Addressing climate change and environmental challenges from a demographic perspective

Raya Muttarak

Population and Just Societies Program, International Institute for Applied Systems Analysis (IIASA)

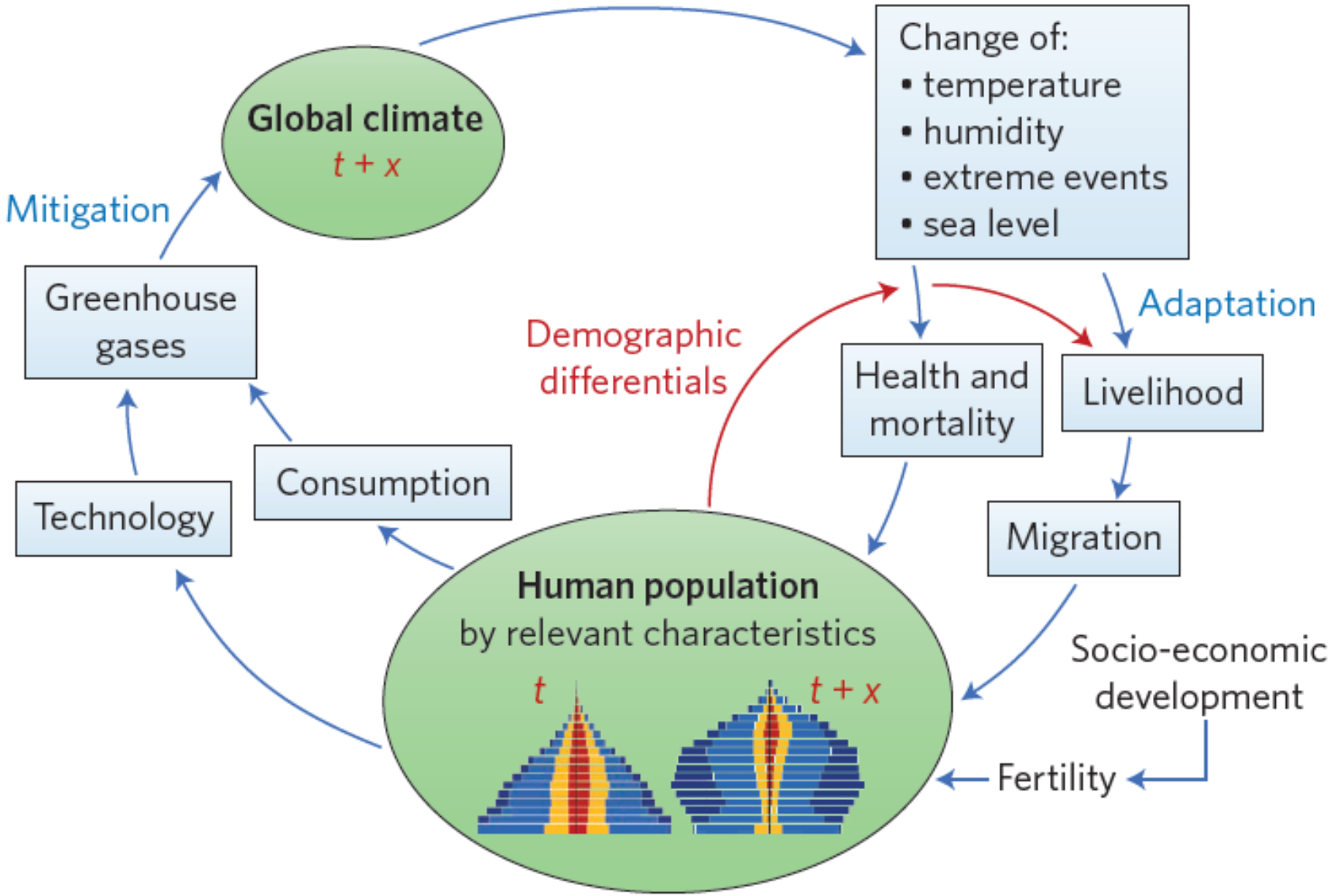
Wittgenstein Centre for Demography and Global Human Capital (Univ. Vienna, IIASA, VID/ÖAW

Virtual expert group meeting

Population Division of the United Nations Department of Economic and Social Affairs

22 July 2021

Population in the context of climate change mitigation and adaptation



Source: Lutz, W. & Muttarak, R. 2017. *Nature Climate Change.*

Population impact on the climate

Source: Dreastime.com

Source: vietnamnet.vn

I = P x A x T

I = Human impact on the environment

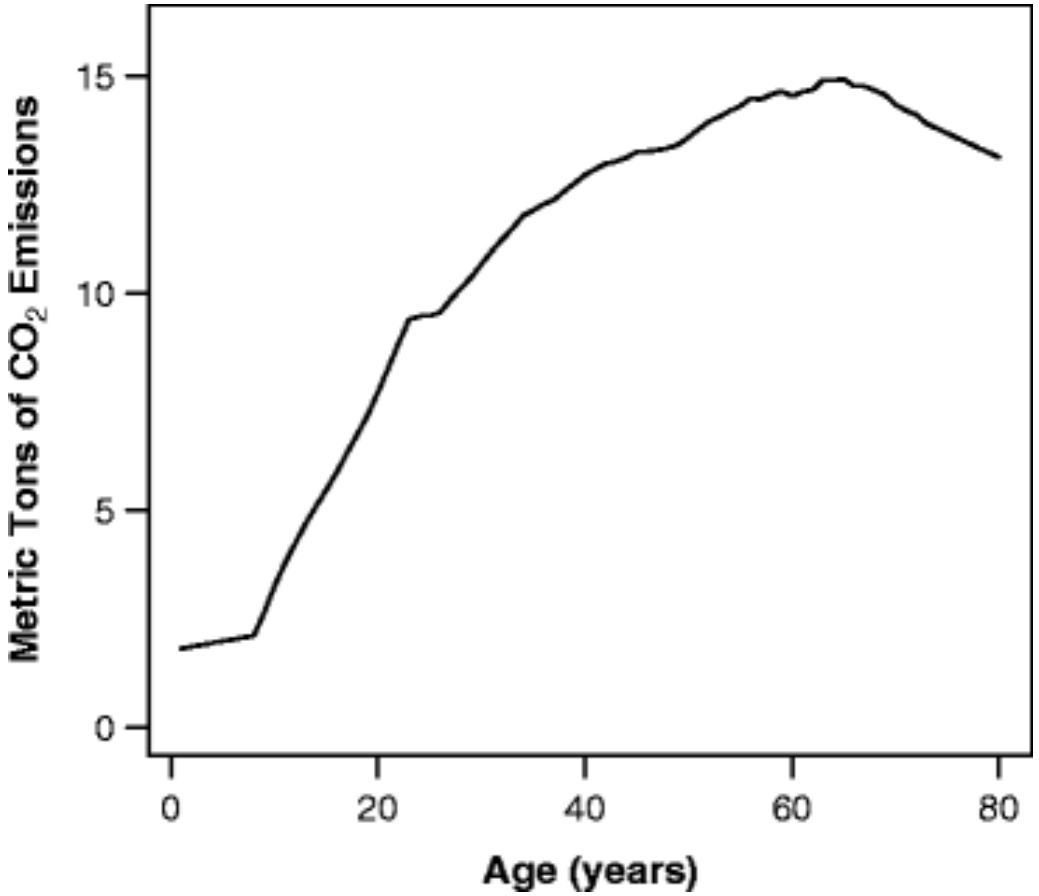
P = Population

A = Affluence (consumption per person)

