Put simply, planetary health is the health of human civilization and the state of the natural systems on which it depends.

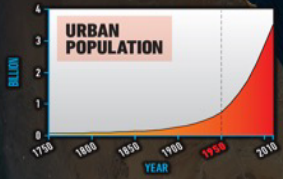
Centre on Climate Change & Planetary Health

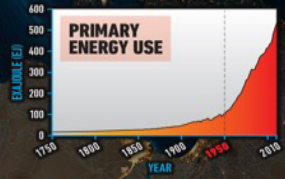
Andy Haines

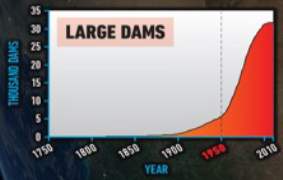
LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

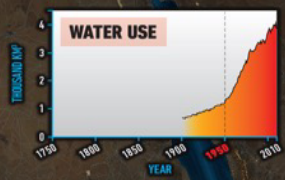
THE GREAT ACCELERATION

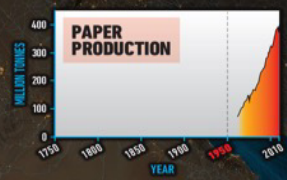
SOCIO-ECONOMIC TRENDS

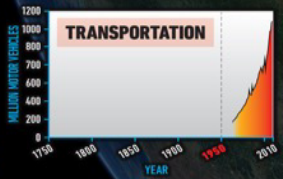




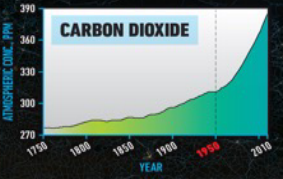


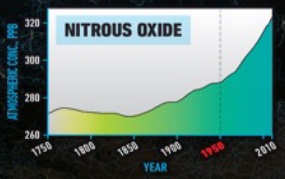


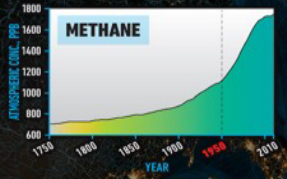


