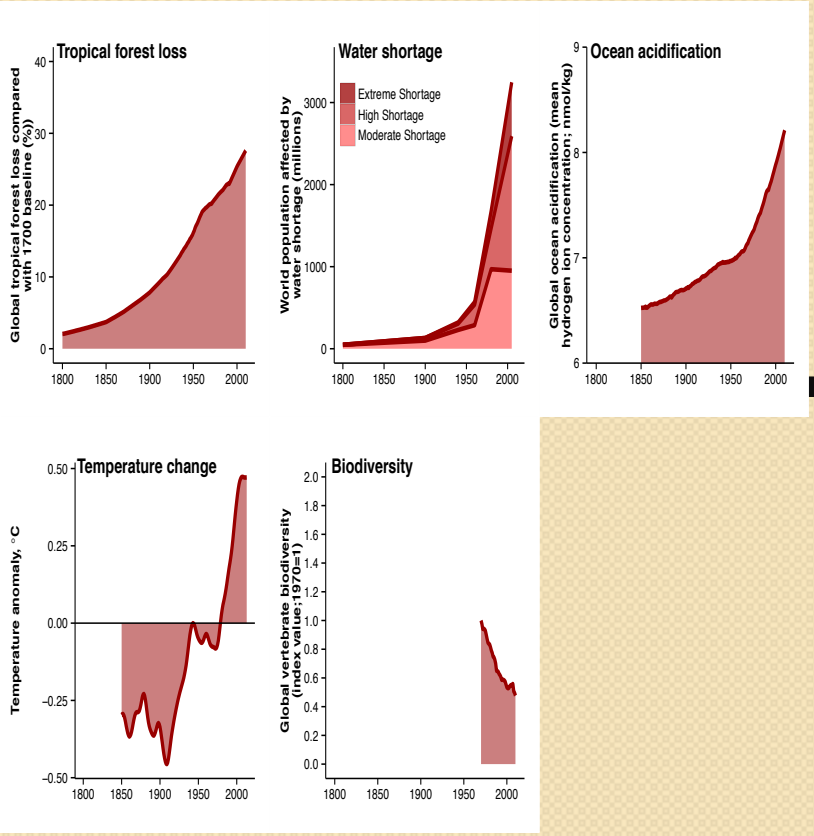
**Put simply, planetary health is the health of human civilization and the state of the natural systems on which it depends.**