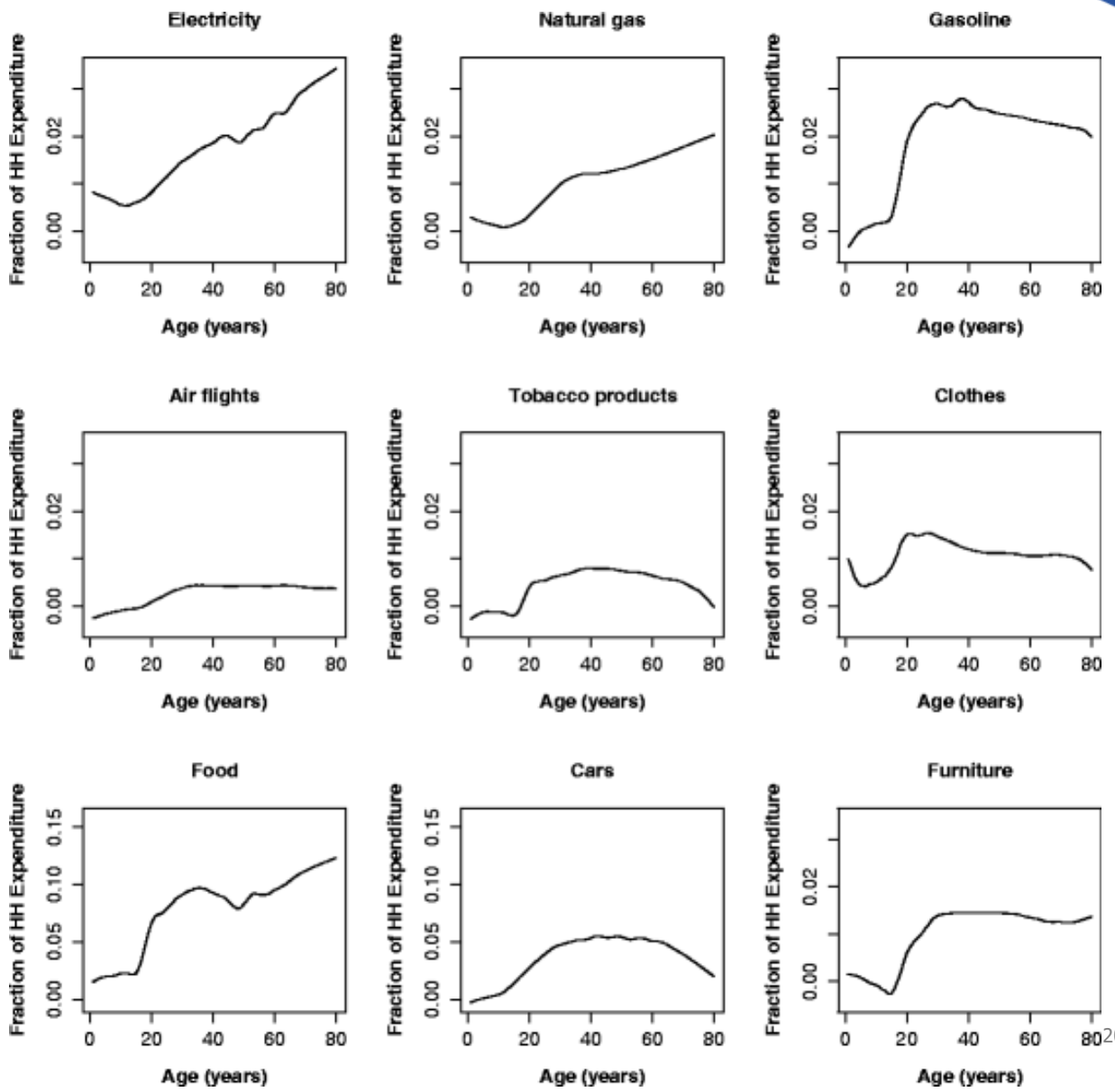
T = Technology (impact per unit of consumption)

Demographic heterogeneity in consumption patterns

Estimated profile of per-capita CO2 emissions by age



U.S. profiles of age-specific demand for consumption of a selected group of energy-intensive goods, net of the income effect

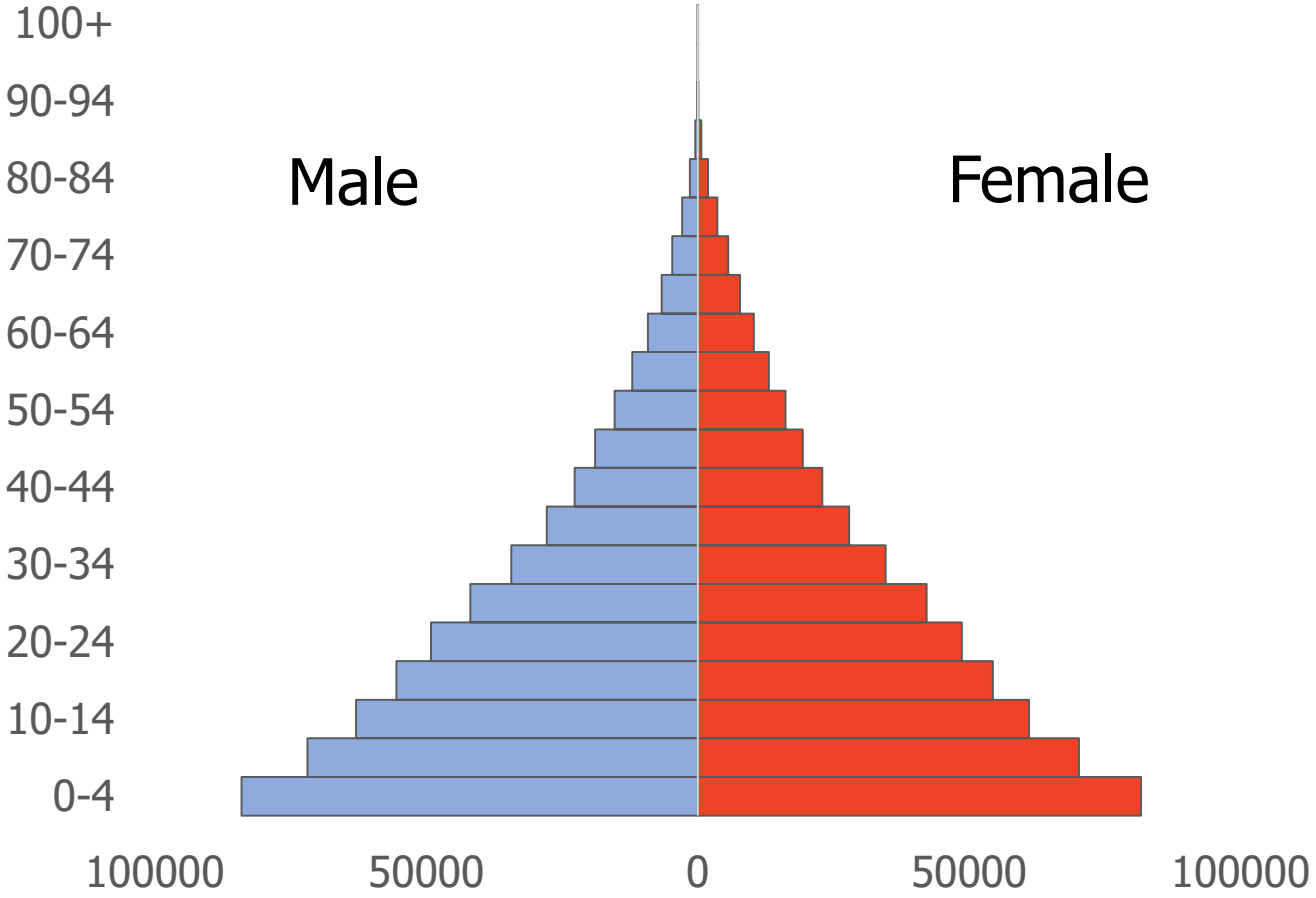


Source: Zagheni, E. 2011. *Demography*.