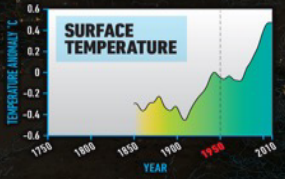


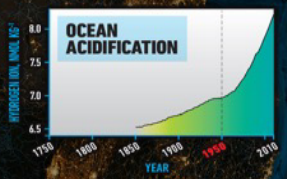
EARTH SYSTEM TRENDS

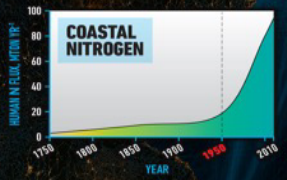


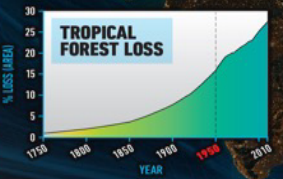


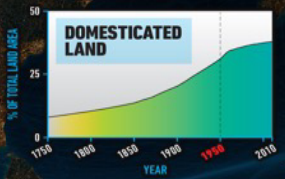


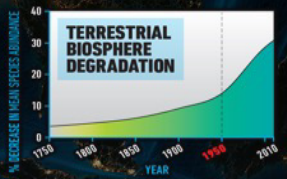








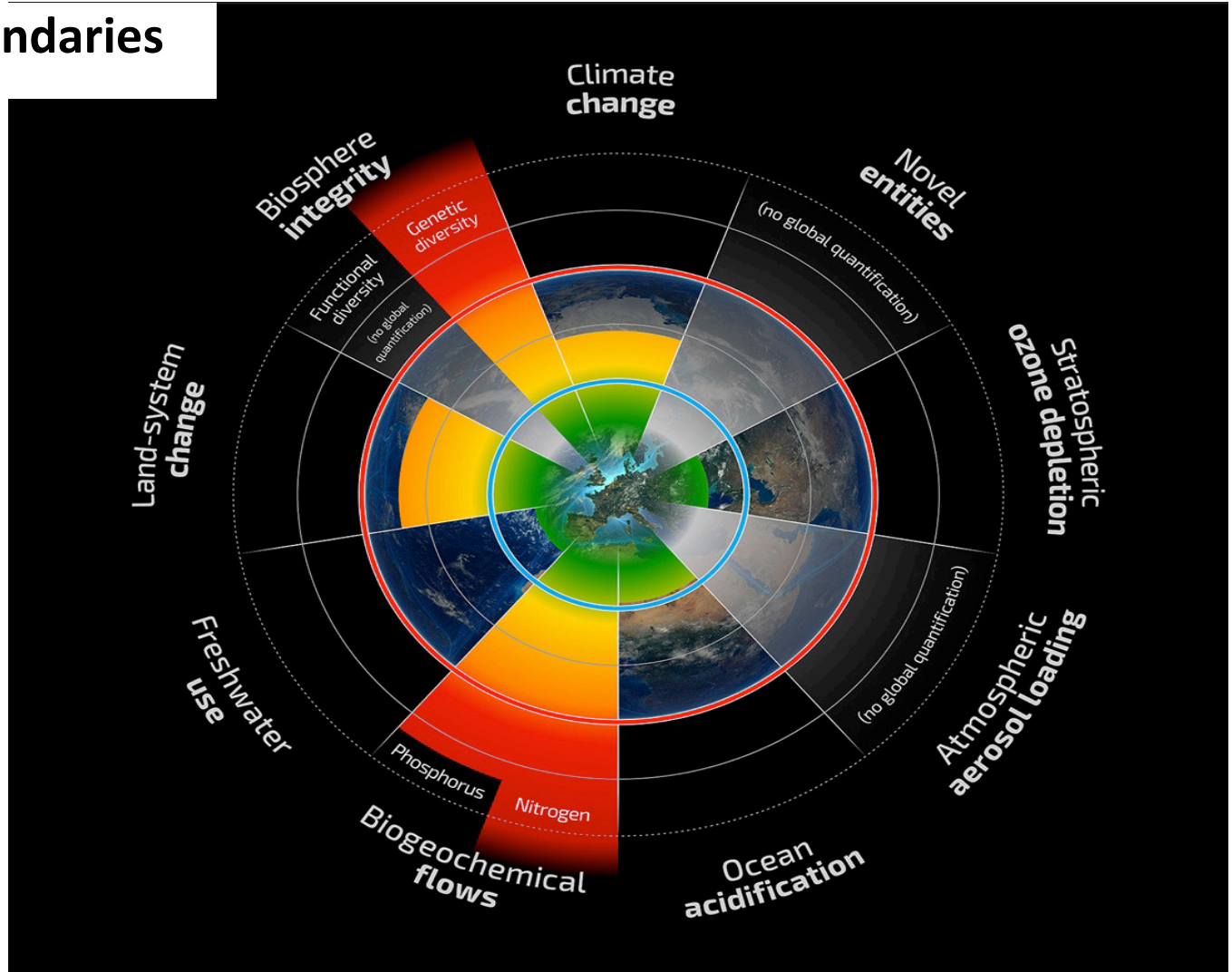




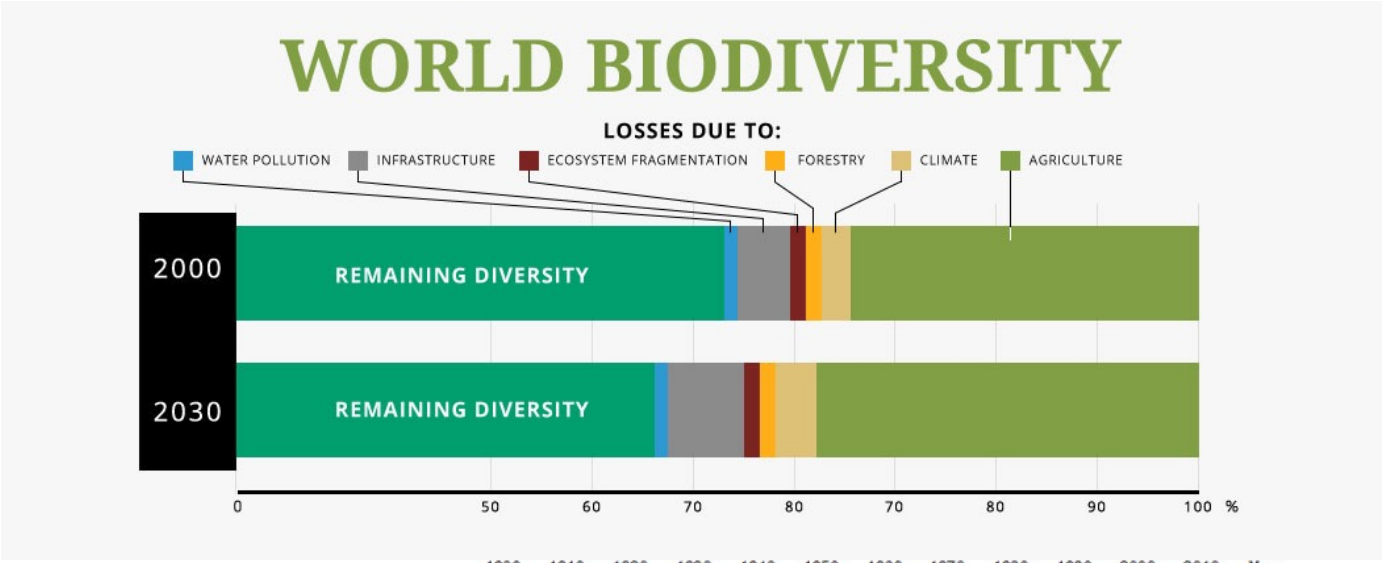
REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig, The Trajectory of the Anthropocene: the Great Acceleration, *The Anthropocene Review*, 16 January 2015.

Planetary boundaries

(Steffen et al Science 2015)



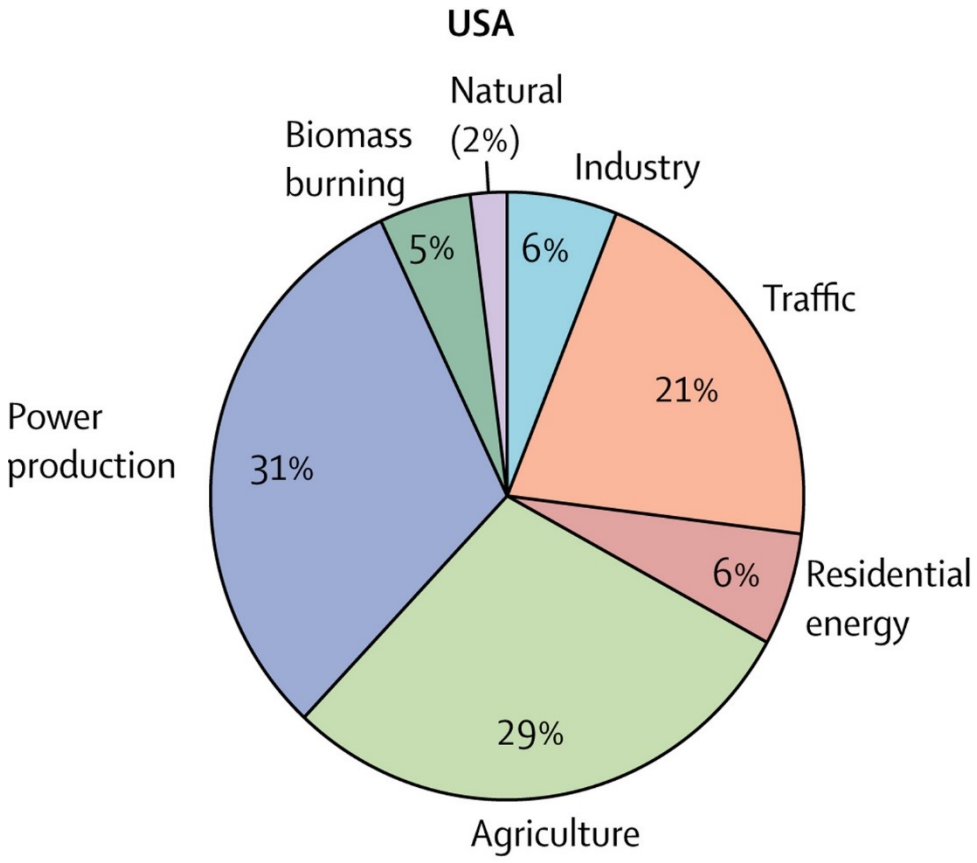
Impacts of the food system on the environment

