Climate change and differential food consumption and food security from a demographic perspective

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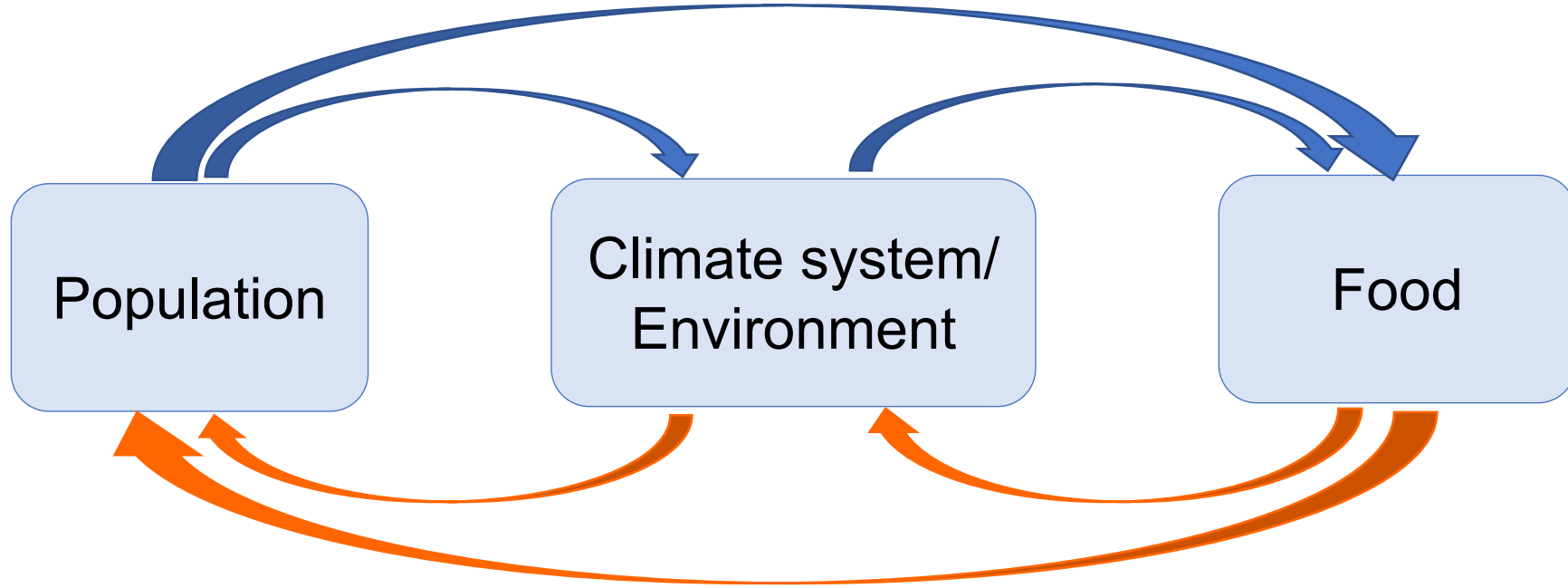
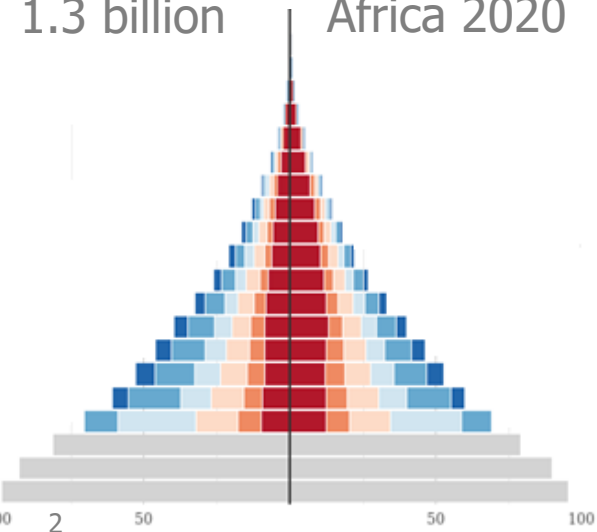Wittgenstein Centre for Demography and Global Human Capital

Relationships between population, environment and food

Population → Climate system/Environment → Food

1.3 billion   Africa 2020

Projected population density for SSP2 (2100)

All developing country regions

Population (billions)

Central Transition (CT)
Stalled Transition (ST)
Rapid Transition (RT)