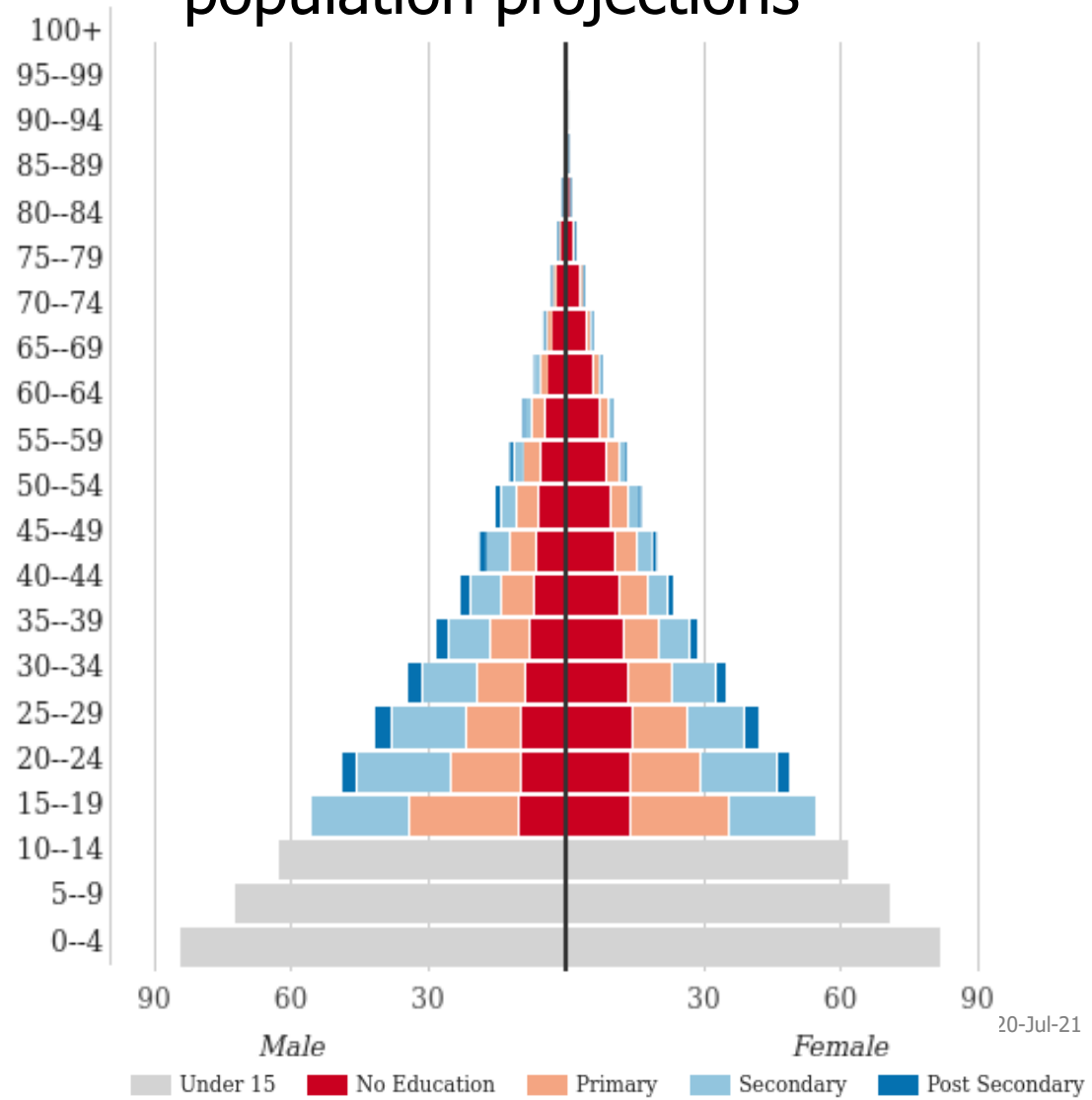
Education as another source of demographic heterogeneity

Africa 2010

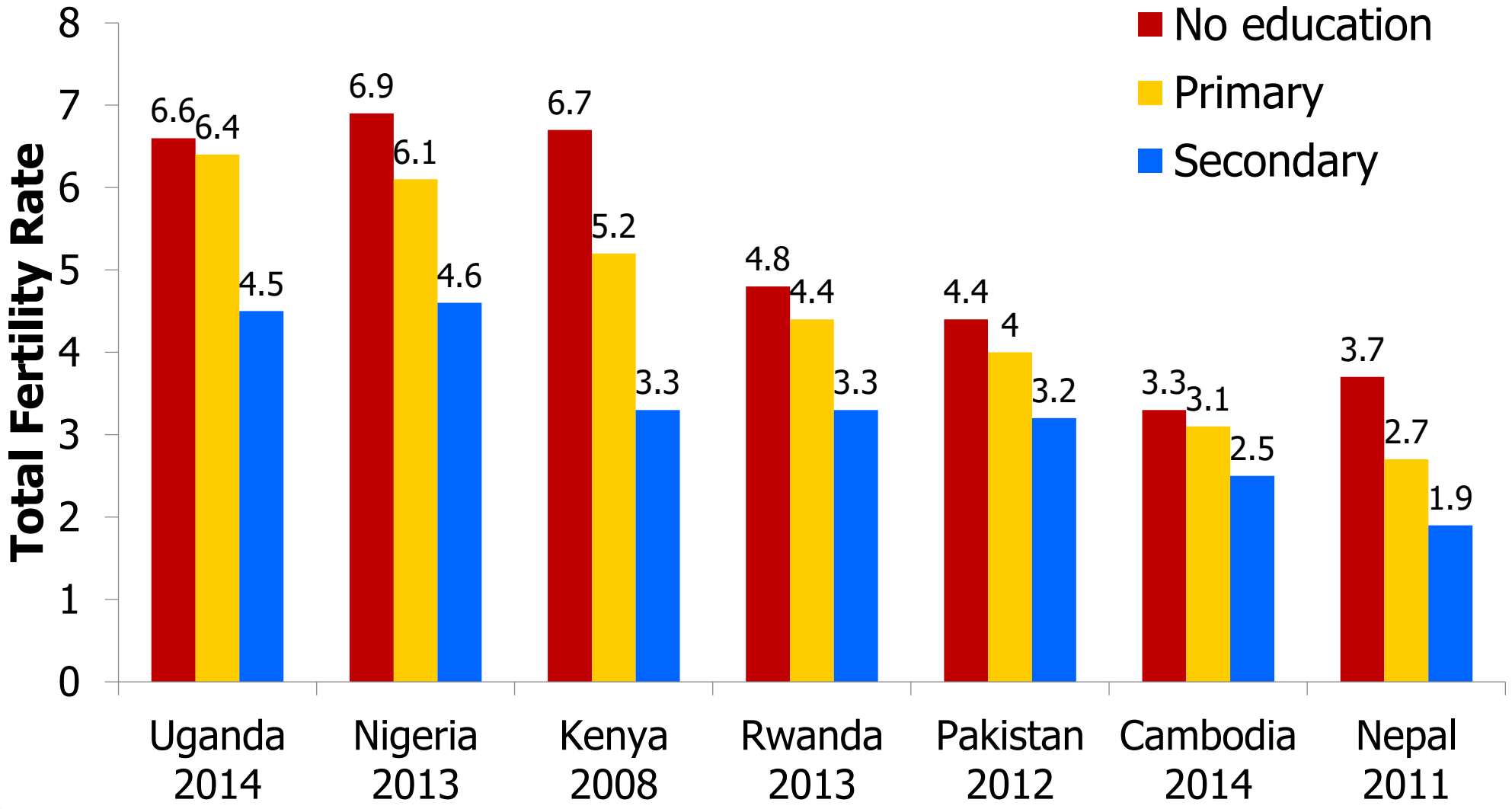
Standard population pyramid (UN)