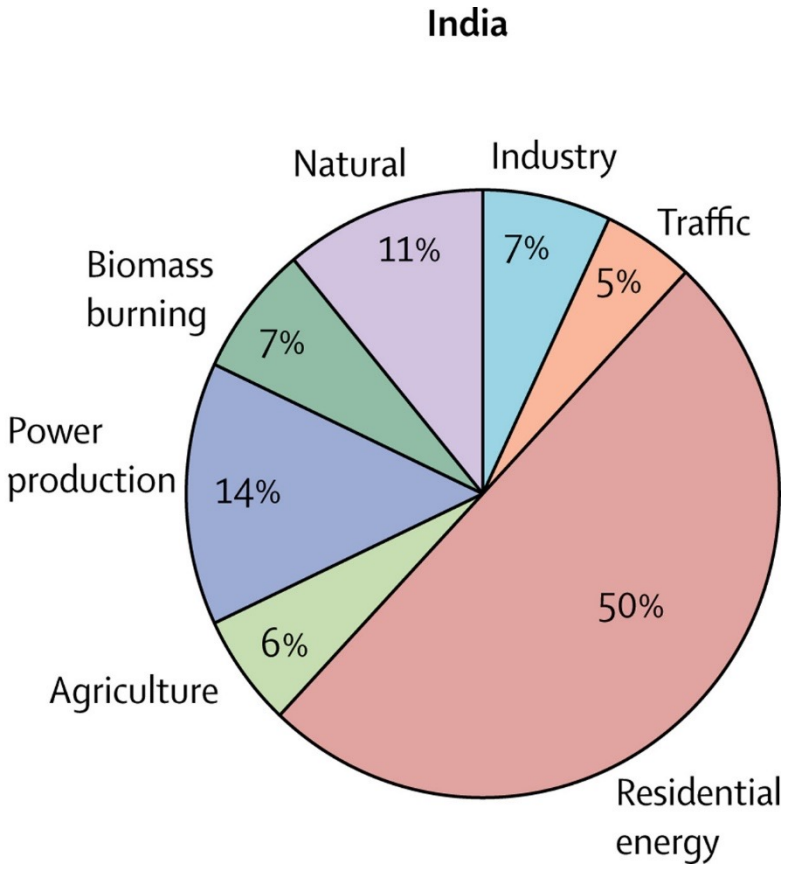


- Greenhouse gases
- Water
- Soil degradation and erosion
- Land use change and habitat loss

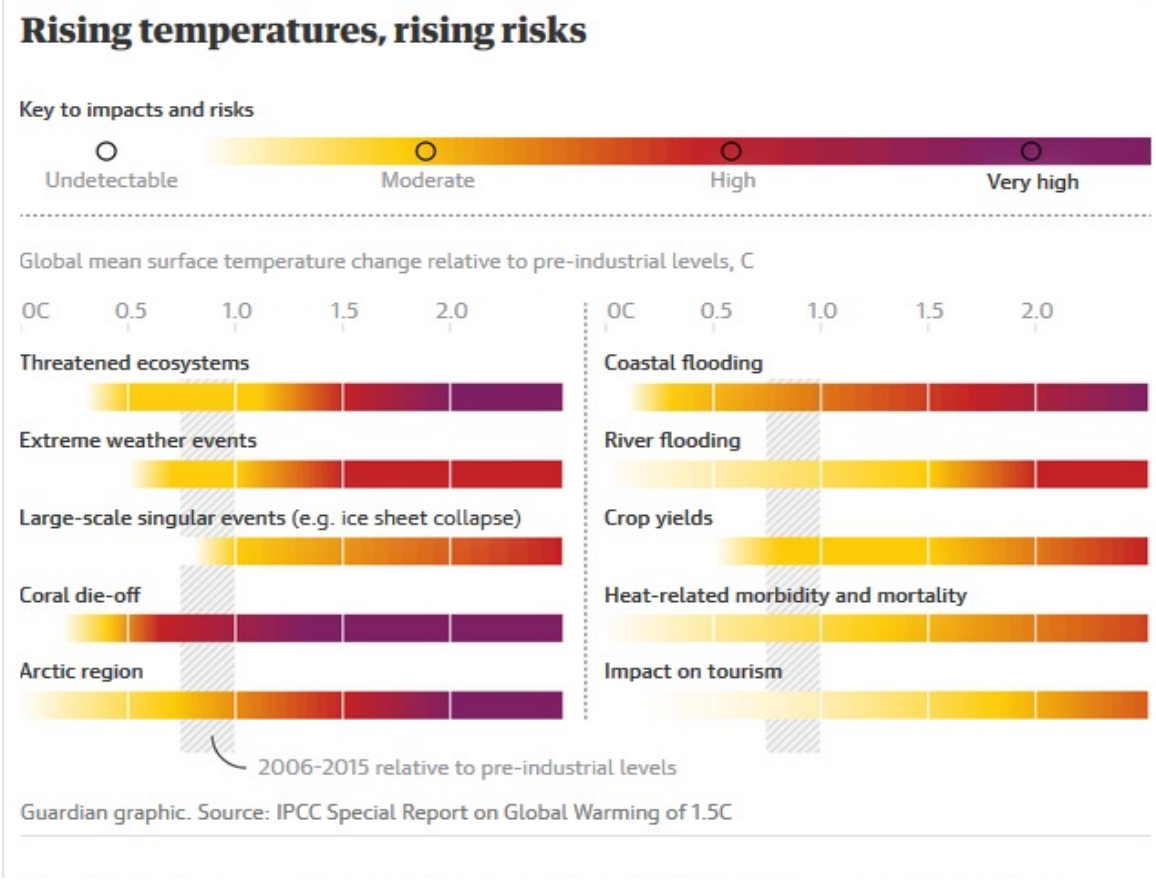
Sources of ambient air pollution deaths

(Lelieveld, Haines, Pozzer, Lancet Planetary Health 2018)