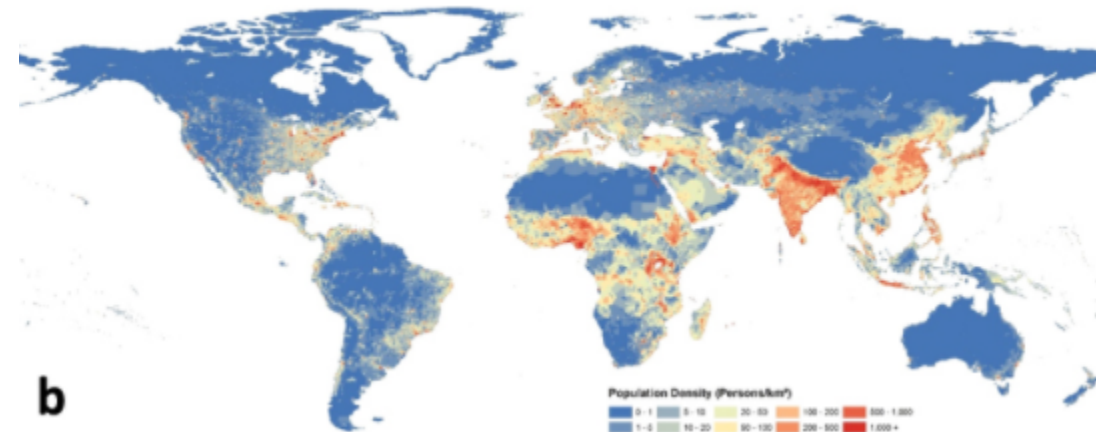2010   2030   2050   2070   2090
Year

Population Density (Persons/km²)

Source: Wittgenstein Centre Data Explorer.
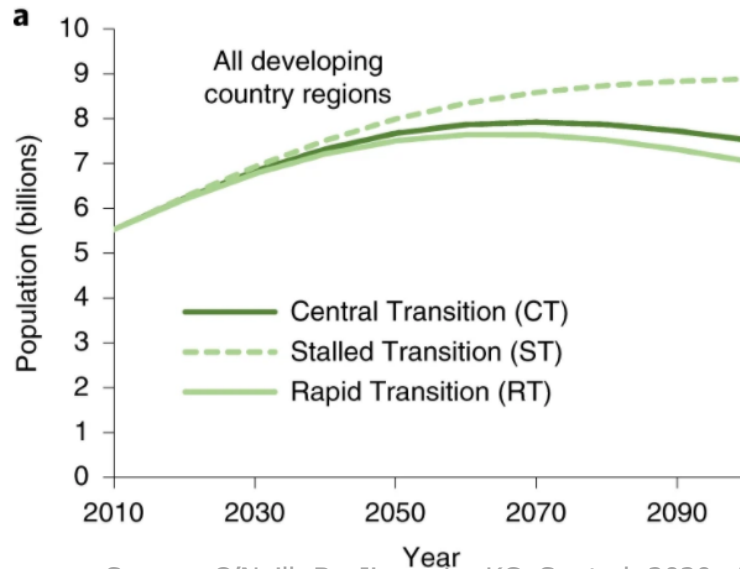
Source: O'Neill, B., Jiang, L., KC, S. et al. 2020. *Nature Sustainability*.

Source: Jones, B. and O'Neill, B. 2016. *Environmental Research Letters*.

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Demographic perspectives on food consumption and food security

Providing empirical evidence

- Food consumption and production

- Population dynamics and food production

- Demographic differentials in dietary intakes nutritional habits and preferences