Wittgenstein Centre (WIC) population projections

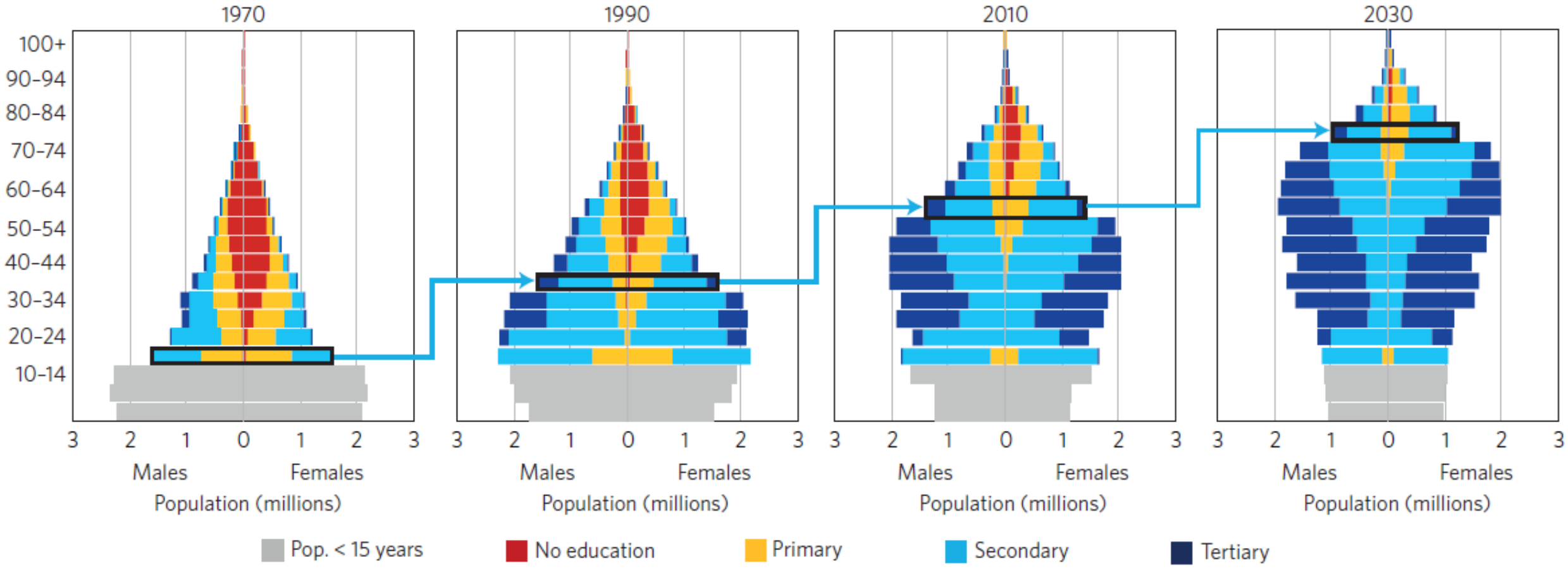


Future population size depends on fertility patterns



Source: Demographic and Health Surveys

Multi-state population projections by age, sex and education for the Republic of Korea

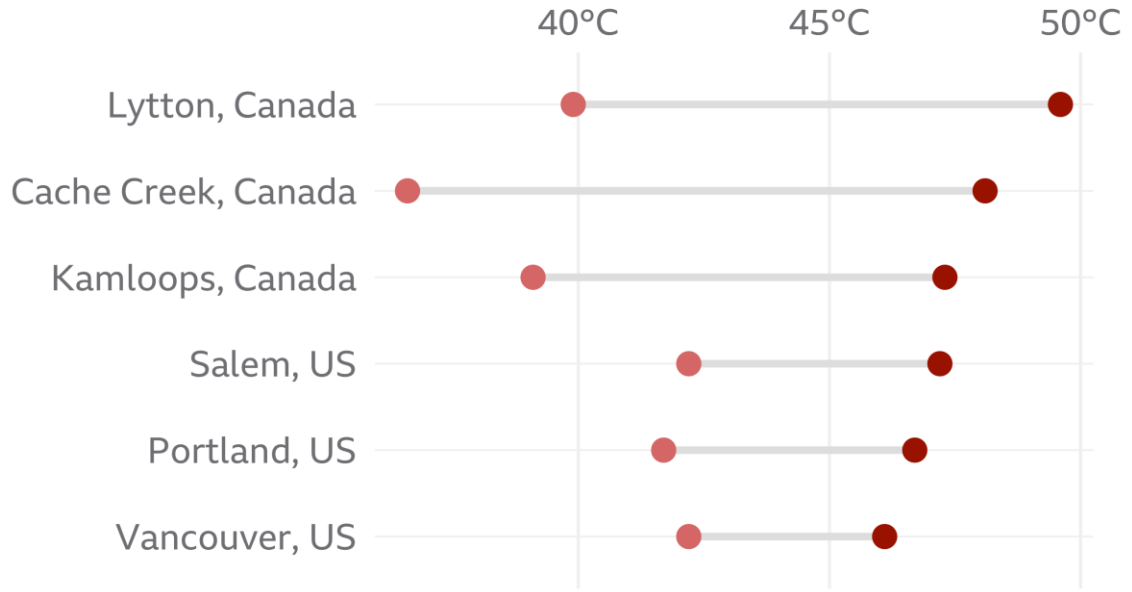


Source: Lutz, W. & Muttarak, R. 2017. *Nature Climate Change.*

Impact of climate change on population

The current heatwave is record-breaking

Previous record-highs compared to **new record temperatures**



Source: Meteorological Service of Canada, US National Weather Service

BBC

20.07.2021

Impact of climate change is not distributed evenly

Demographically differentiated vulnerability refers to differential impacts of natural disasters or climate change on different subgroups of population (Muttarak, Lutz and Jiang 2016)

Climate change 'impacts women more than men'

BBC NEWS

INDEPENDENT

The forgotten generation: The elderly are most at risk of suffering from climate change