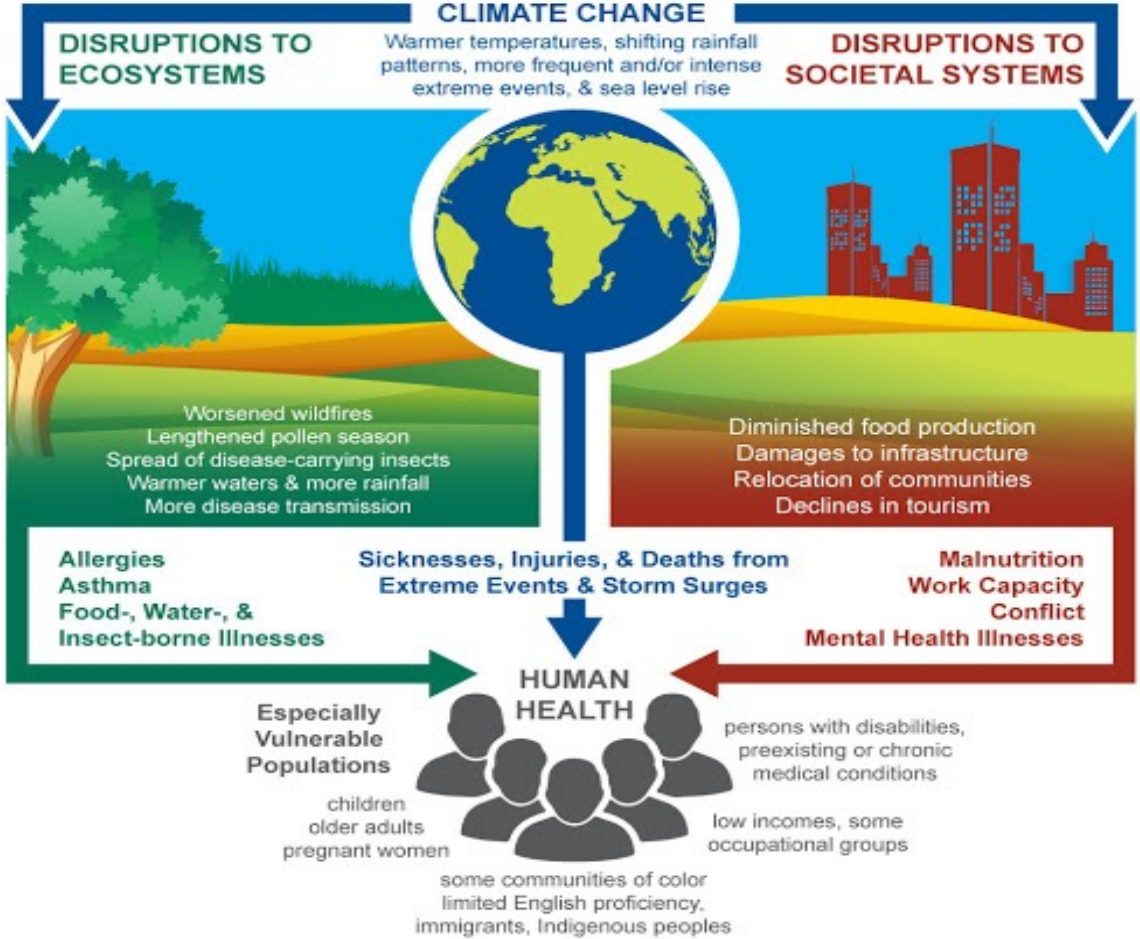




Growing risks from Climate Change
IPCC 1.5°C report 8 October 2018

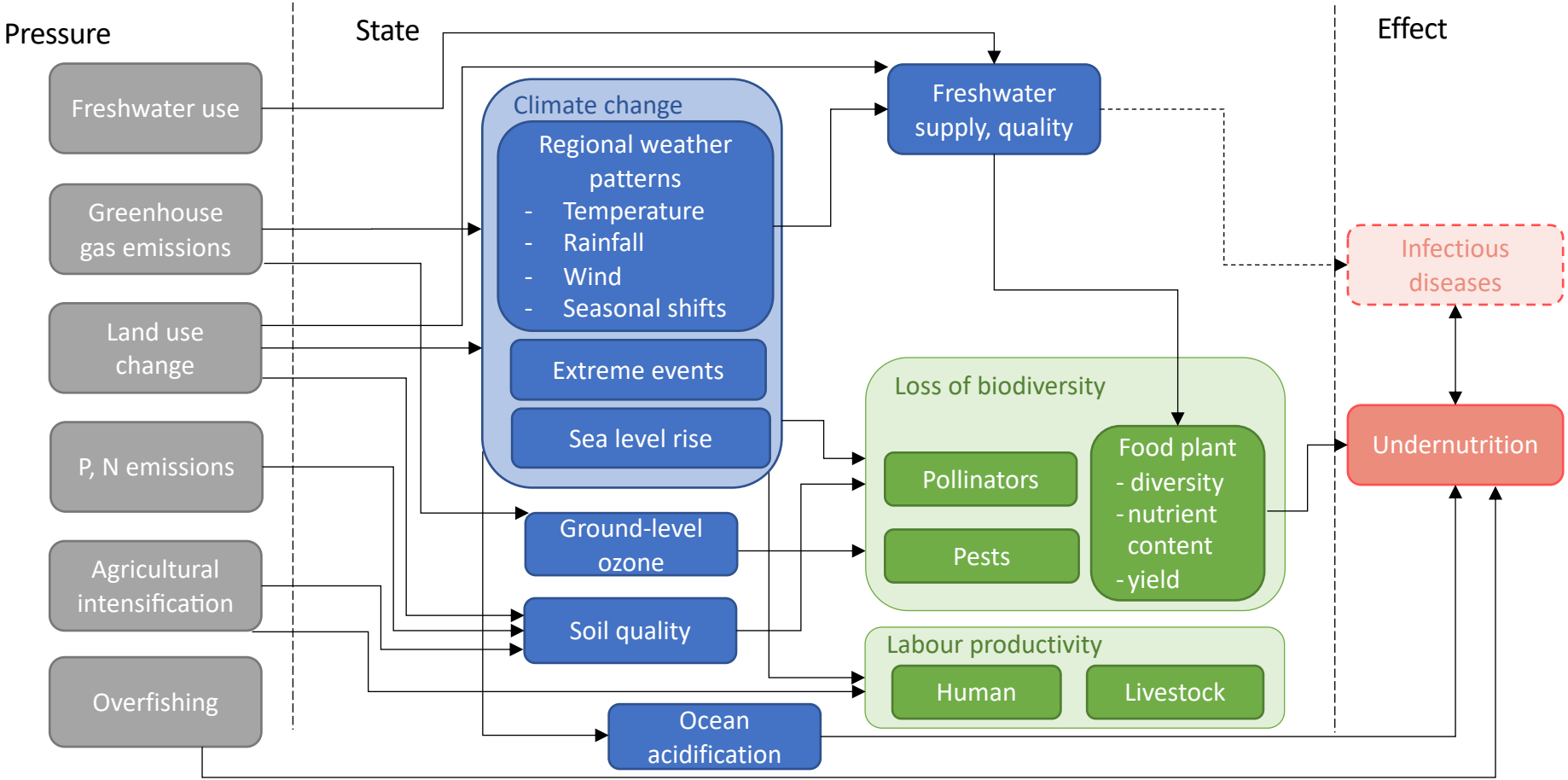


The Impacts of Climate Change on Human Health



http://blogs.edf.org/climate411/2016/04/05/the-impacts-of-climate-change-on-human-health-a-sobering-new-report/