# Risks to health in the Anthropocene Epoch



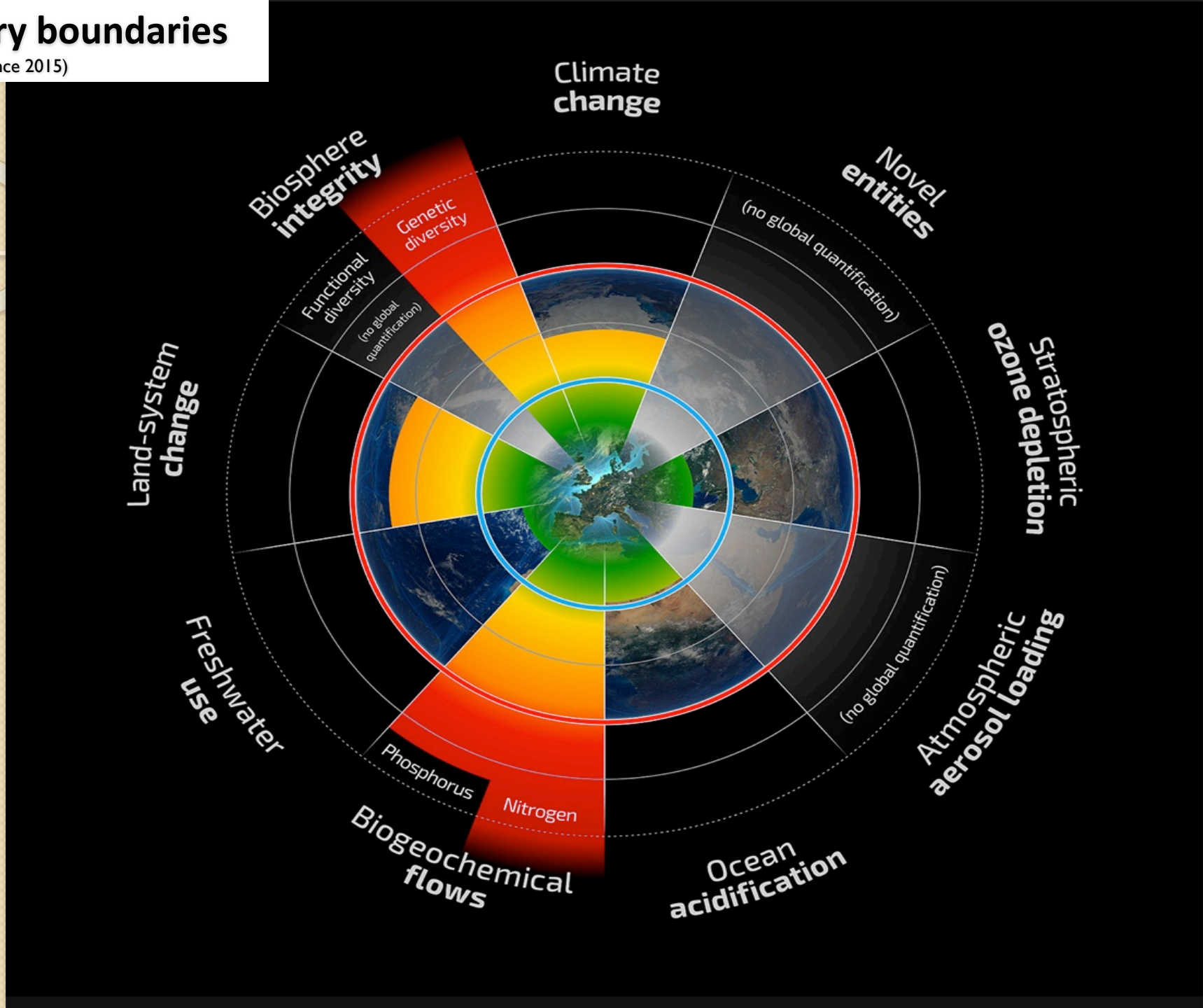

**DIRECT EFFECTS ---HEAT AND EXTREME EVENTS**

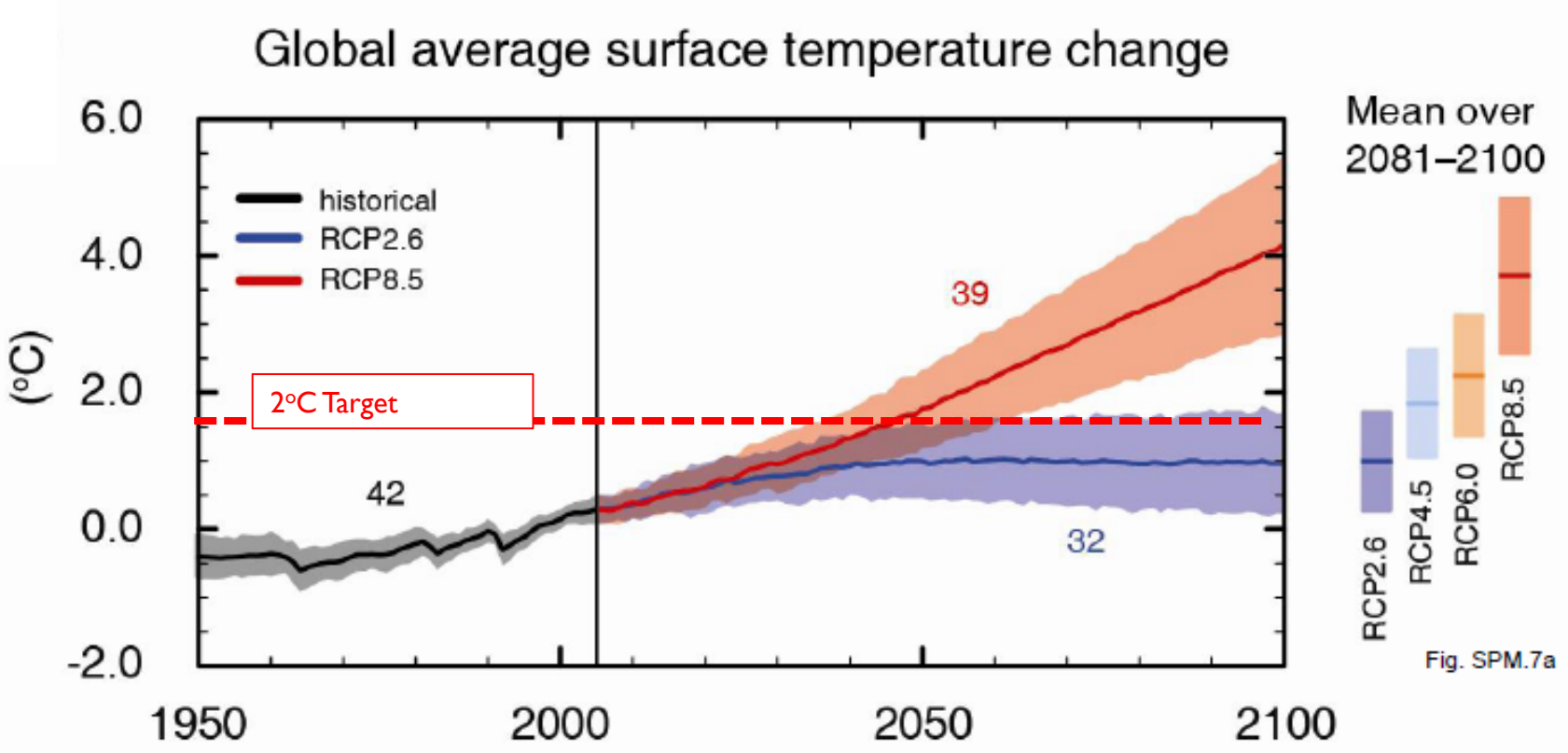
**ECOSYSTEM MEDIATED EFFECTS e.g.**
**EMERGING INFECTIOUS DISEASES**
**VECTOR-BORNE DISEASES e.g malaria, dengue**
**WATER-BORNE DISEASES**
**FOOD SUPPLY and UNDERNUTRITION**

**SOCIALLY MEDIATED EFFECTS e.g. POVERTY, MIGRATION AND CONFLICT**

# Planetary boundaries

(Steffen et al Science 2015)

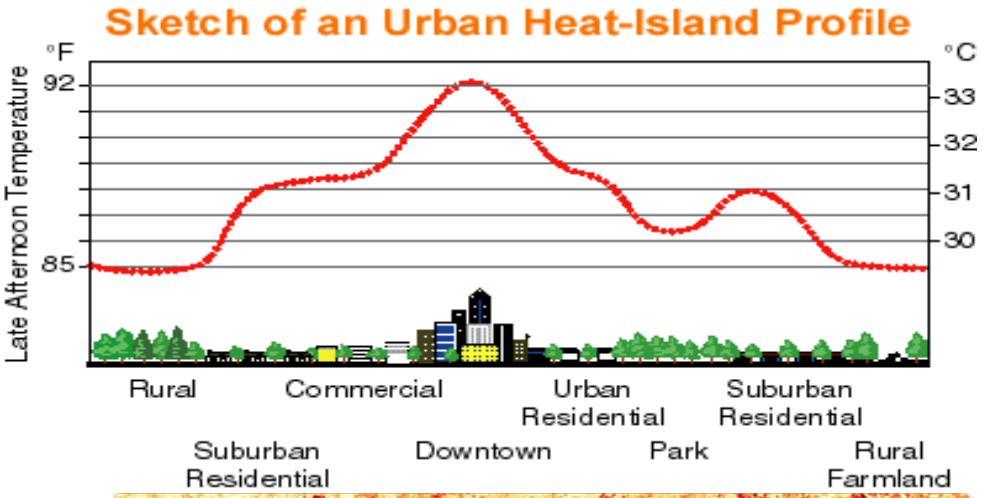





Global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C relative to 1850 for all scenarios

# Urban heat island

**The rate of increase in the annual number of extreme heat events between 1956 and 2005 in the most sprawling metropolitan regions in the USA was more than double the rate of increase observed in the most compact metropolitan regions** ( Stone,Hess and Frumkin (Env Health Perspect. 2010)