THE CONVERSATION

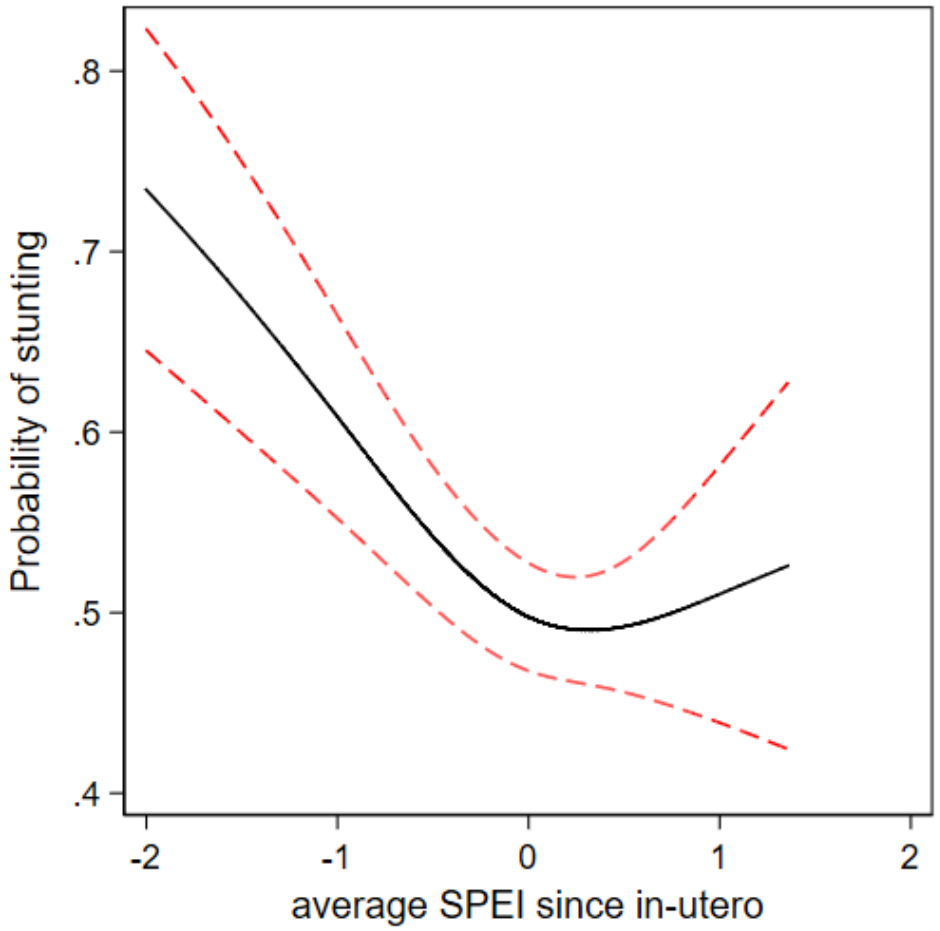
Racial and ethnic minorities are more vulnerable to wildfires

SCIENTIFIC AMERICAN

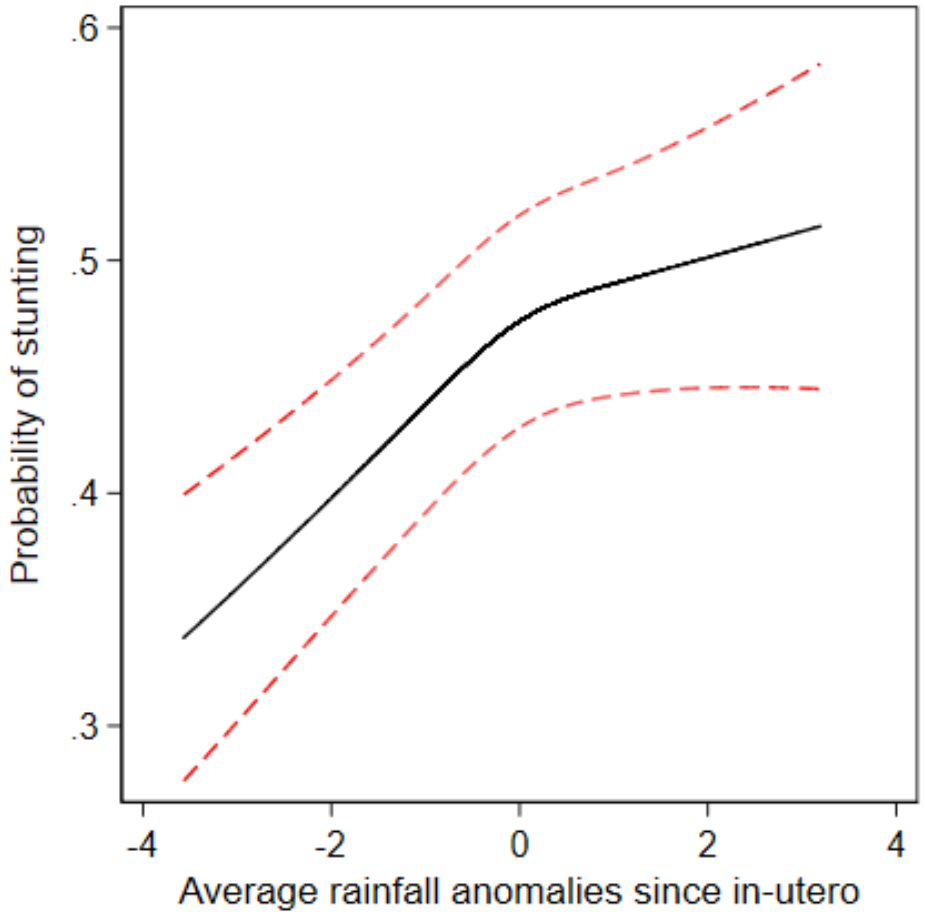
Children Are Particularly Vulnerable to Climate Change's Health Impacts

Impacts of climate variability on stunting (children aged<5)

Ethiopia



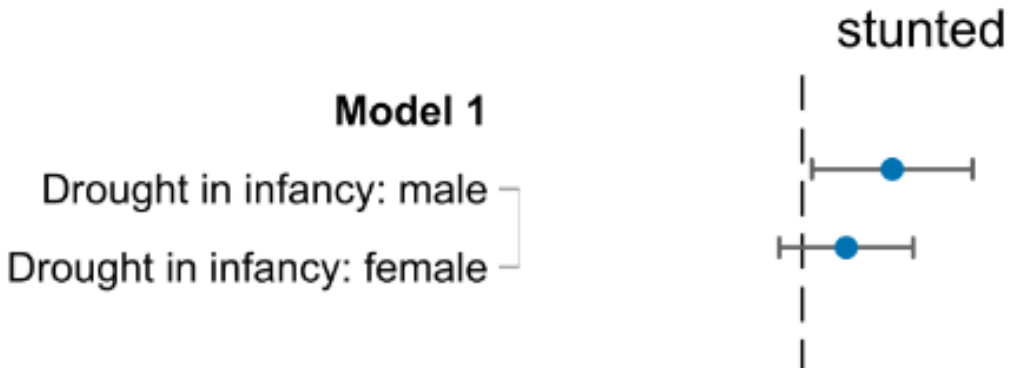
India



Source: Dimitrova, A. & Bora, J. 2020. *PLOS ONE*.