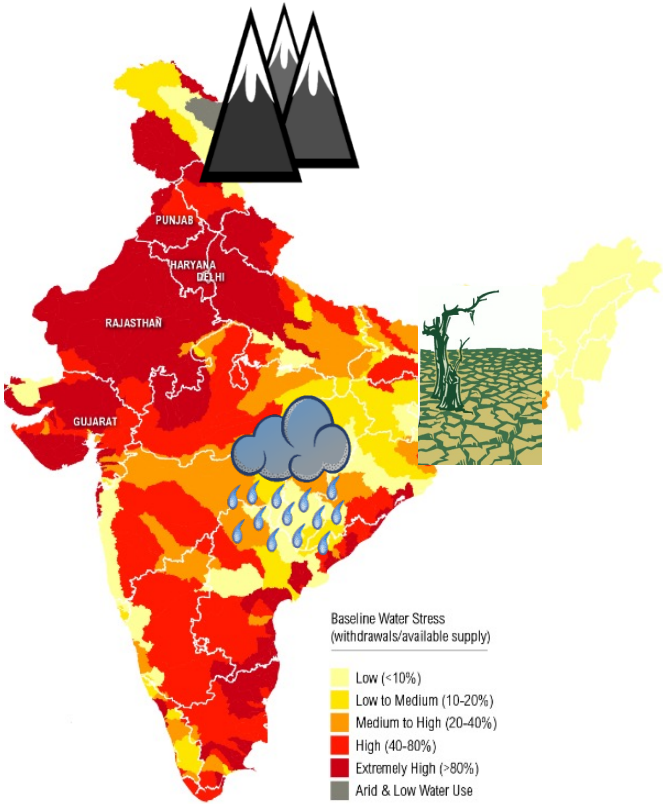
Planetary Health and undernutrition



An example -Future food security challenges for India:

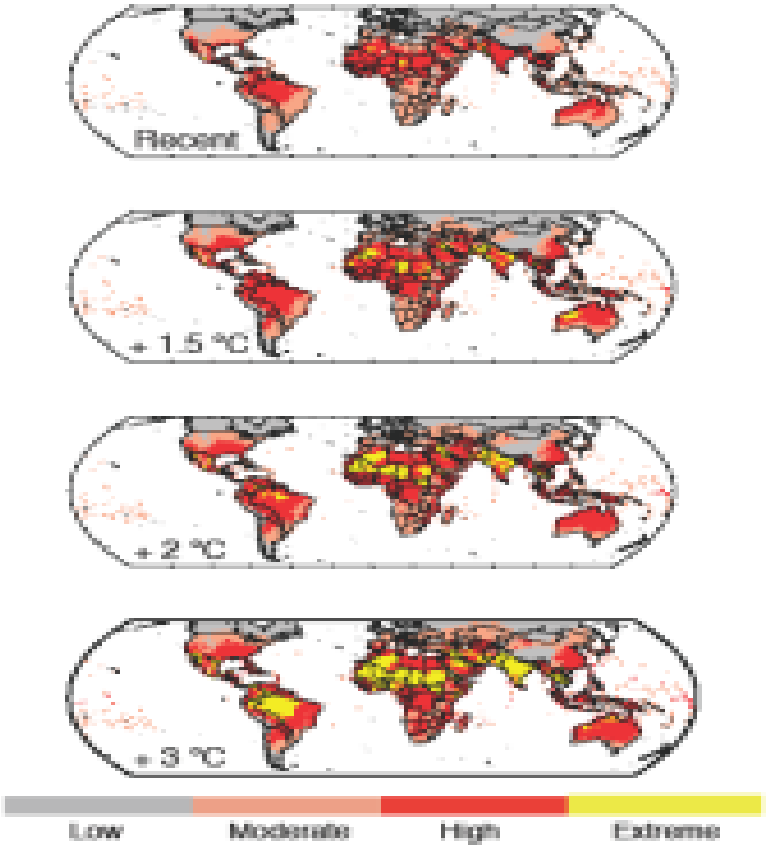
1. Population Growth
2. Dietary change
3. Groundwater depletion
4. Climate change

Adoption of **affluent diets by the whole population would result in increases of 19–36%** across GHG emissions, blue and green Water Footprints, and Land Use.
with regional variations (Aleksandrowicz, et al 2019)