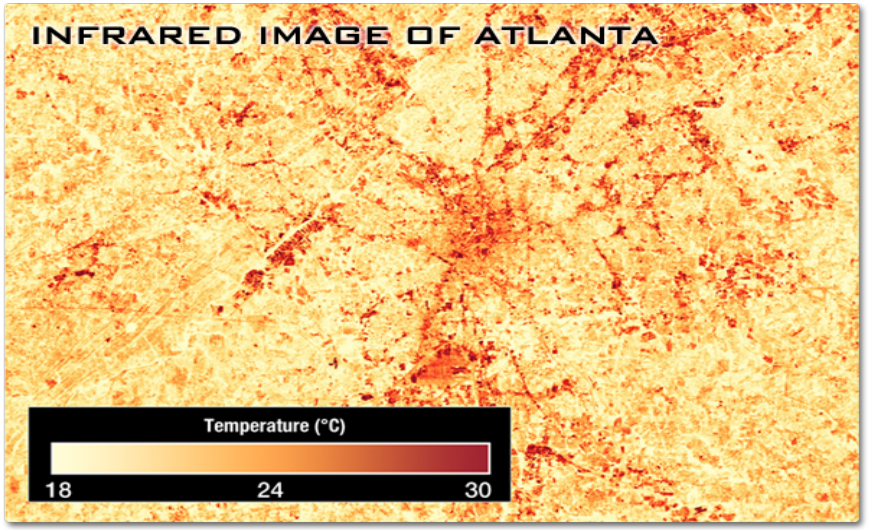
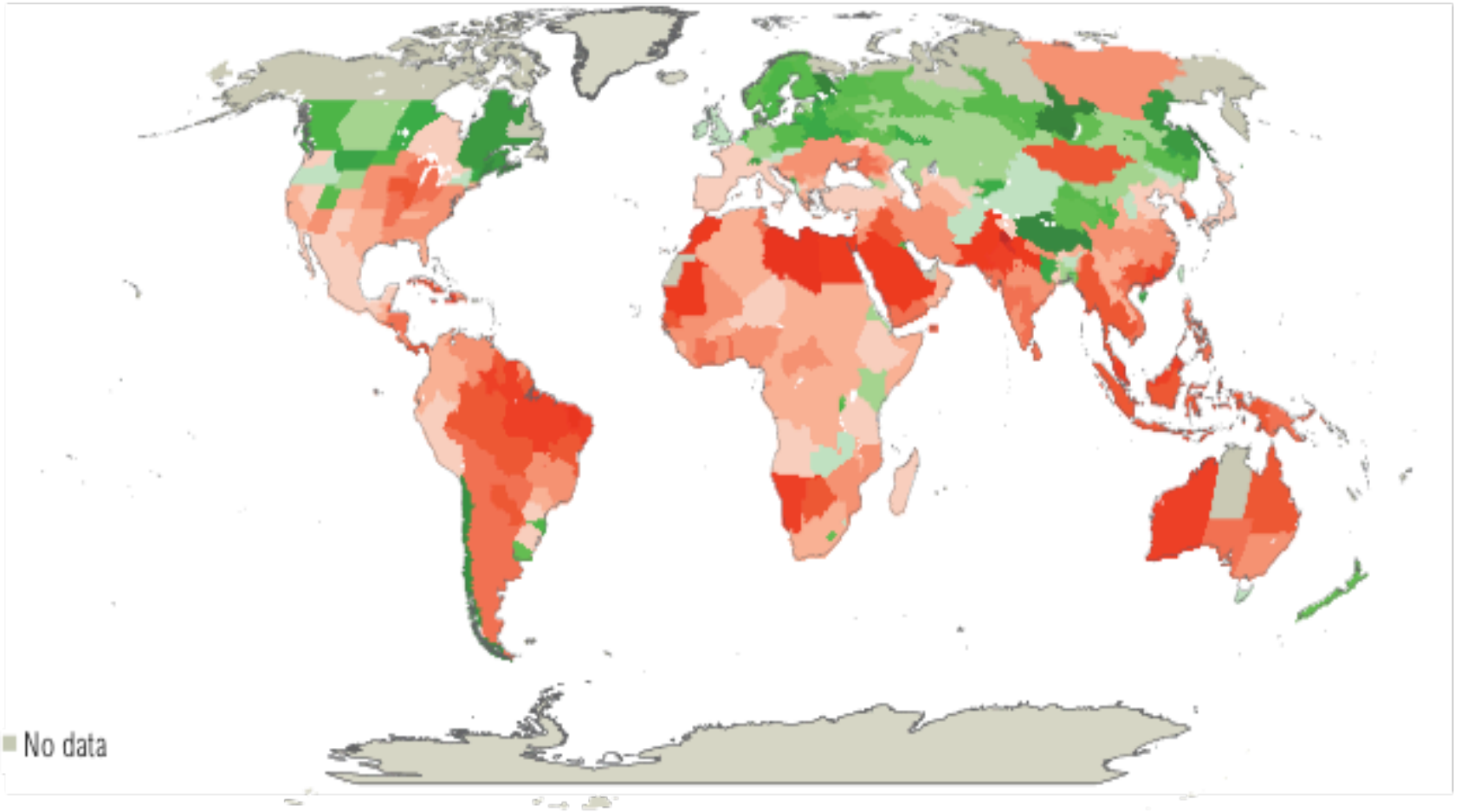
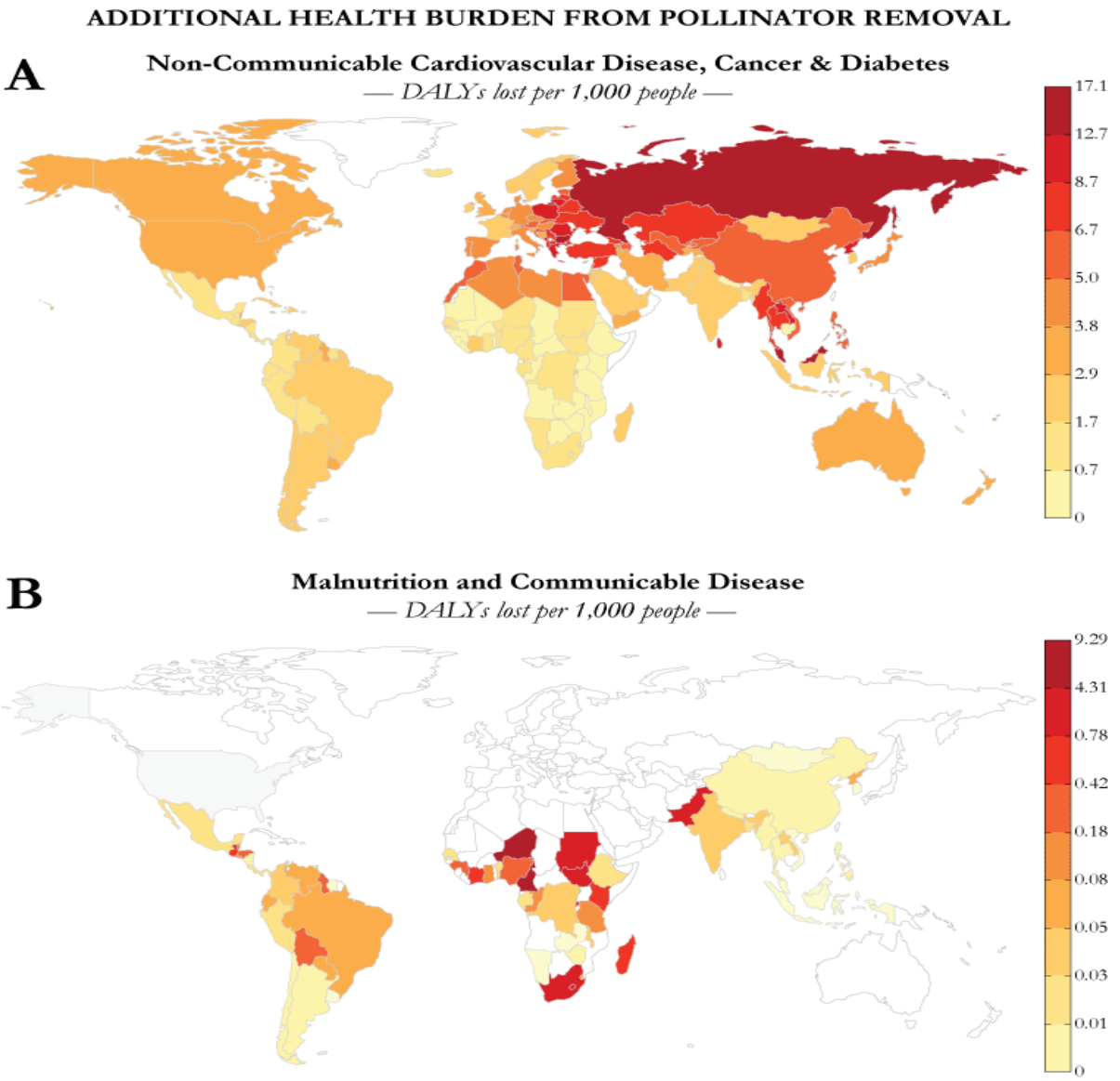



Figure 2 | **Most studies now project adverse impacts on crop yields due to climate change (3°C warmer world)**