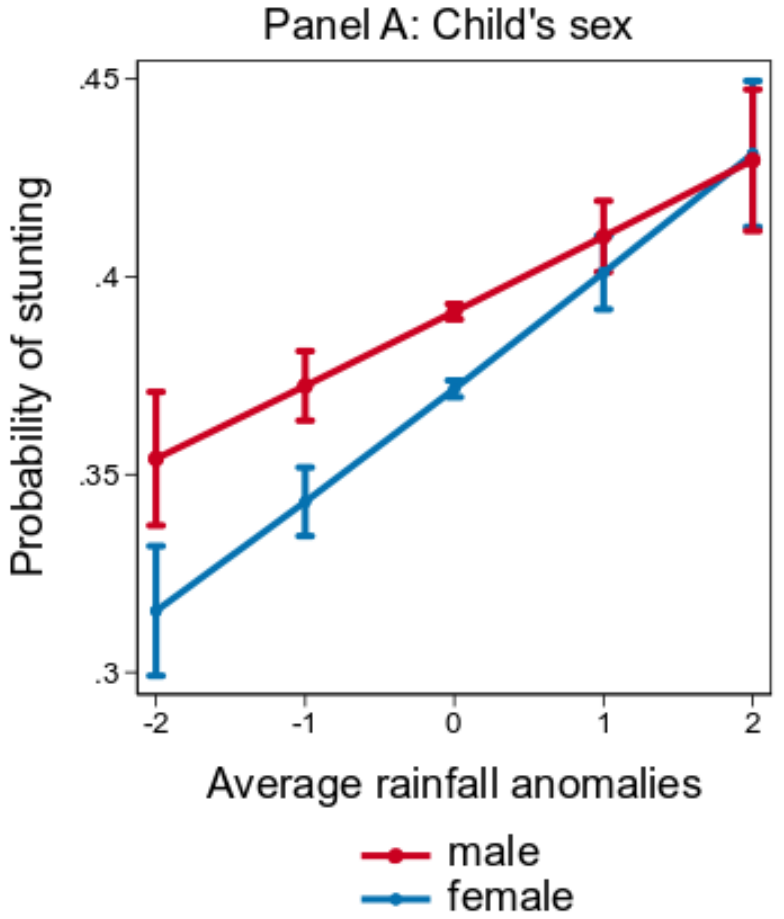
Does the effects of climate anomalies on child undernutrition differ between boys and girls?

Ethiopia



Source: Dimitrova, A. 2021. *World Development*.

India



Source: Dimitrova, A. & Muttarak, R. 2020. *Global Environmental Change*.

Education – relevant source of demographic heterogeneity

Evidence everywhere

Outcomes

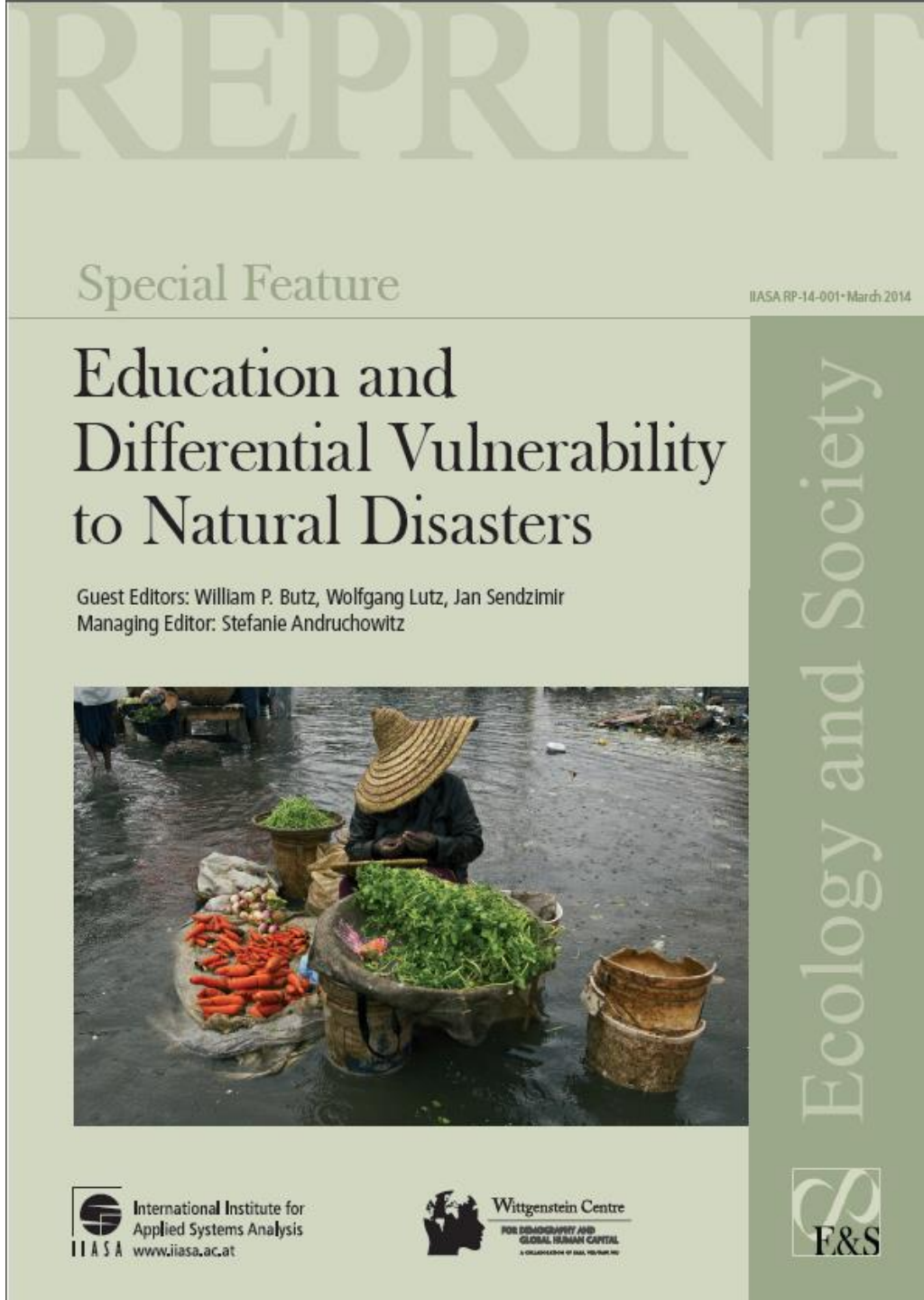
- Pre-disaster period e.g. disaster preparedness
- During disaster e.g. evacuation, lower loss & damage
- Post-disaster e.g. recovery