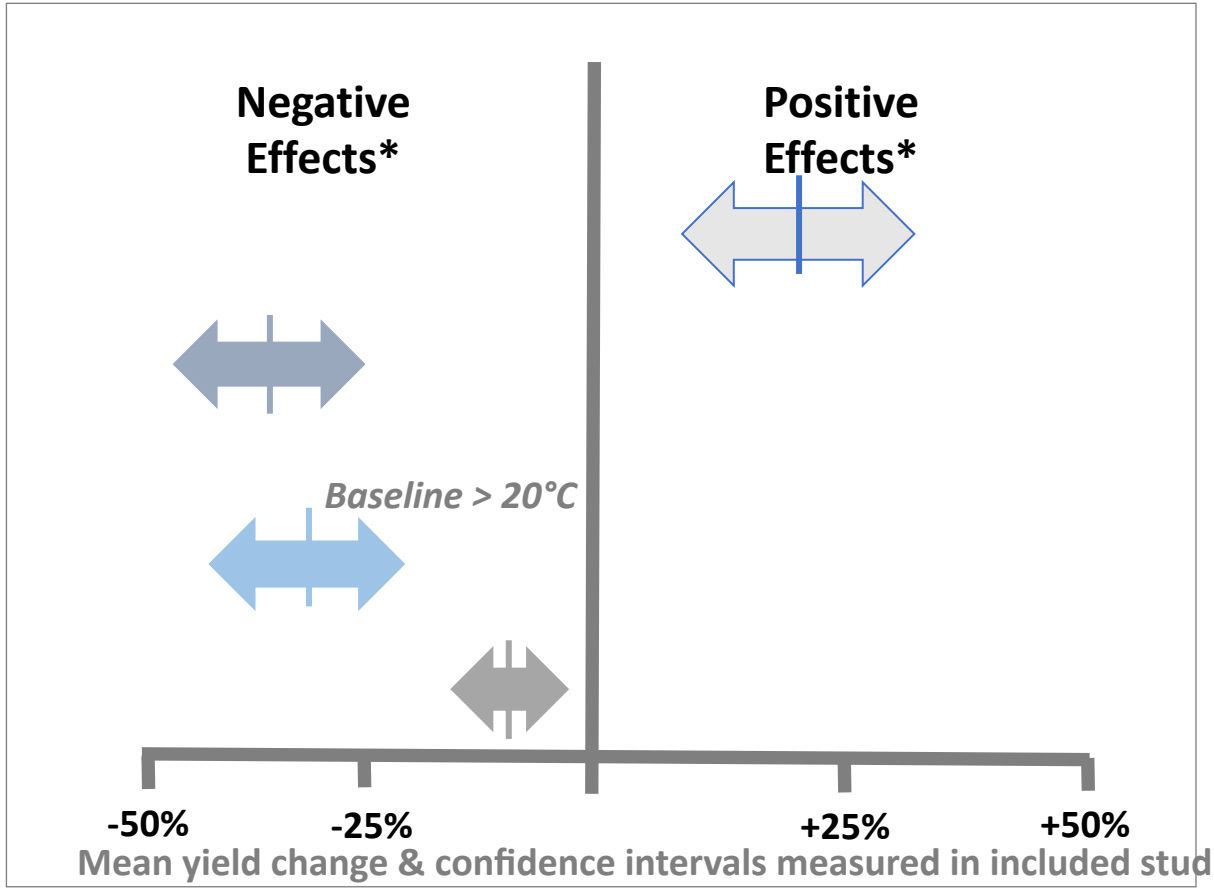


~1 billion people exposed to extreme heat preventing moderate physical labour in the hottest month after global temperature >2·5°C above pre-industrial levels.

(Andrews et al 2018 Lancet Planetary Health)



Systematic review of impacts of environmental exposures on vegetable/legume yields (Scheelbeek et al PNAS 2018)



CO2 +250ppm

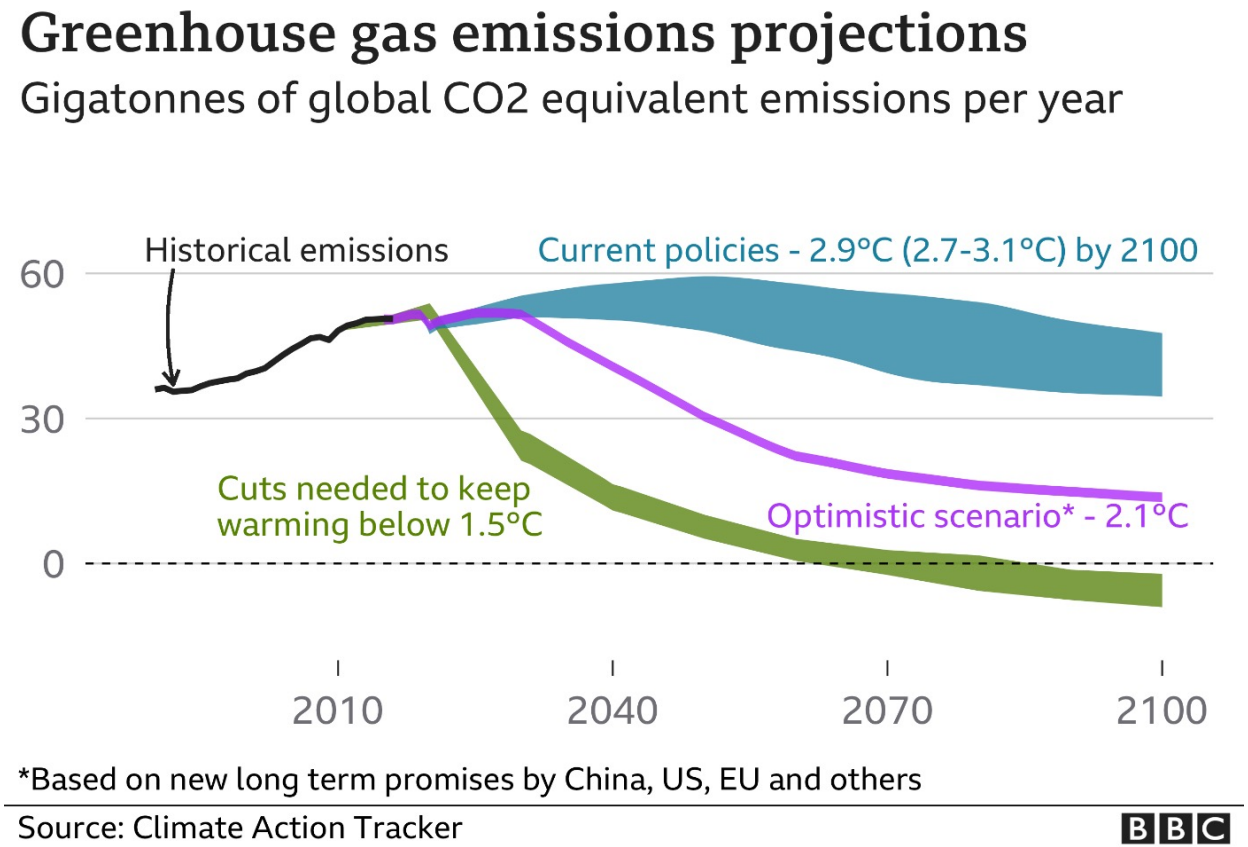
Water availability -50%

Temperature +4°C

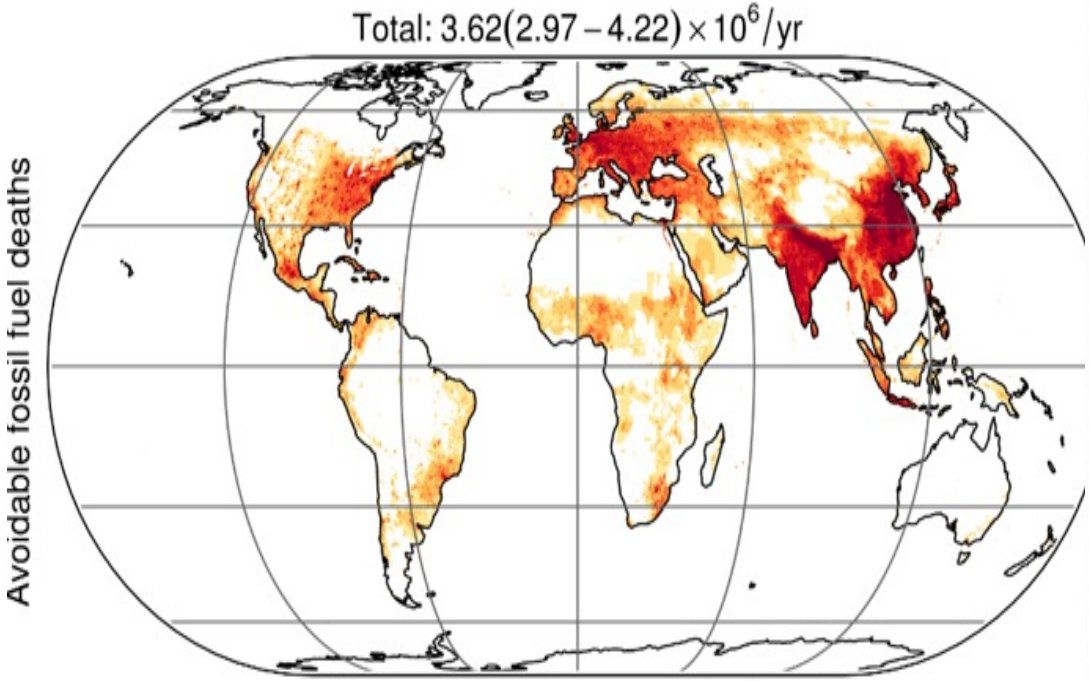
Ozone +25%

***All vegetables & legumes combined**

The imperative of rapid climate action --- capitalizing on the health co-benefits from climate change mitigation



