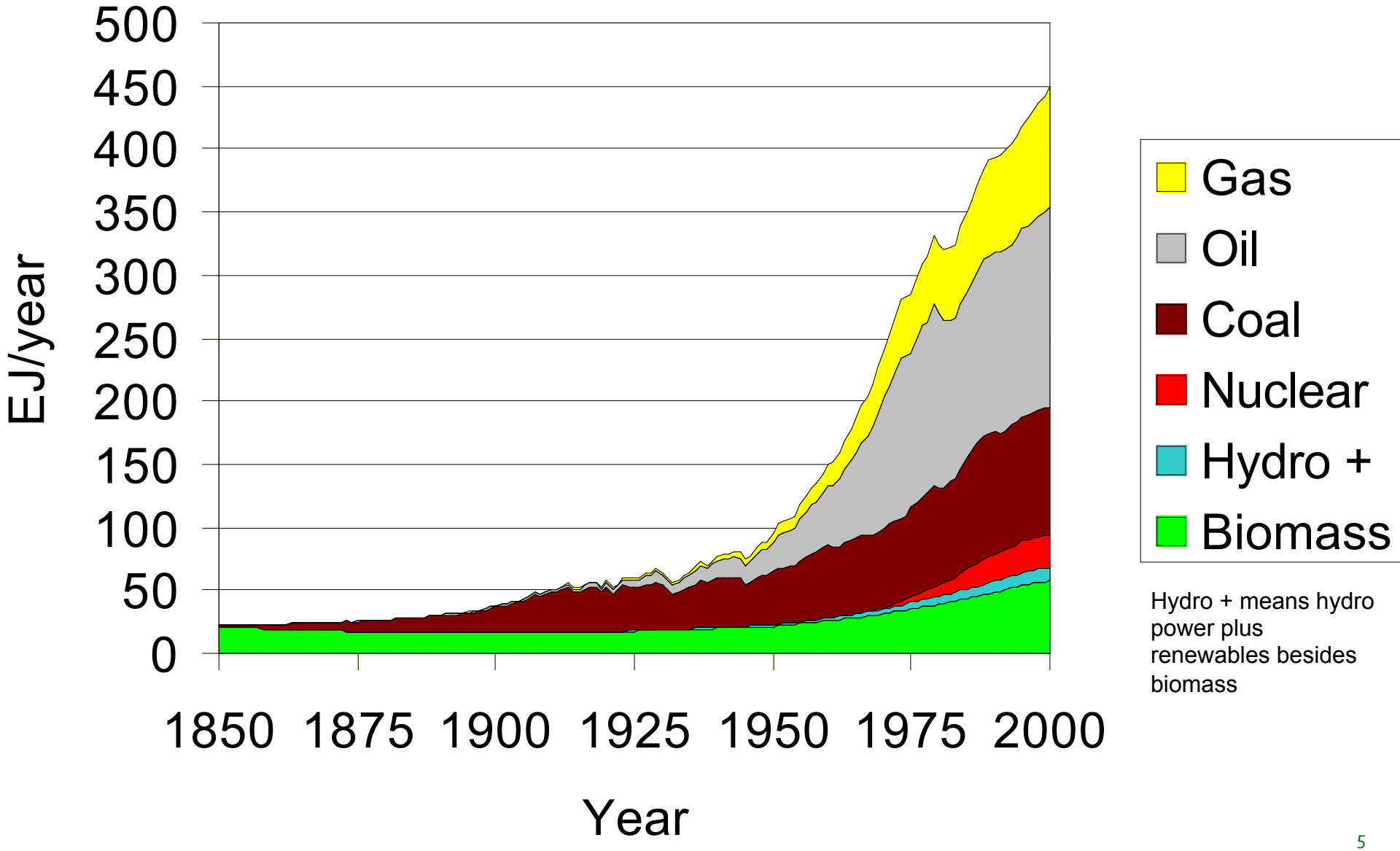

Concentrations of Greenhouse Gases from 0 to 2005
Source: IPCC, 2007
Carbon Dioxode (CO_2)
Methane (CH_4)
Nitrous Oxide (N_2O)
CO_2 (ppm), N_2O (ppb)
CH_4 (ppb)
Year
400
350
300
250
2000
1800
1600
1400
1200
1000
800
600
0
500
1000
1500
2000

Unprecedented Warming



World Primary Energy Supply 1850-2000:

The world energy system is increasingly dominated by oil and gas



Hydro + means hydro power plus renewables besides biomass

Health impacts of climate change

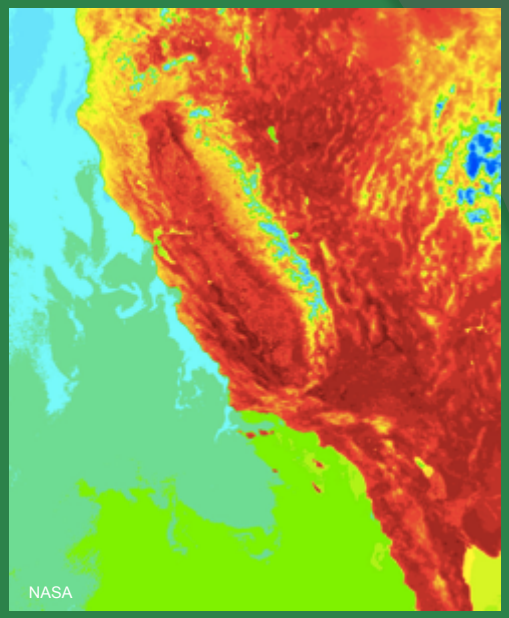
Climate Change:

- Temperature rise
- Sea level rise
- Hydrologic extremes

HEAT	→ Heat stress, cardiovascular failure
SEVERE WEATHER	→ Injuries, fatalities
AIR POLLUTION	→ Asthma, cardiovascular disease
ALLERGIES	→ Respiratory allergies, poison ivy
VECTOR-BORNE DISEASES	→ Malaria, dengue, encephalitis, hantavirus, Rift Valley fever
WATER-BORNE DISEASES	→ Cholera, cryptosporidiosis, campylobacter, leptospirosis
WATER AND FOOD SUPPLY	→ Malnutrition, diarrhea, harmful algal blooms
MENTAL HEALTH	→ Anxiety, despair, depression, post-traumatic stress
ENVIRONMENTAL	→ Forced migration, civil

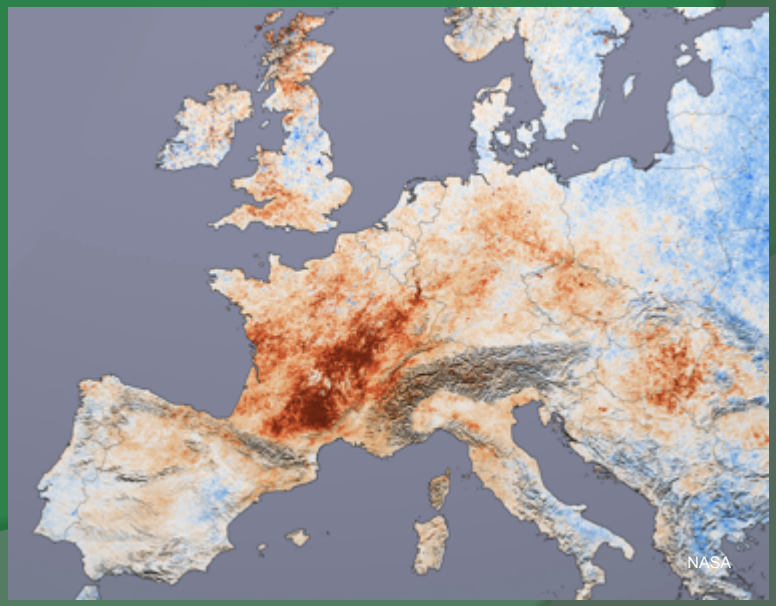
Adapted from J. Patz

Heat Wave Examples



2006 California heat wave

- Daytime temperatures
  > 100 degrees for 2 weeks
- Record nighttime highs
- > 1 million people lost electricity
- Death toll: 150-450
- Excess ER visits: 16,000
- Excess hospitalizations: 1000



2003 European heat wave

- Death toll > 45,000

1995 Chicago heat wave

- Death toll: 900

Increase in Wildfires

Contributor and a consequence of climate change

Frequency is expected to increase

Increased air pollutants, fine particulates (PM 10 and PM 2.5) and ground-level ozone

Most vulnerable: elderly, children, people with respiratory illnesses

Photos: FEMA, Florida Division of Forestry

Increased Ozone and Poor Air Quality


Ben Amstutz, Flickr


WHO, HCWH


Senor Codo, Flickr

Increased risk of ER visits and hospital admissions

Increased risk of asthma onset and exacerbations, cardiac arrhythmias, myocardial infarction and total mortality

Pollen and Natural Air Pollutants

Increased temperatures and ground-level CO_2 will increase pollen production, longer and earlier pollen seasons