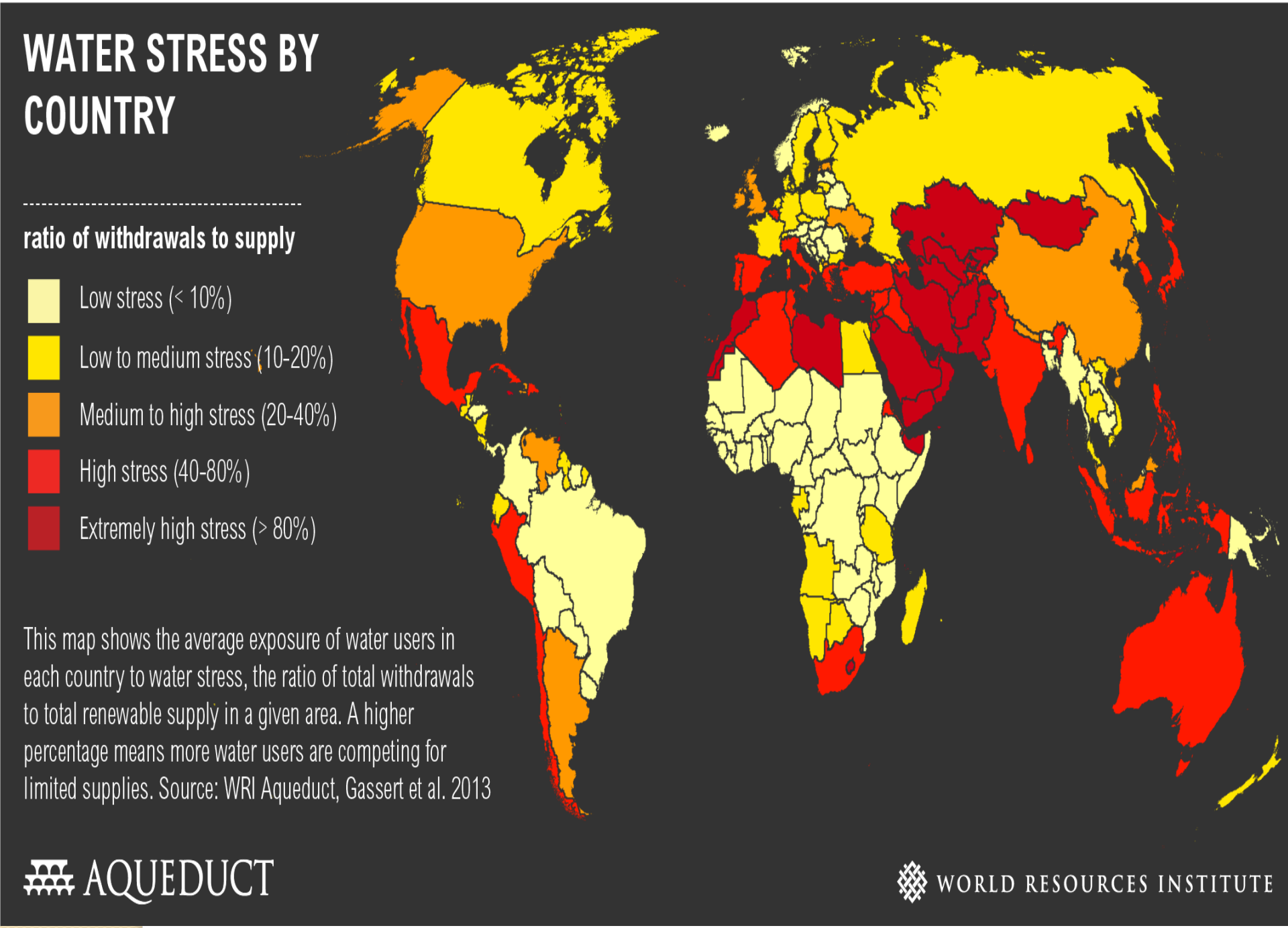



*Source:* World Bank (2010a).

# Full pollinator service loss would lead to an estimated 1.42 million (1.38–1.48) additional deaths per year Smith, Myers et al Lancet 2015