Phasing out fossil fuel burning could avert ~3.6 million deaths annually from ambient air pollution and increase rainfall over critical food growing areas (additional benefits from cutting other sources of air pollution) (Lelieveld, Klingmüller Pozzer, Burnett, Haines, Ramanathan PNAS 2019)



Reducing short lived climate pollutants (black carbon, ozone and methane) saves lives and protects crops (Shindell et al 2012)

Annual benefits

From large-scale mitigation by 2030

Climate	**Avoided warming**	Reduced disruption of weather patterns	Reduced rate of melting	Reduced rate of sea-level rise by ~20% by 2050
Health	**2.4 million**	Avoided premature deaths annually from outdoor air pollution	Reduced air pollution: world's largest environmental health risk	
Crops	**52 million**	Tonnes of avoided crop losses from 4 major staples year		

Reducing food loss and waste and promoting healthy sustainable diets

Nearly 30% of the world's total agricultural land is used to produce food that is never eaten.

Environmental Impact	Estimated relative differences compared to current diets	
Aleksandrowicz et al., PLoS ONE 2016		
	Healthy dietary guidelines	**Vegetarian diets**
Greenhouse gas emissions	**12%** reduction	**31%** reduction
Land use	**20%** reduction	**51%** reduction
Water Use	**6%** reduction	**37%** reduction

Current research…

Rice intensification:

Could climate change interventions help African malaria elimination?

27 months (from July 2019)

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Jo Lines
Jeff Waage
Kallista Chan

AfricaRice

Kazuki Saito
Elliott Dossou-Yovo

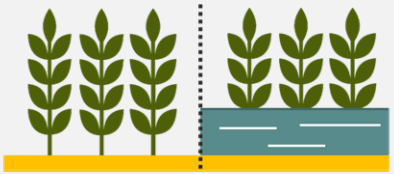
IRRI

Abdelbagi Ismael
Setegn Gebeyehu

wellcome

"Our Planet, Our Health"

Scientists from the rice sector & the public health sector have independently developed:

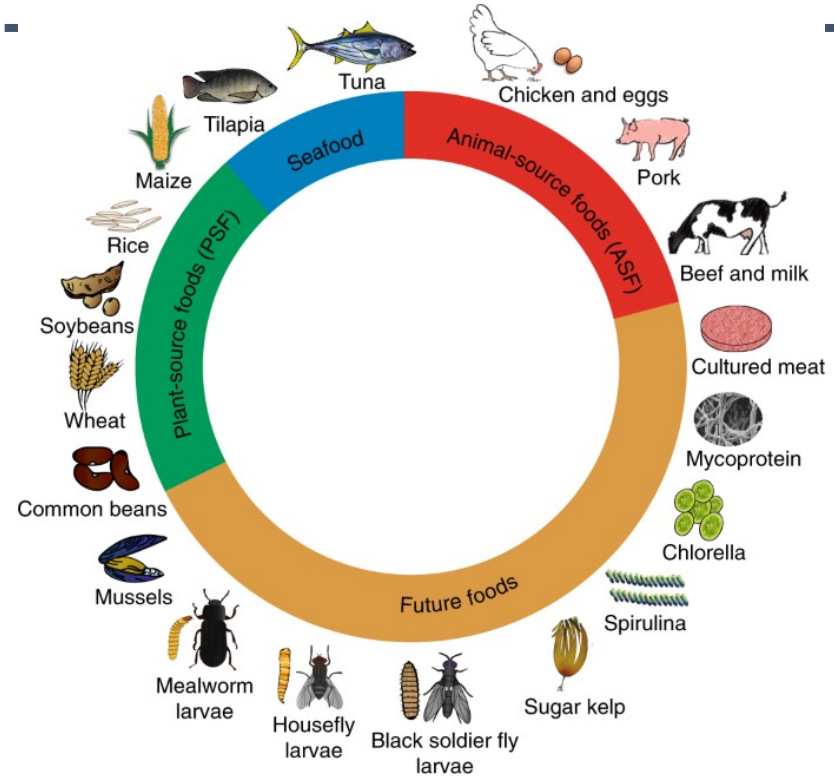


Alternate wetting and drying

vs.

intermittent irrigation

Future foods



'The complete array of essential nutrients in the mixture of future foods makes them good-quality alternatives for current animal-source foods compared to plant-source foods. Moreover, future foods are land-efficient alternatives for animal-source foods, and if produced with renewable energy, they also offer greenhouse gas benefits'

Parodi et al 2018 https://www.nature.com/articles/s41893-018-0189-7

Optimising biomass use for health

(Muscat et al Systematic review **of food-feed-fuel competition**. Global Food Security 2020)