Countries

- Less developed countries
- Industrialised countries

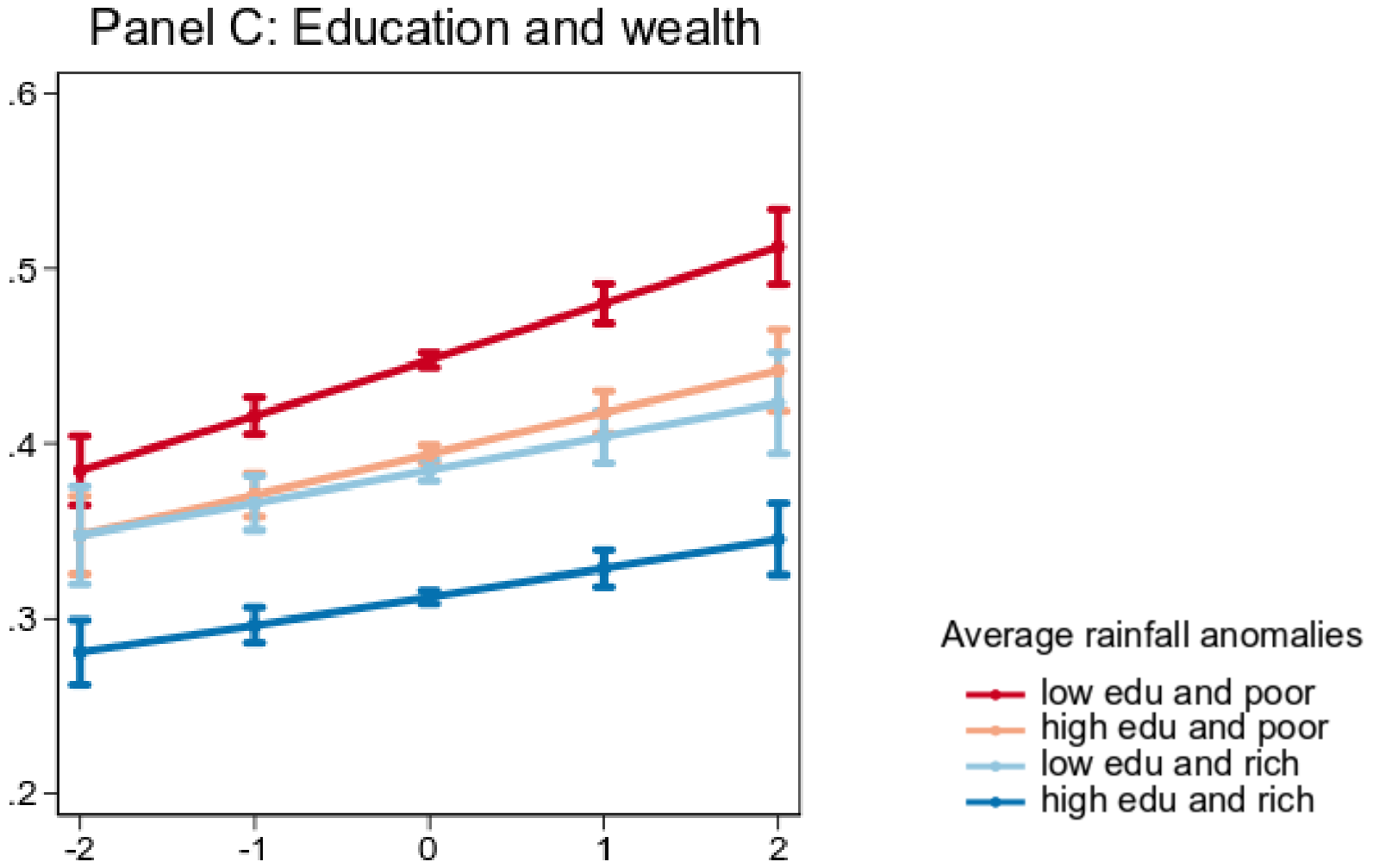
Levels/Units of analysis

- Individual & household
- Community
- National



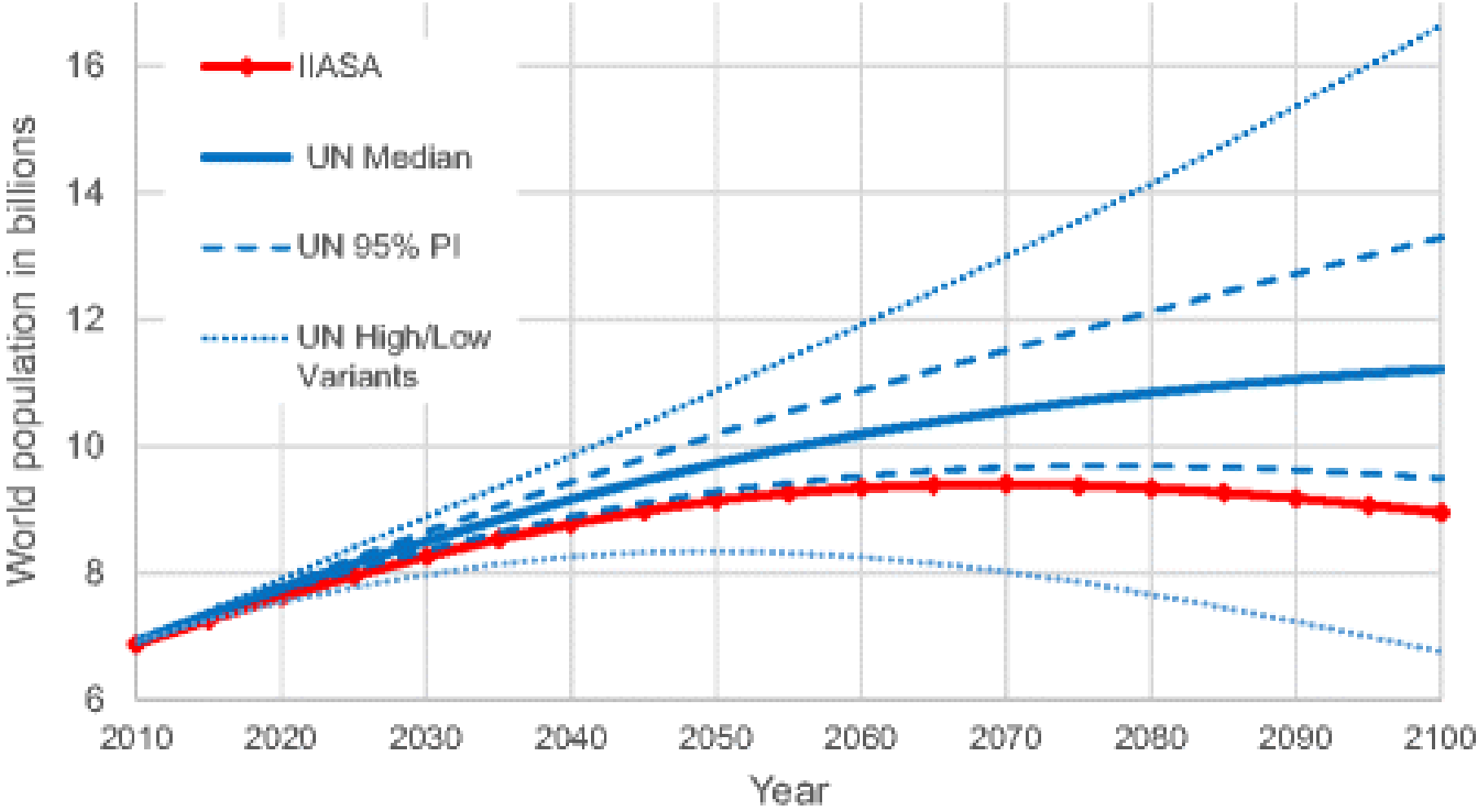
Source: Butz, B. Lutz, W. & Sendzimir, J. (Eds.) 2014. *Ecology & Society* 19.

Effects of rainfall anomalies on childhood stunting in India



Source: Dimitrova, A. & Muttarak, R. 2020. *Global Environmental Change*.

How will demographic change affect emissions patterns and vulnerability to climate change?



Source: Rozell, D. 2017. *Climatic Change*.