# WATER STRESS BY COUNTRY

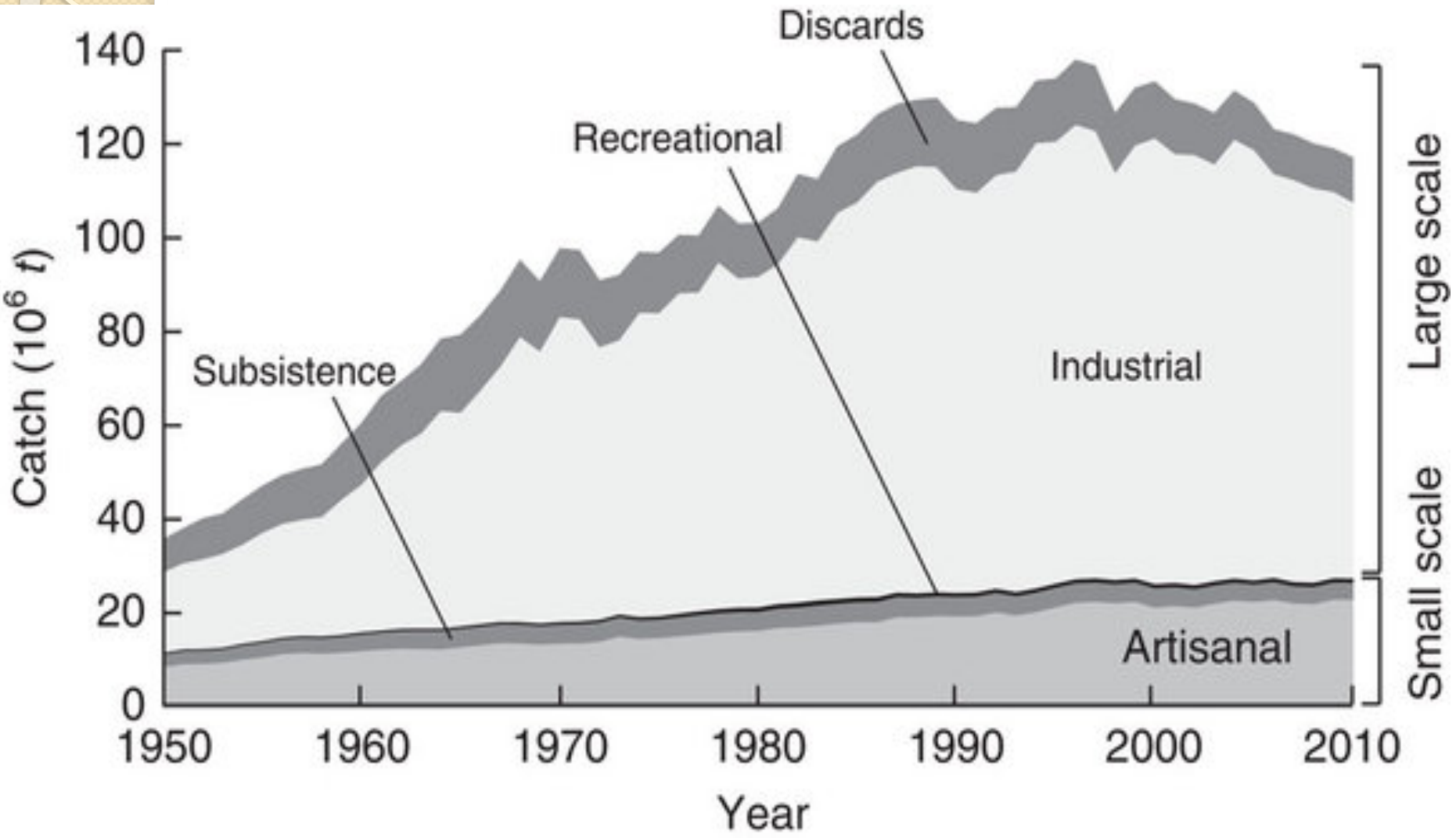



This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013

AQUEDUCT

WORLD RESOURCES INSTITUTE

# Fishery decline (Pauly and Zeller Nature 2015 )

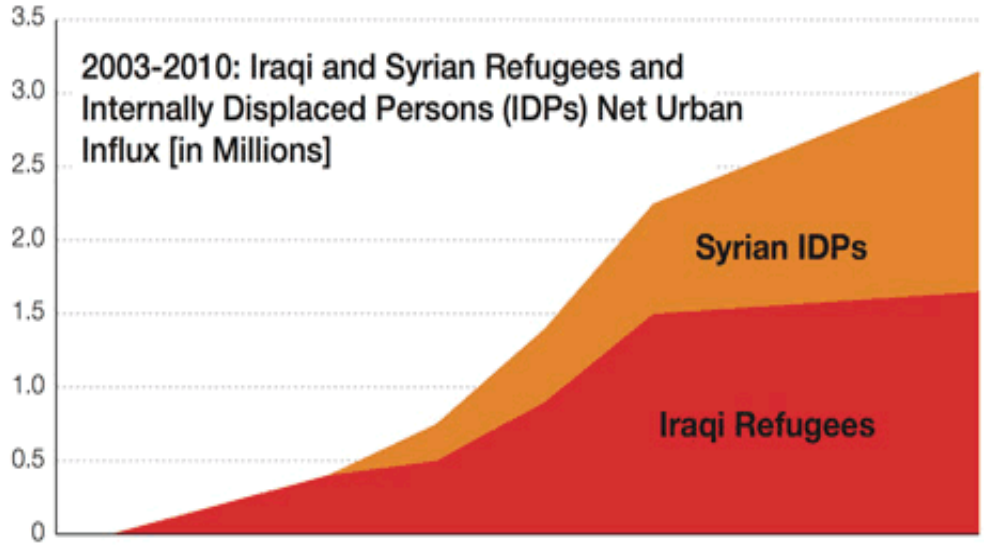


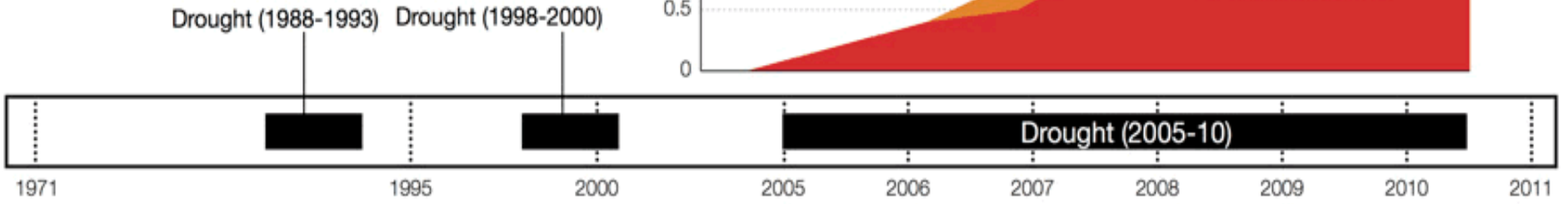
# Record drought in Syria – risk more than doubled by climate change

## Timeline of Events

### Prior to the 2011 Uprising

**1970s-1990s**
*Agricultural policies promote production of staple crops, leading to increase in number of groundwater wells and use of inefficient and outdated irrigation methods*




**12 March, 1971**
*Hafez al-Assad becomes president of Syria*

*Syria achieves self-sufficiency in wheat production*

*Drying of the Khabur River in NE Syria*

**Since 2005**
*Apartment prices in Damascus have more than doubled*

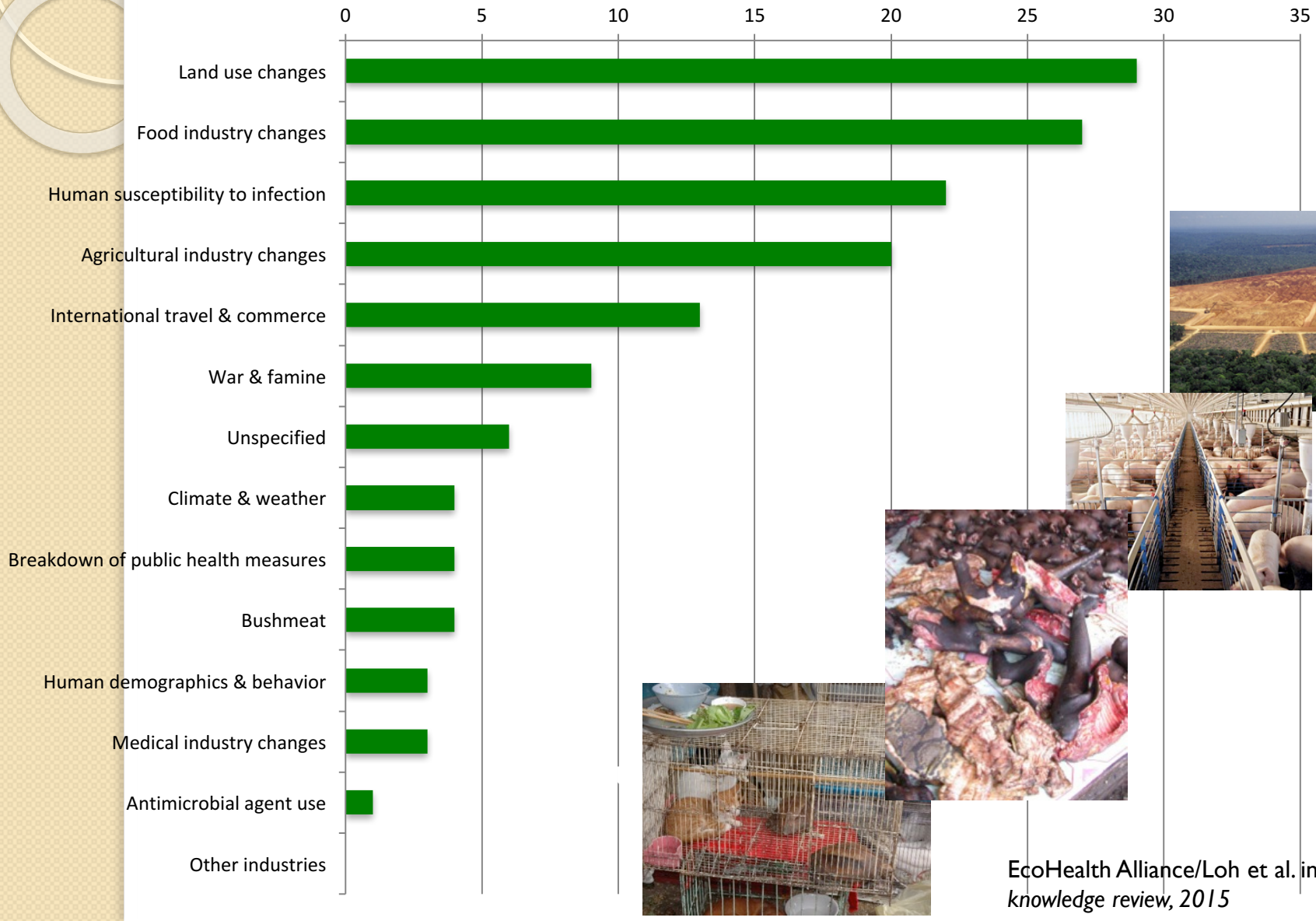
**Winter 2007-08:**
**Driest in observed record**

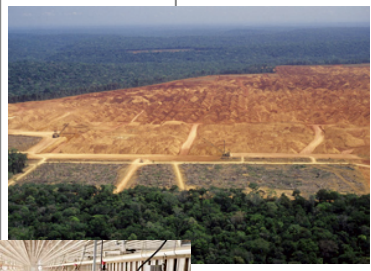
**Since 2007**
*Wheat, rice, and feed prices have doubled*

**March 2011**
*Uprising in Syria*

Kelley et al., PNAS 2015

# Drivers of recently-emerging infectious diseases in humans from wildlife









EcoHealth Alliance/Loh et al. in *State of knowledge review, 2015*

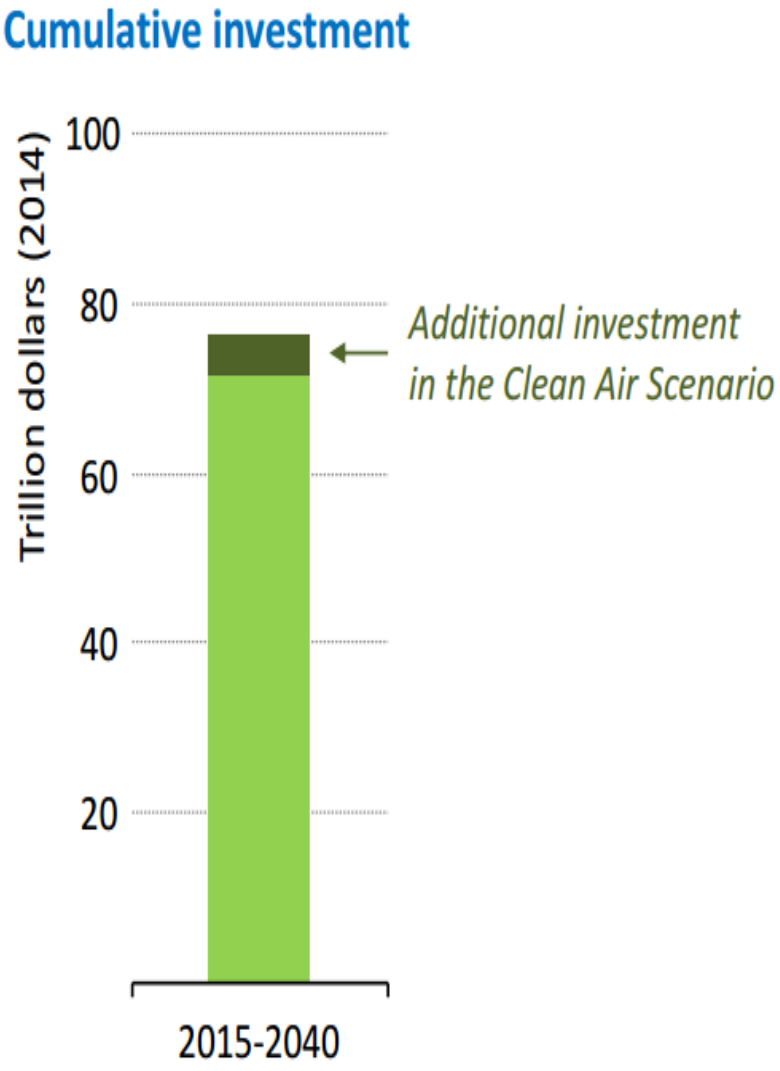
# What could cities do for Planetary Health?