Image Credit: JONATHAN BURTON

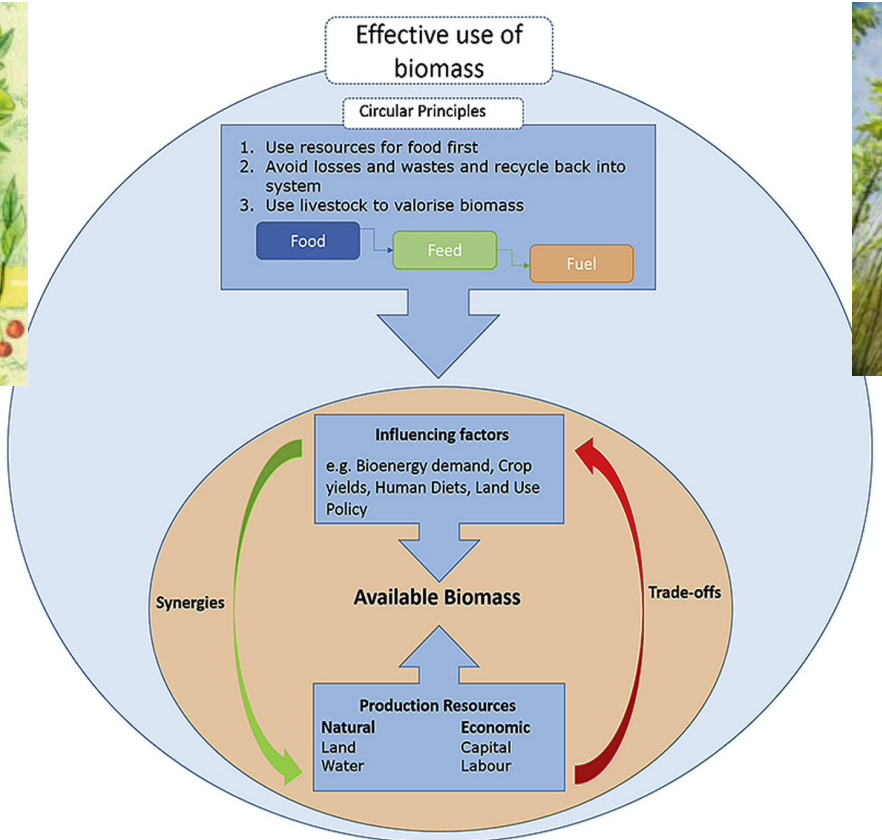


Image Credit: GETTY IMAGES

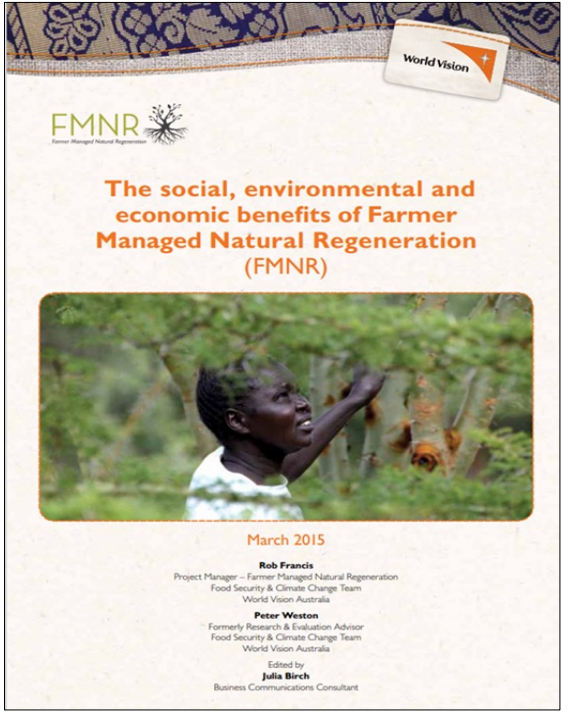
Nature-Based Solutions can provide over one-third of the cost-effective climate mitigation needed between now and 2030 to stabilize warming to below 2 °C (Griscom et al, PNAS 2017)

Bauch et al PNAS 2014

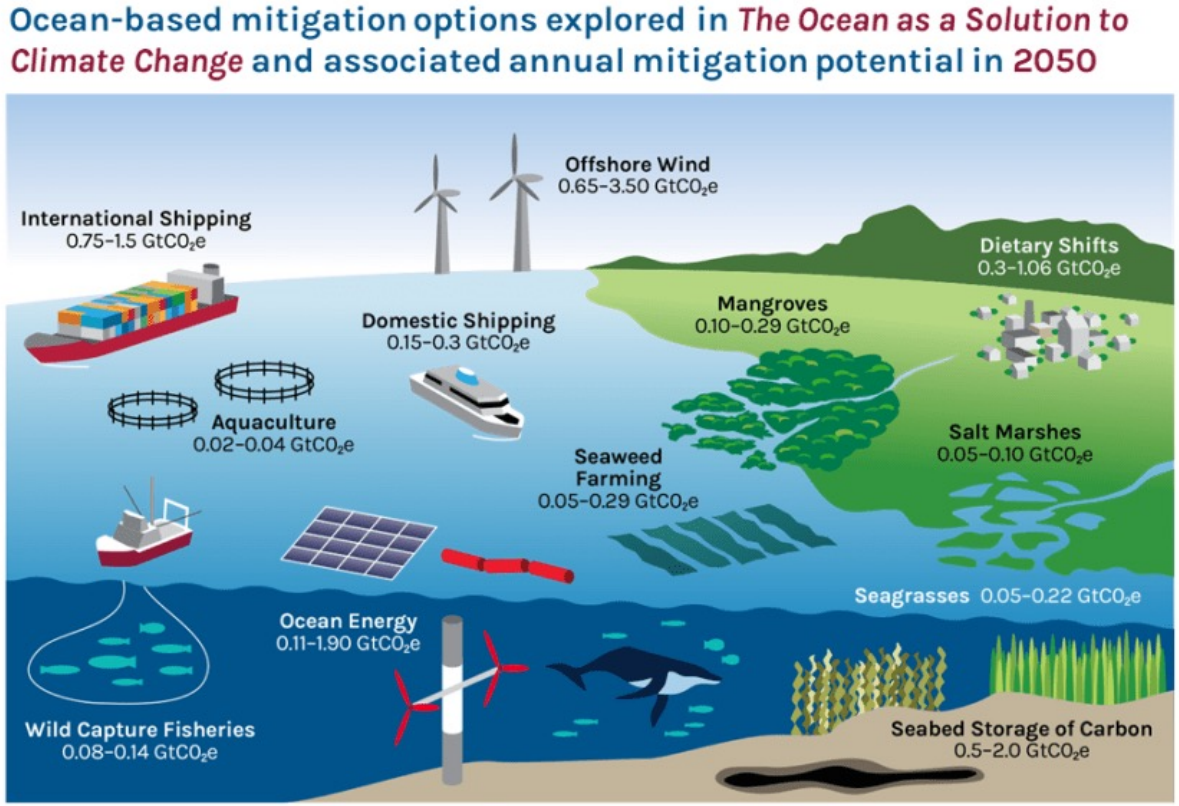
Forest conservation reduces disease risks in the Brazilian Amazon

- Decreased Malaria transmission
- Reduced air pollution and fewer Acute Respiratory Infections (ARI)
- Cleaner water--- Less diarrhoeal disease

Restoring ecosystems regulates freshwater quantity and quality and provides flood protection (wetlands and mangroves)



Ocean-based mitigation –potential health effects



oceanpanel.org

HIGH LEVEL PANEL for A SUSTAINABLE OCEAN ECONOMY

Solutions?

- Agricultural and behavioural

- Climate, trade, equity policies….

Integrating health into the Nationally Determined Contributions of GHG reductions under the Paris Agreement