- Food security

- Differential vulnerability and adaptive capacity

- Differential impact of climate change on household/individual food security
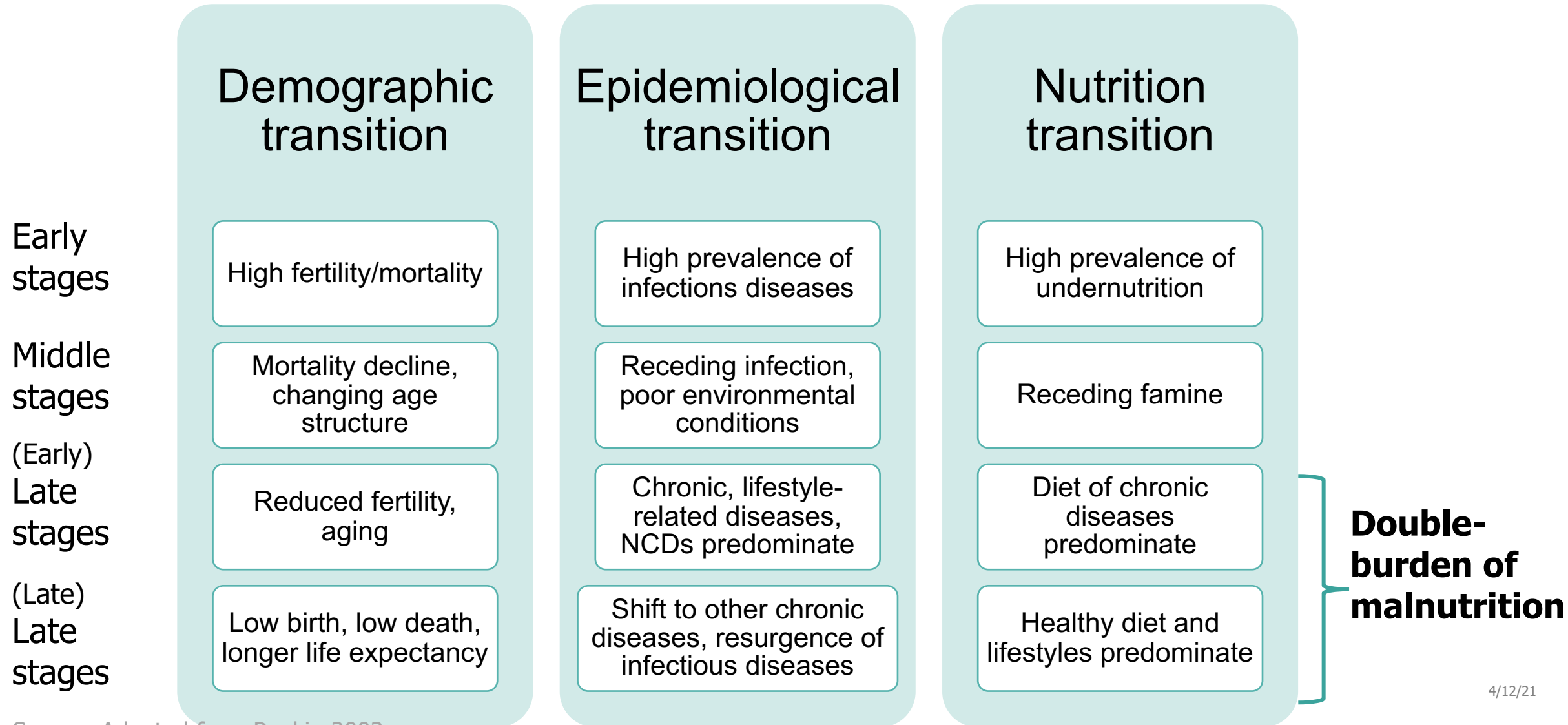
Population projections and forecasting