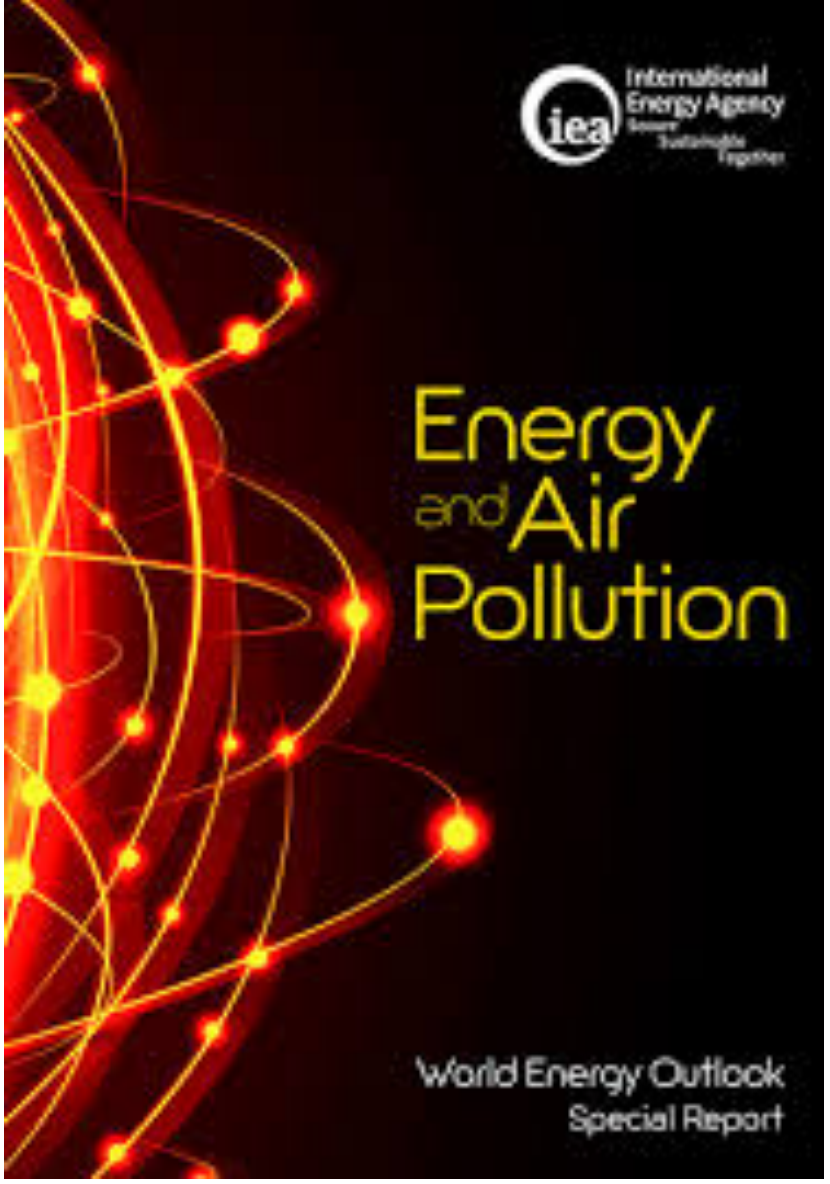
Accessible efficient public transport and active travel

Universal access to clean low carbon energy

Safe access to green spaces and ecosystem strategies for resilience

Housing Improvements Water and Sanitation



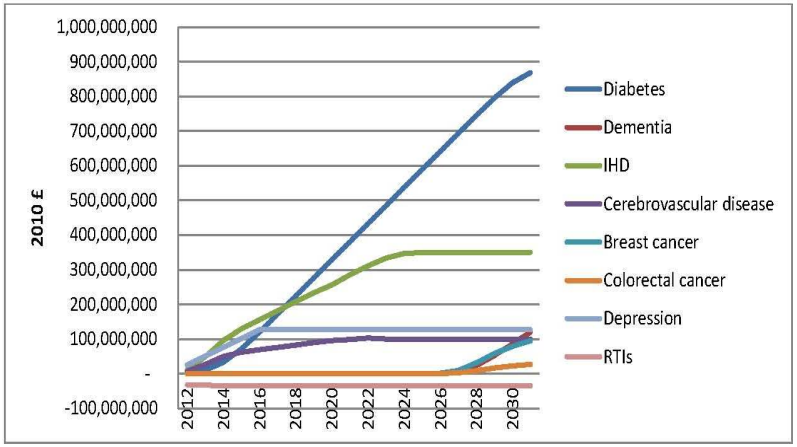




***A 7% increase in investment can save over 3 million lives in 2040, while providing energy access for all, lower energy import bills and leading to a peak in $CO_2$ by 2020***

# Increased active travel and low carbon transport – health and environmental benefits

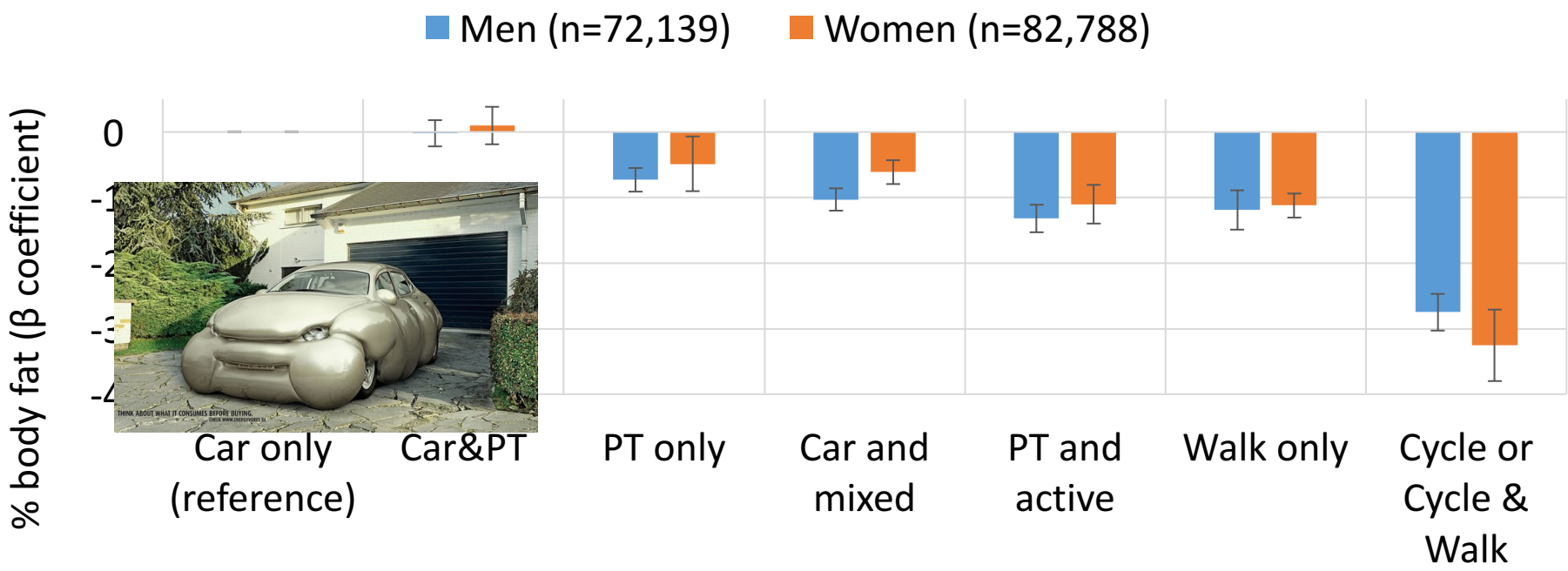
**( Woodcock et al 2009, Jarrett et al 2012))**

