Scenarios of future socio-demographic trends in Asia to support climate change and sustainable development research

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Asian Population Forum

Asian Demographic Research Institute, Shanghai

October 11, 2016

Scenarios dominate climate change analysis

Alternative visions of how future may evolve

<u>Rationale:</u>

Deep uncertainty

Facilitate integrated research and assessment

1990

1992

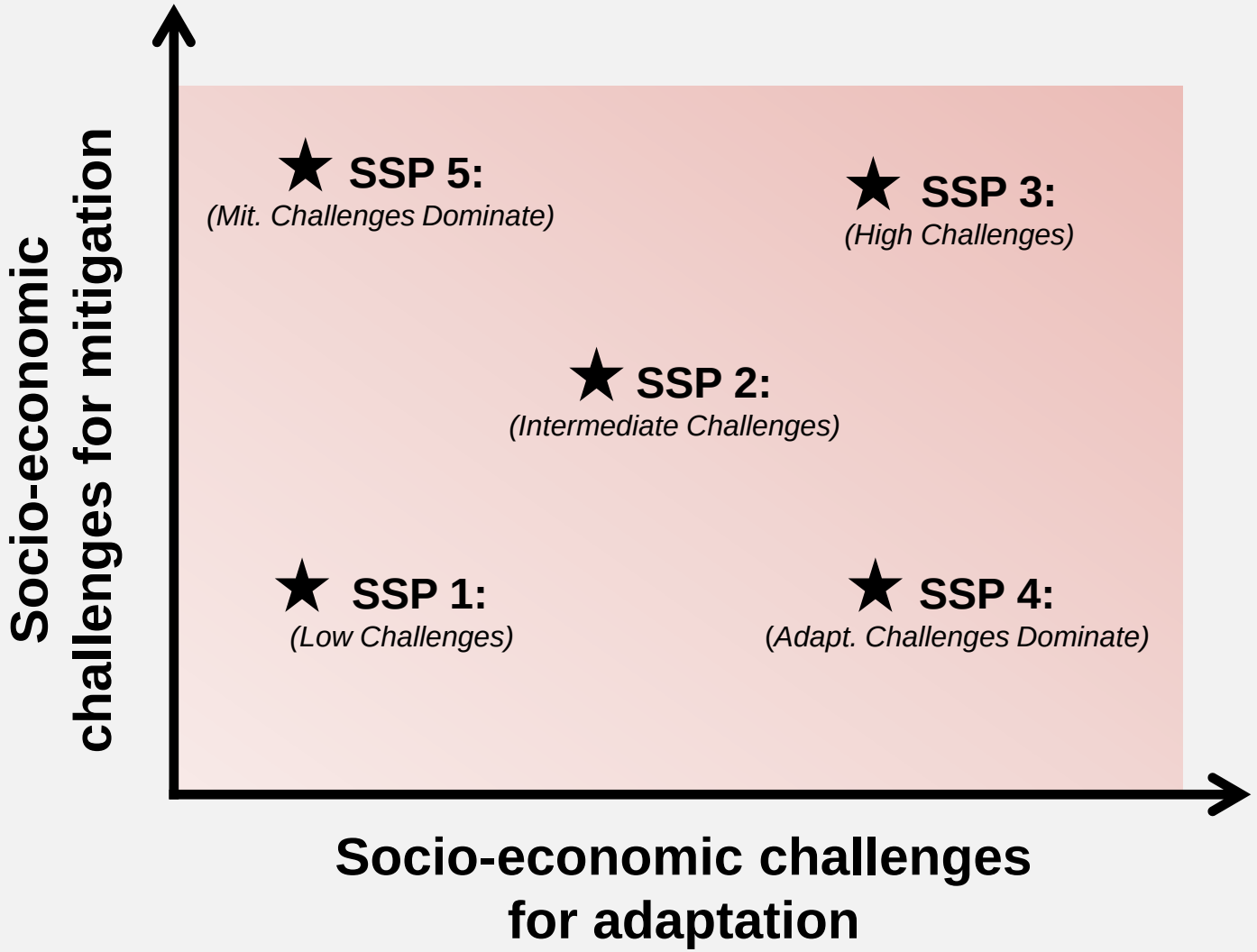
2000

2014
"Shared Socioeconomic Pathways"