- Population projections quantify uncertainty in future population trends underlying food consumption, production, vulnerability and climate change
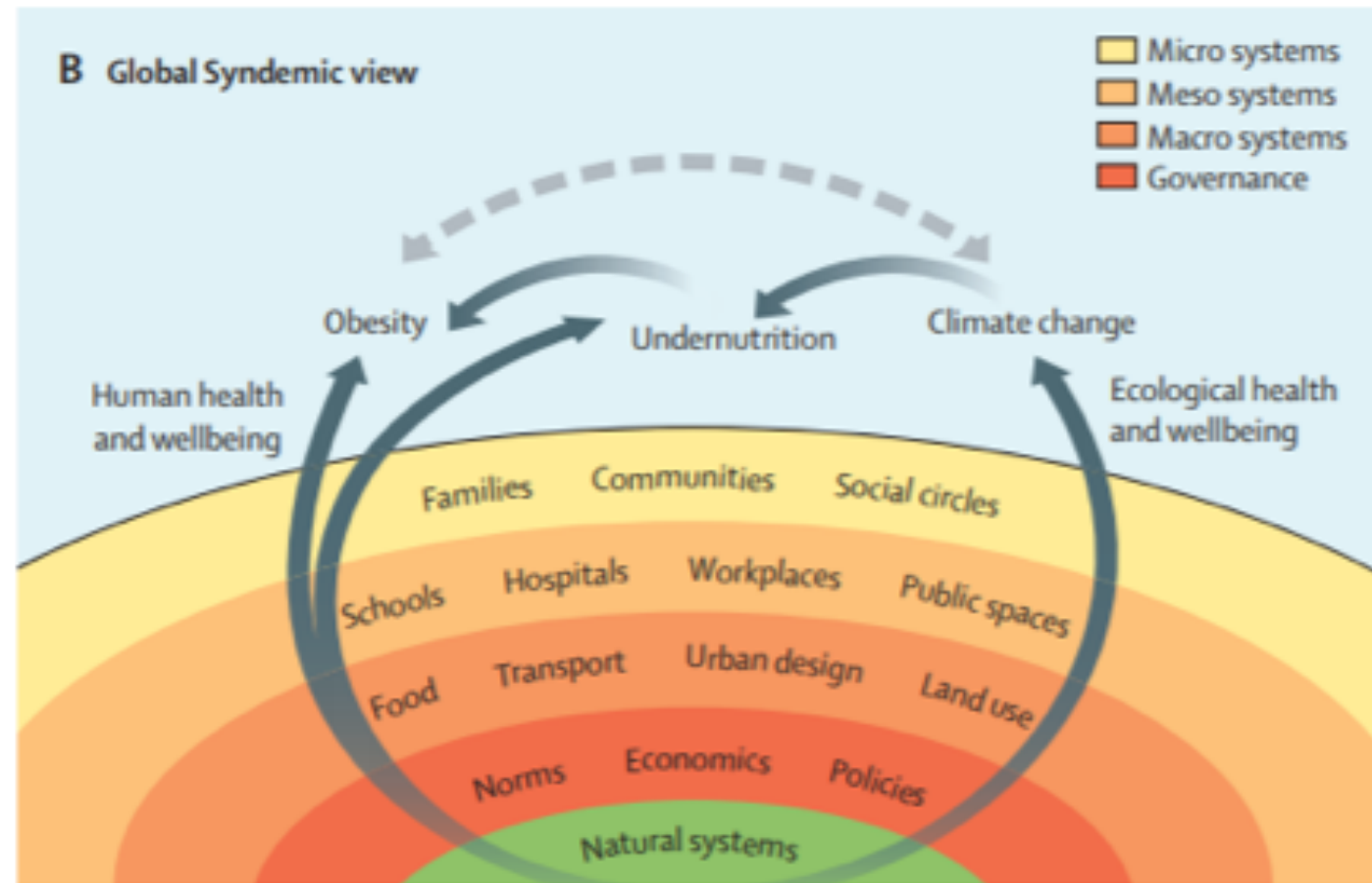
Population projections relevant for the climate change community

- Consider both spatial and demographic heterogeneity

- Extension of scenario-based population projections (SSPs) e.g. including quantified indicators of vulnerability and resilience, downscaled projections, new range of scenarios that include impacts and policy

Stages of demographic, health and nutritional change

Stage	Demographic transition	Epidemiological transition	Nutrition transition
Early stages	High fertility/mortality	High prevalence of infections diseases	High prevalence of undernutrition
Middle stages	Mortality decline, changing age structure	Receding infection, poor environmental conditions	Receding famine
(Early) Late stages	Reduced fertility, aging	Chronic, lifestyle-related diseases, NCDs predominate	Diet of chronic diseases predominate
(Late) Late stages	Low birth, low death, longer life expectancy	Shift to other chronic diseases, resurgence of infectious diseases	Healthy diet and lifestyles predominate

Double-burden of malnutrition

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Global syndemic of obesity, undernutrition and climate change