Increase in allergic rhinitis, asthma and chronic obstructive pulmonary disease

Zoonotic and Vector-borne Diseases

- Introduction and spread of new diseases
- Increased geographical range and risk of current diseases
- Re-emergence of formerly prevalent diseases
- Prolonged transmission cycles
- Examples: Lyme disease, West Nile Virus, Dengue Fever, Malaria, Chikungunya, Tularemia, Rabies


CDC/ Wikimedia Commons

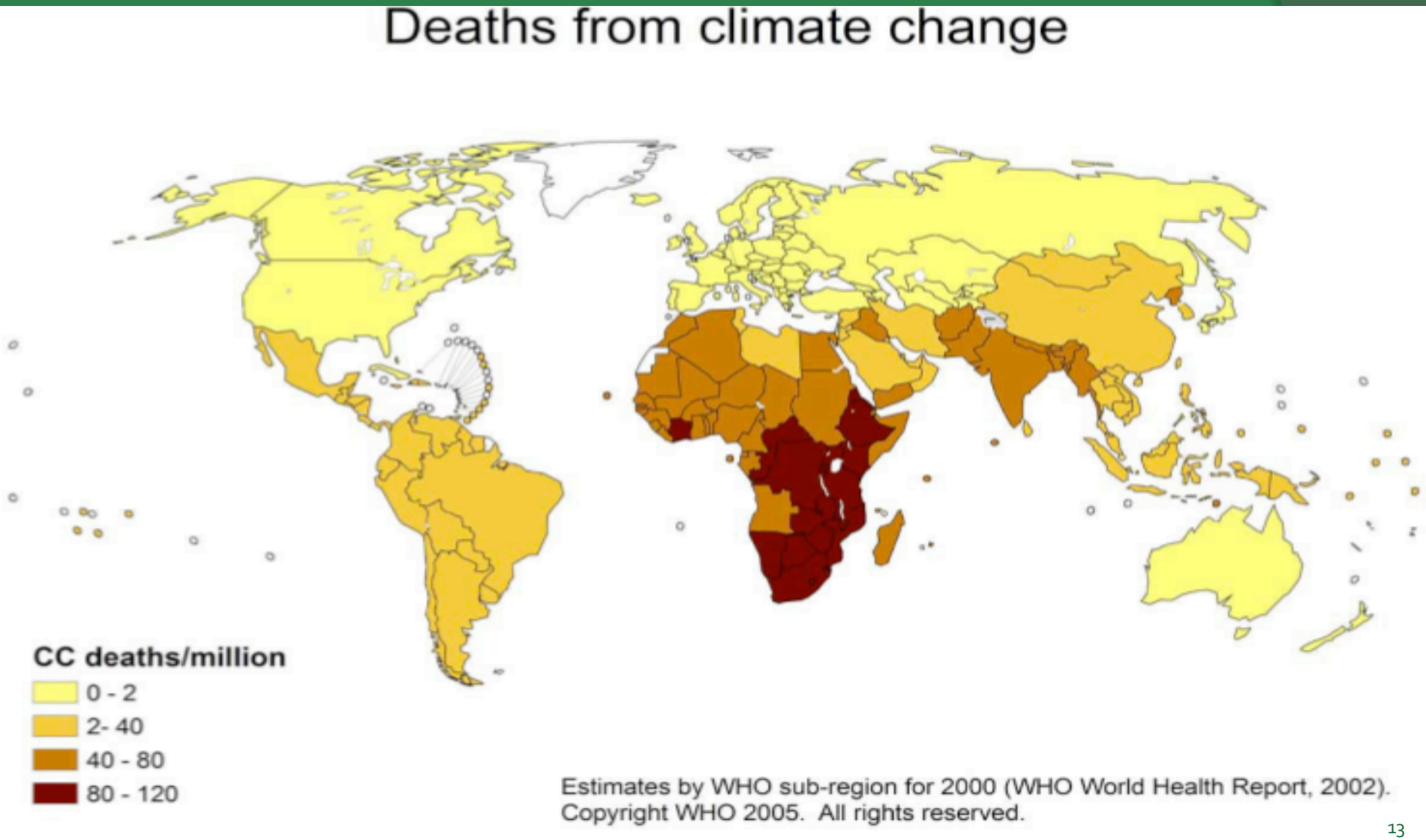

USDA

Water- and Food-Borne Diseases

- Increased air and water temperatures increase the replication, persistence, survival, transmission and range of some pathogens
- Heavy rainfall and flooding facilitates rapid transportation of pathogens to water supplies


Source: Living Water International / Flickr
www.water.cc

Deaths Attributed to Climate Change: 150,000 per year



The climate equity gap