Shared Socioeconomic Pathway (SSP) Logic

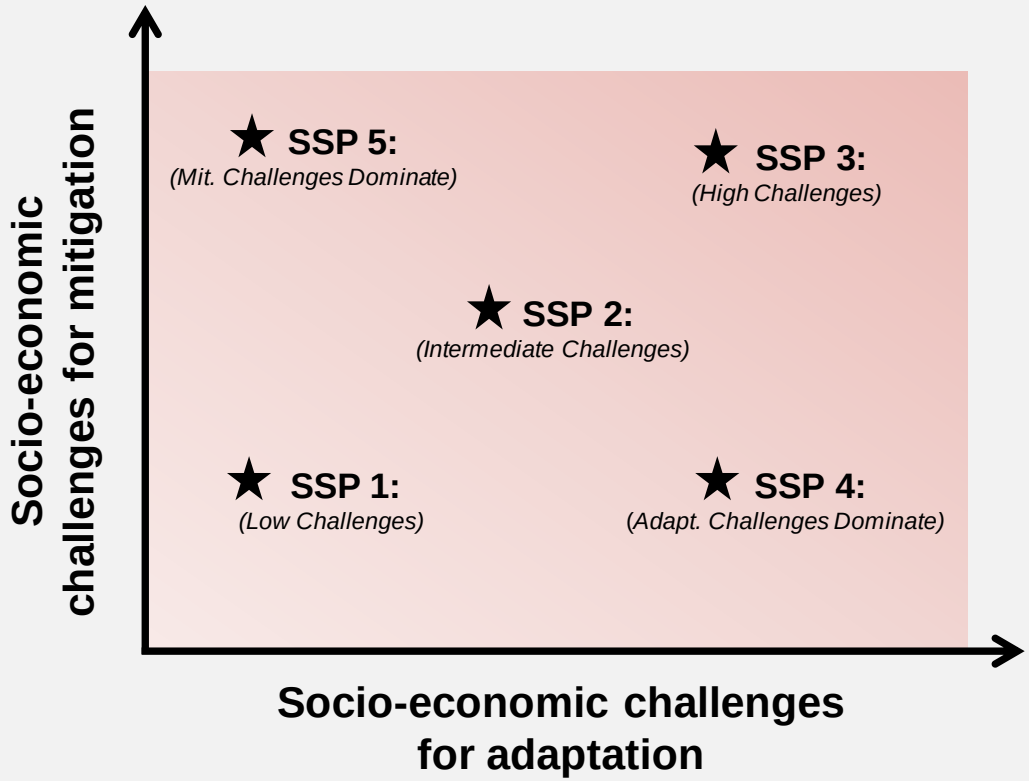
Relevant range of uncertainty spanned:

challenges to adaptation, mitigation



O'Neill et al., 2014.

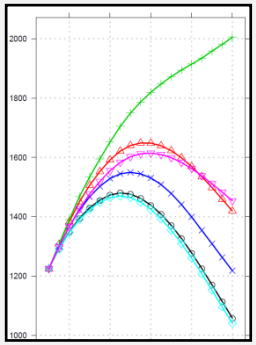
Shared Socioeconomic Pathways (SSPs)



Narrative

Qualitative description of broad patterns of development

Logic relating elements of narrative to each other



Quantitative elements

National:

- Population
- Education
- Urbanization
- GDP

Subnational:

- Spatial population

O'Neill et al., 2014.

SSP3 Narrative

SSP3: Regional Rivalry

Multi-pole Cold War

Conflict, focus on security

Barriers to trade, migration

Little investment in health, education

Slow technological progress

Weak institutions

Slow income growth

(→ mostly high fertility, high mortality, low migration, slow urbanization)

What might Asia look like (especially demographically) in a world like this?