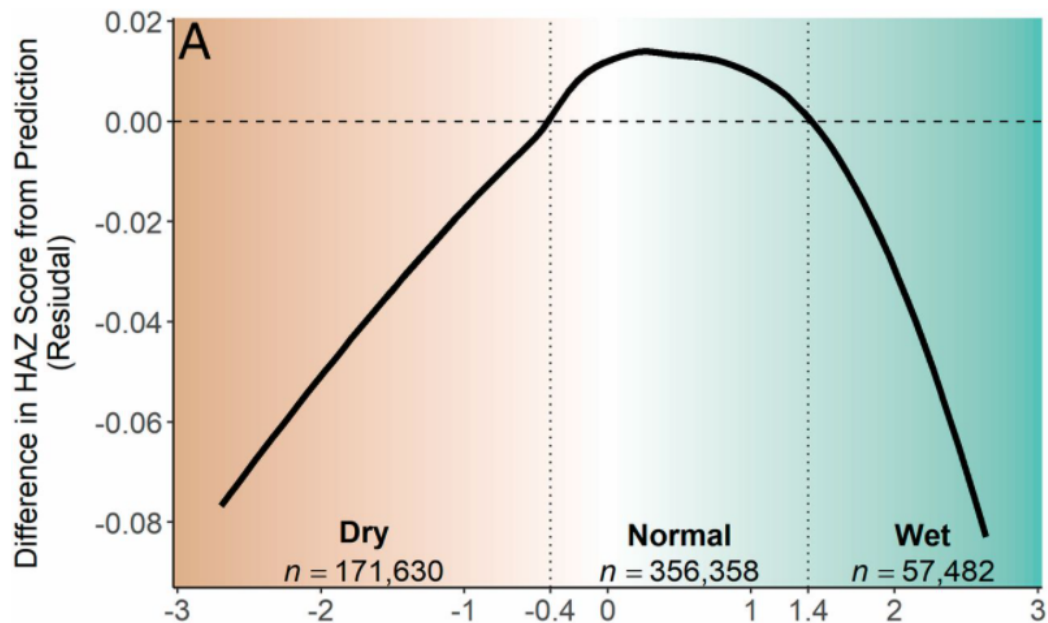Source: Swinburn, B.A., Kraak, V.I., Allender, S. et al. *The Lancet*.
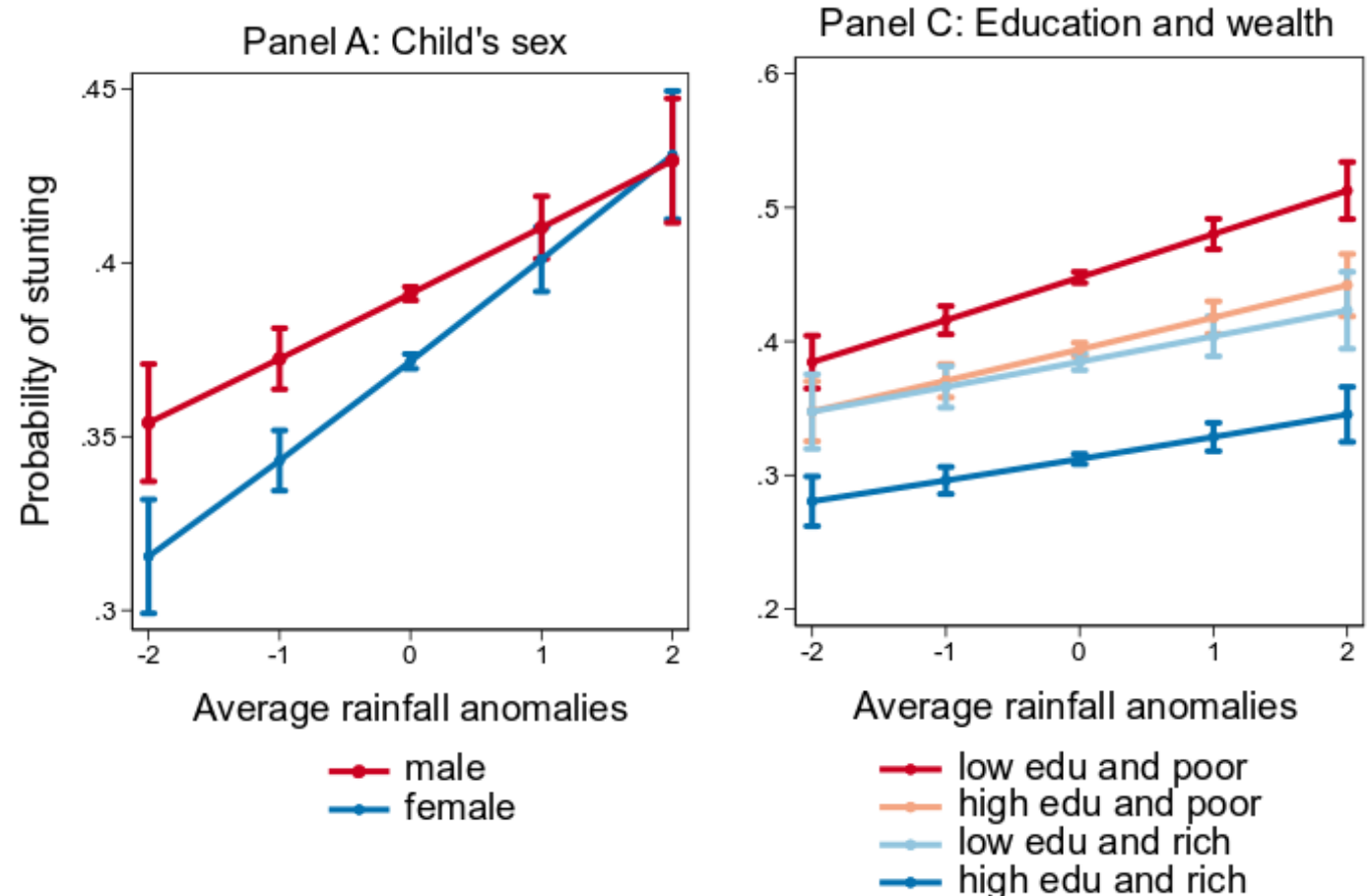
Demographic differentials in meat consumption
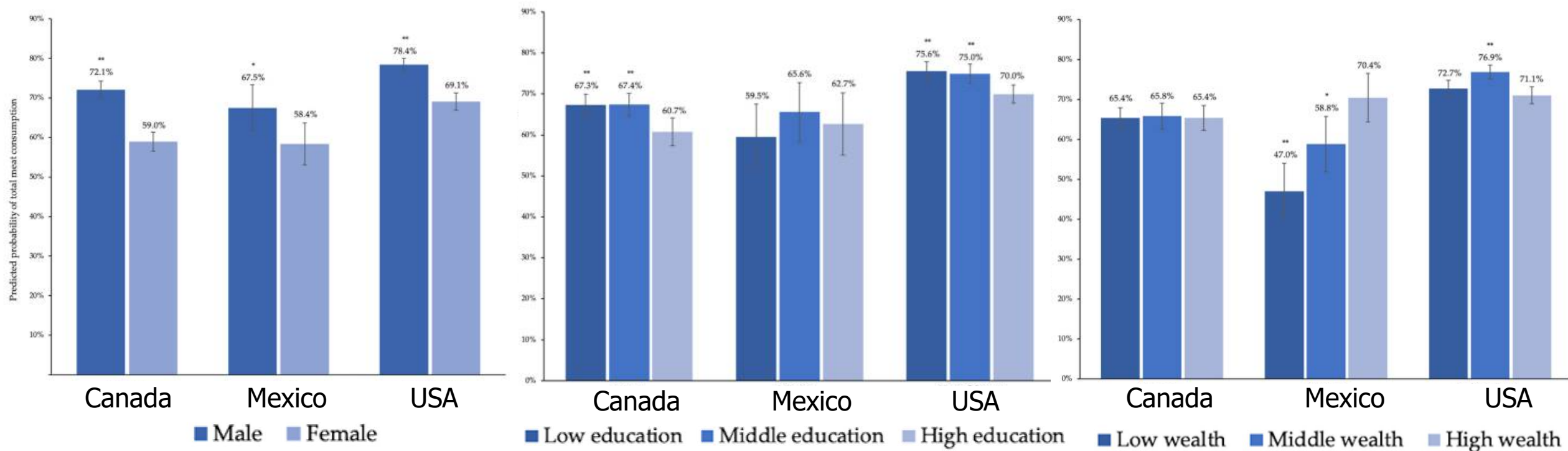
Adjusted predicted probability of total meat consumption for one day of 24-h dietary recall data

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Heterogeneity in the impact of rainfall anomalies on height-for-age z-scores (HAZ) and stunting

Relationship between the 24-month SPEI and residual HAZ scores in 53 developing countries

Impacts of rainfall anomalies on stunting: India

Source: Cooper, M.W., Molly, E.B. et al. 2019. *PNAS*.

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

Projection of the productivity-weighted labour-force dependency ratio for EU28 under different scenarios, 2015–2060

Scenario	Description
Baseline	Continuation of past trends
Baseline/Swedish_LF	Assume labour-force participation rates, particularly among women and elderly to the levels observed in Sweden today
Canadian	Doubling of EU immigration, selective immigration
Canadian/Swedish_LF	
Canadian/Hi_Int	LF participation match that of the native born
Canadian/Lo_Ed/Lo_Int	LF of Denmark, EDU of Italy
Japanese	Low volume of immigration but highly qualified

Productivity-Weighted Dependency Ratio

Legend:
- i. Baseline
- ii. Baseline/Swedish_LF
- iii. Canadian
- iv. Canadian/Swedish_LF
- v. Canadian/Hi_Int
- vi. Canadian/Lo_Ed/Lo_Int
- vii. Japanese

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