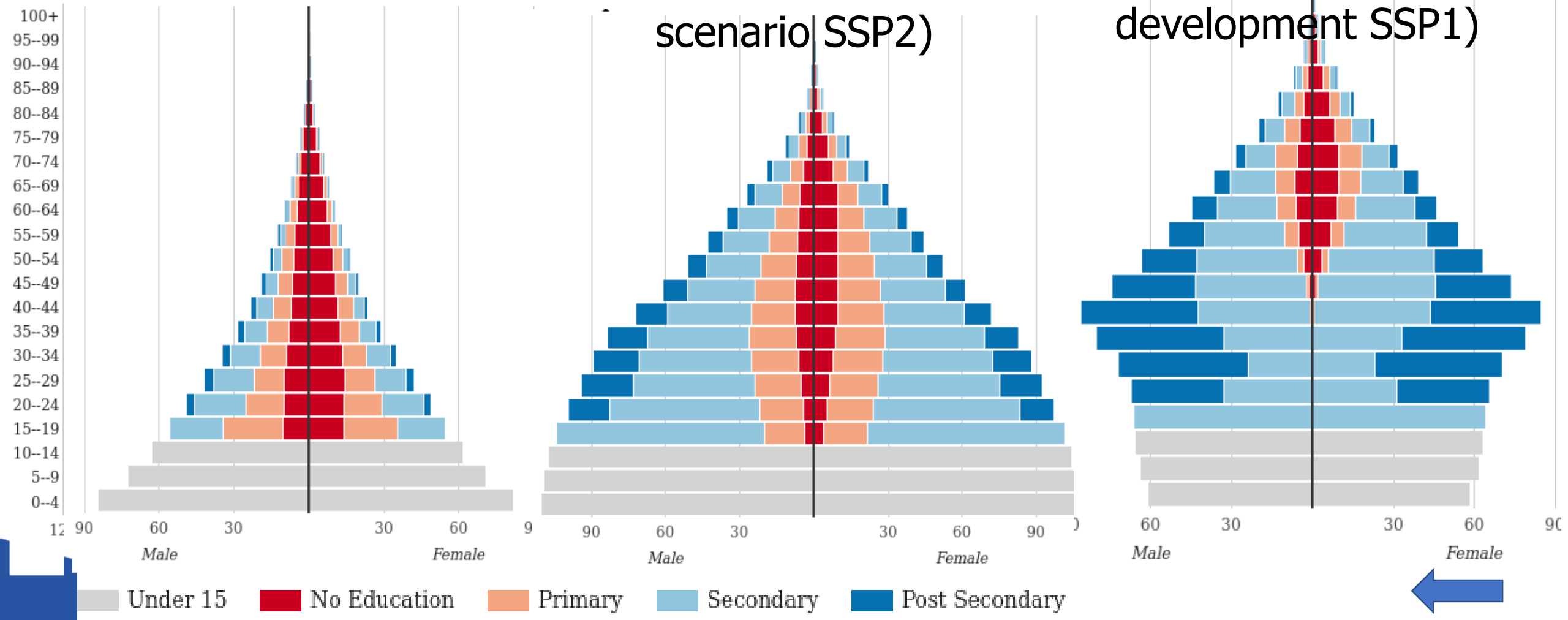
Future population composition matters

Wittgenstein Centre (WIC) population projections: Africa

2010: 1050.7m

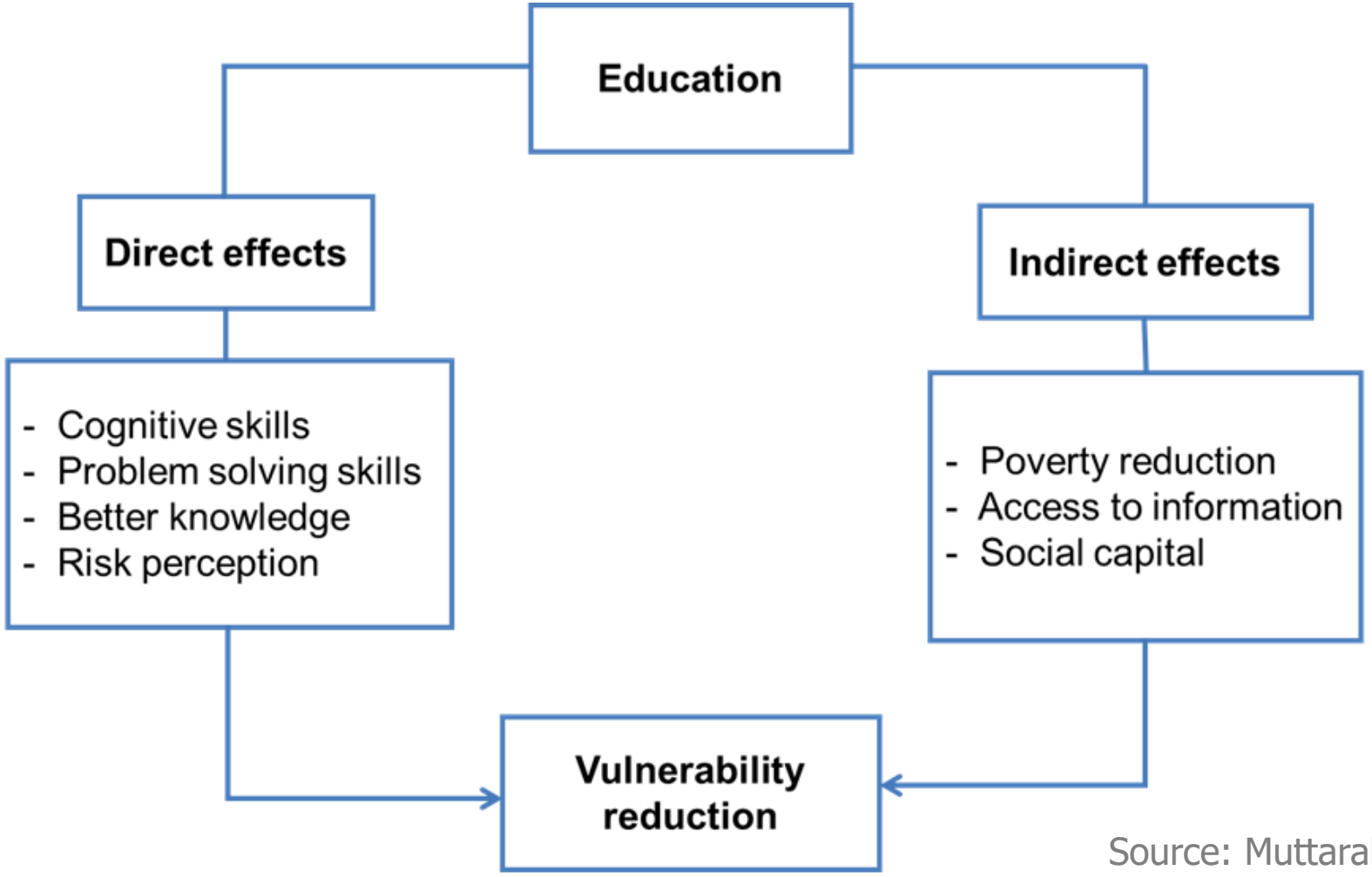
2050: 2254.2m (Medium scenario SSP2)

2050: 1816.1m (Rapid development SSP1)



Raya Muttarak
Population and Just Societies Program
muttarak@iiasa.ac.at

How education contributes to vulnerability reduction



Source: Muttarak, R. & Lutz, W. 2014. *Ecology & Society*.