**Figure 1: Potential annual NHS expenditure averted by year and health outcome from Increased Active Travel scenario**



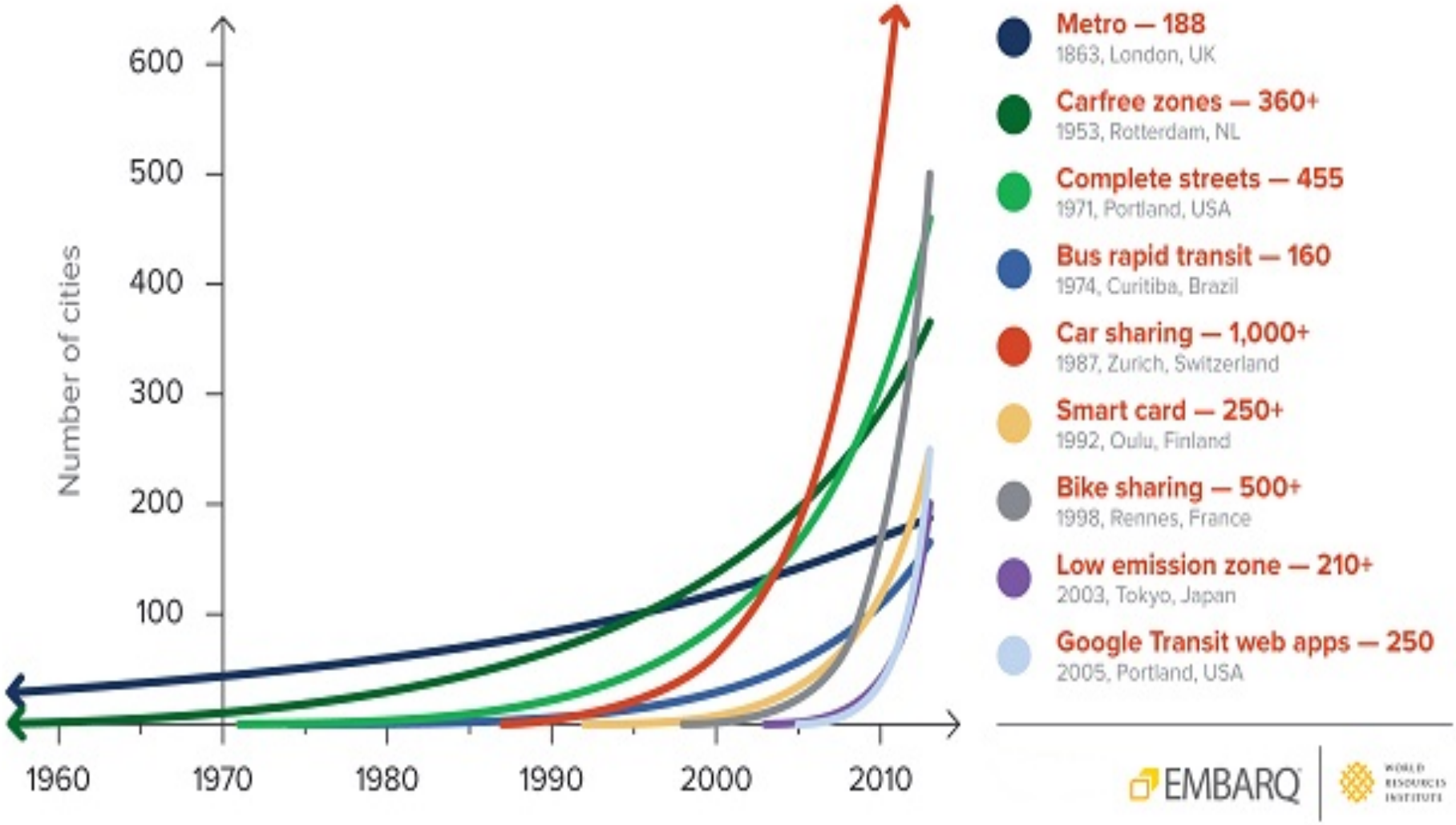
# The relationship between commute mode and percentage body fat in mid-life: Evidence from UK Biobank

( Ellen Flint and Steve Cummins Lancet Diabetes and Endocrinology 2016)

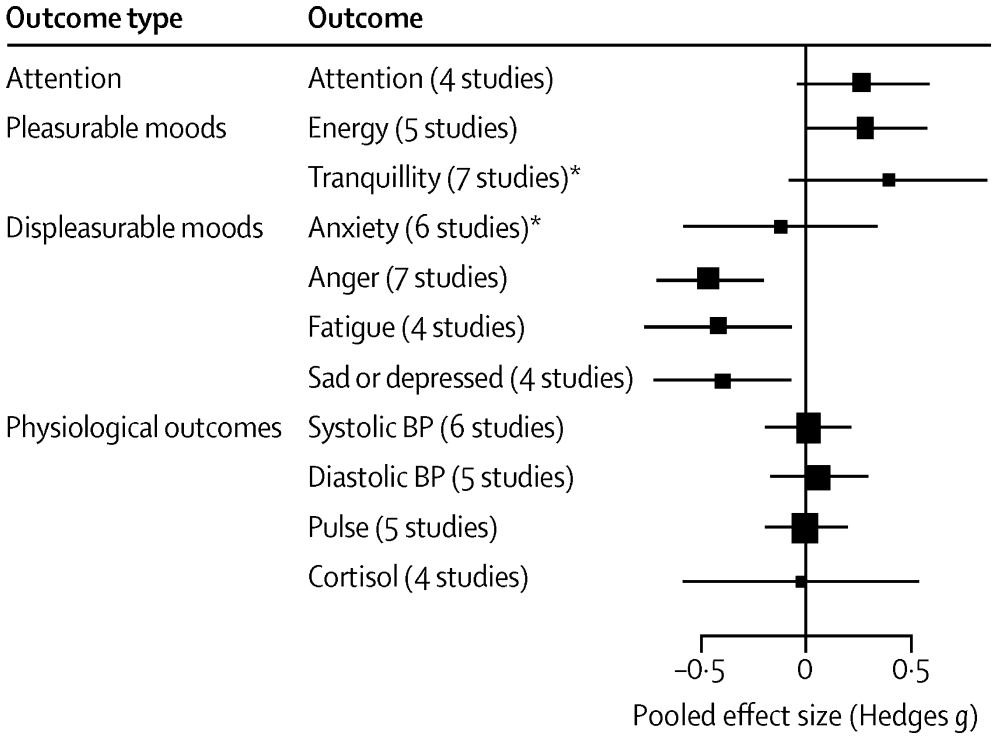



Gender-stratified multivariate linear regression models adjusted for age, days per week of moderate leisure PA, urban/rural area, ethnicity, household income quintiles, Townsend area deprivation quintiles, highest educational qualification, alcohol intake, smoking status, non-work active travel, walking for pleasure, job involves standing/walking, manual job, shift work, self-rated health, limiting longstanding illness.

# Sustainable mobility trends scale up

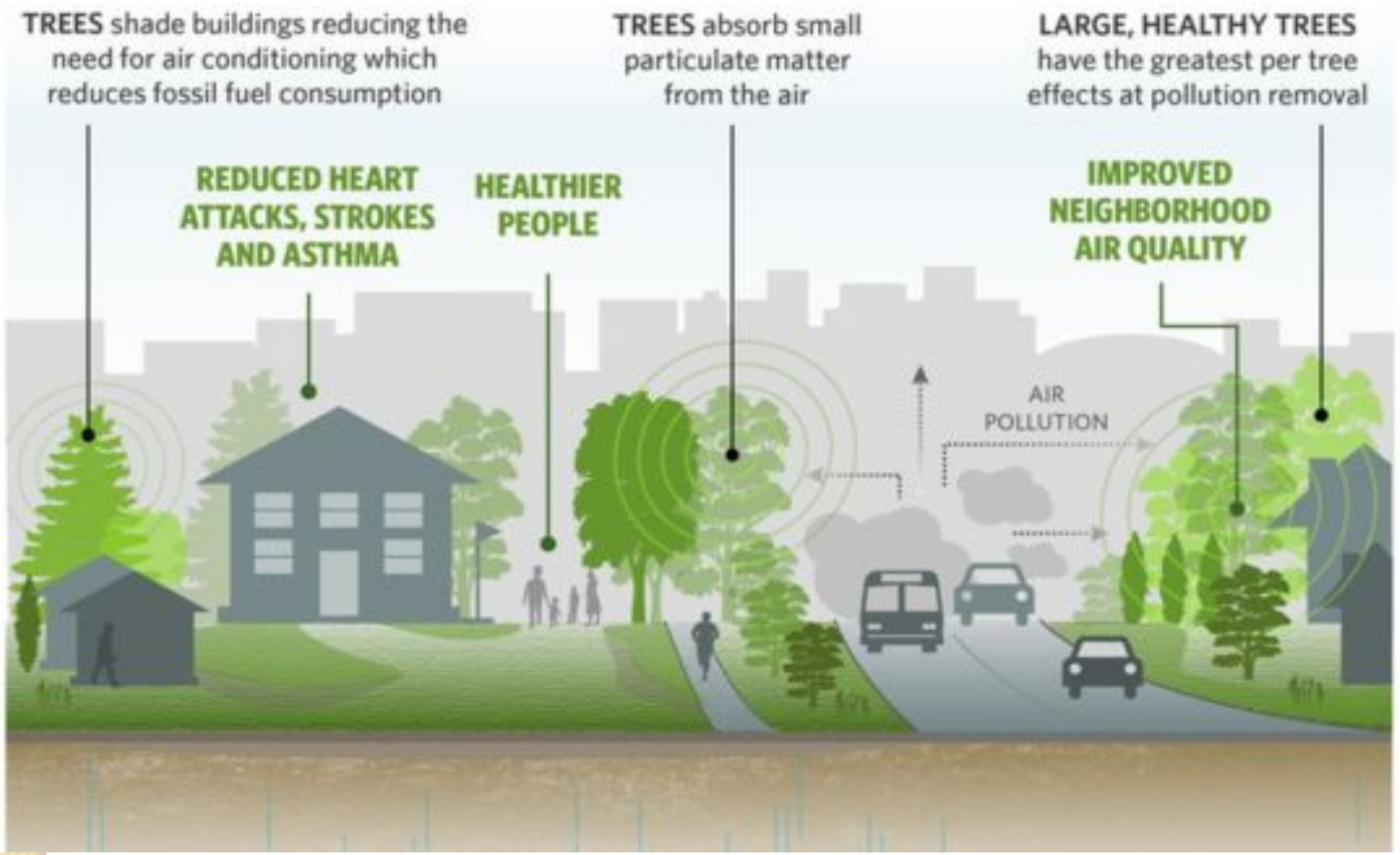


# Benefits of exposure to green space can include improved mental and physical health




*The Lancet* 2015 386, 1973-2028DOI: (10.1016/S0140-6736(15)60901-1)
Bowler and colleagues the Collaboration for Environmental Evidence

**Urban trees can be beneficial for health but need for holistic approaches to avoid unintended adverse consequences e.g. allergenic pollen, pollution and heat trapping, volatile organic compounds** Salmond et al Environmental Health 2016



Ecosystem Restoration

**Restoring ecosystems can play an essential role in regulating freshwater quantity and quality and flood protection**

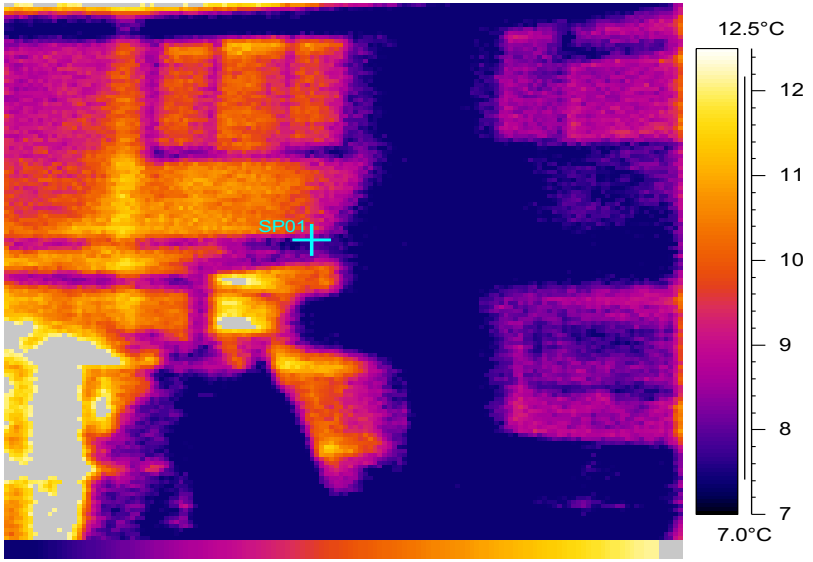
**33 of 105 of the world's largest cities source their clean water from protected areas**

**Figure TS-8**: Relative vulnerability of coastal deltas as indicated by the indicative population potentially displaced by current sea level trends to 2050 (Extreme ≥ 1 million; high =1 million – 50,000; medium 50,000 – 5000 [B6.3]. Climate change would exacerbate these impacts.

# Benefits of low carbon and energy efficient housing the UK

## (combined insulation and ventilation control improvements)

## ( Wilkinson et al 2009




| Impacts | Reduced exposures e.g. to fine particles, radon, cold, mould, tobacco smoke |
|---|---|
| Premature deaths averted | ~ 5400/ year |
| Mt-$CO_2$ saved (vs 1990) | 55 |

# Impacts of shifting from current (Western) diets to more **environmentally sustainable dietary patterns**:

Aleksandrowicz et al., PLoS ONE 2016

| Environmental Impact | Estimated relative differences compared to current diets | |
|---|---|---|
| | **Healthy dietary guidelines** | **Vegetarian diets** |
| **Greenhouse gas emissions** | **12%** reduction | **31%** reduction |
| **Land use** | **20%** reduction | **51%** reduction |
| **Water Use** | **6%** reduction | **37%** reduction |

# HEALTH IN THE SDG ERA

World Health Organization

WWW.WHO.INT/SDGS

SUSTAINABLE DEVELOPMENT GOALS

‘Solutions lie within reach and should be based on the redefinition of prosperity to focus on the enhancement of quality of life and delivery of improved health for all, together with respect for the integrity of natural systems’