O'Neill et al., 2015.

SSP5 Narrative

SSP5: Fossil-fueled development

Rise of the global middle class

Competitive markets

Rapid technological progress

Large investments in human well being (health, education)

Well functioning institutions

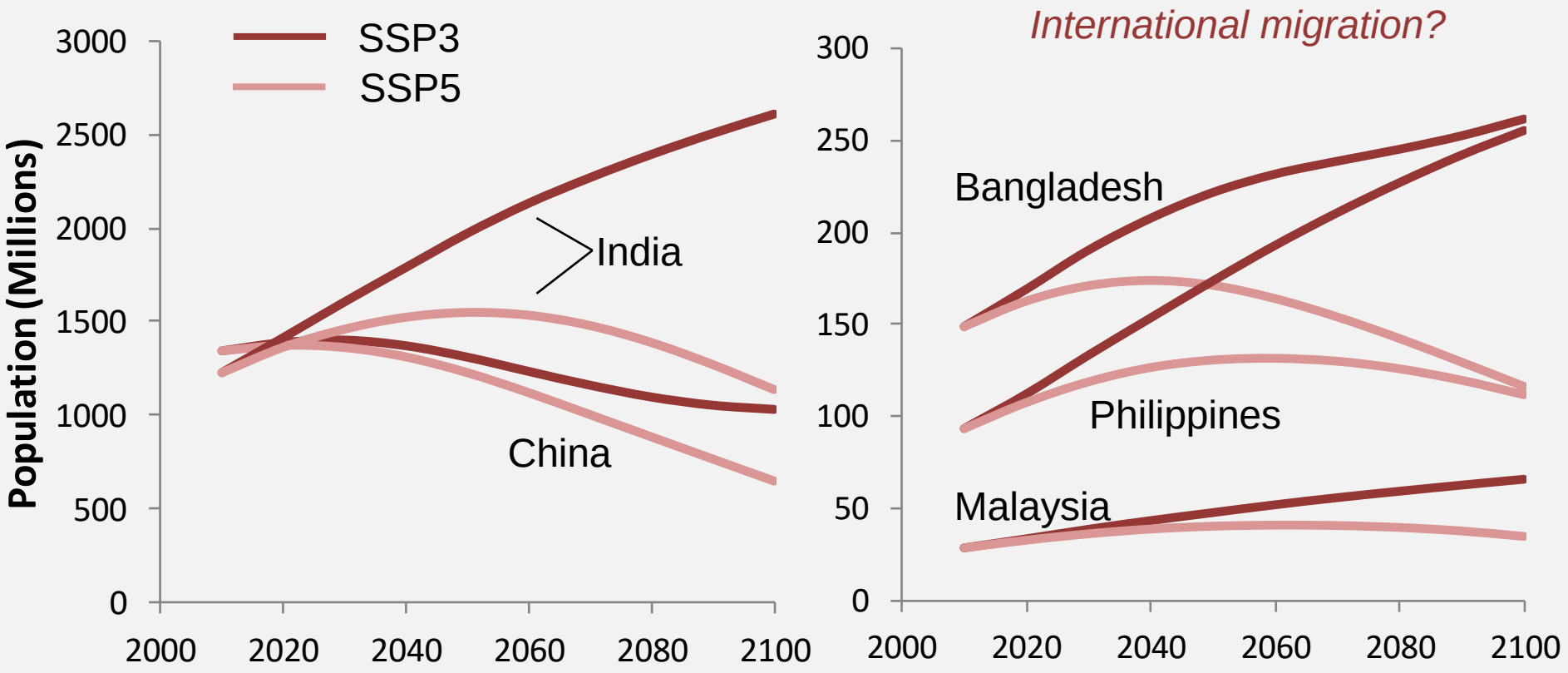
Rapid economic growth

(→ mostly low fertility, low mortality, high migration, rapid urbanization)

What might Asia look like (especially demographically) in a world like this?

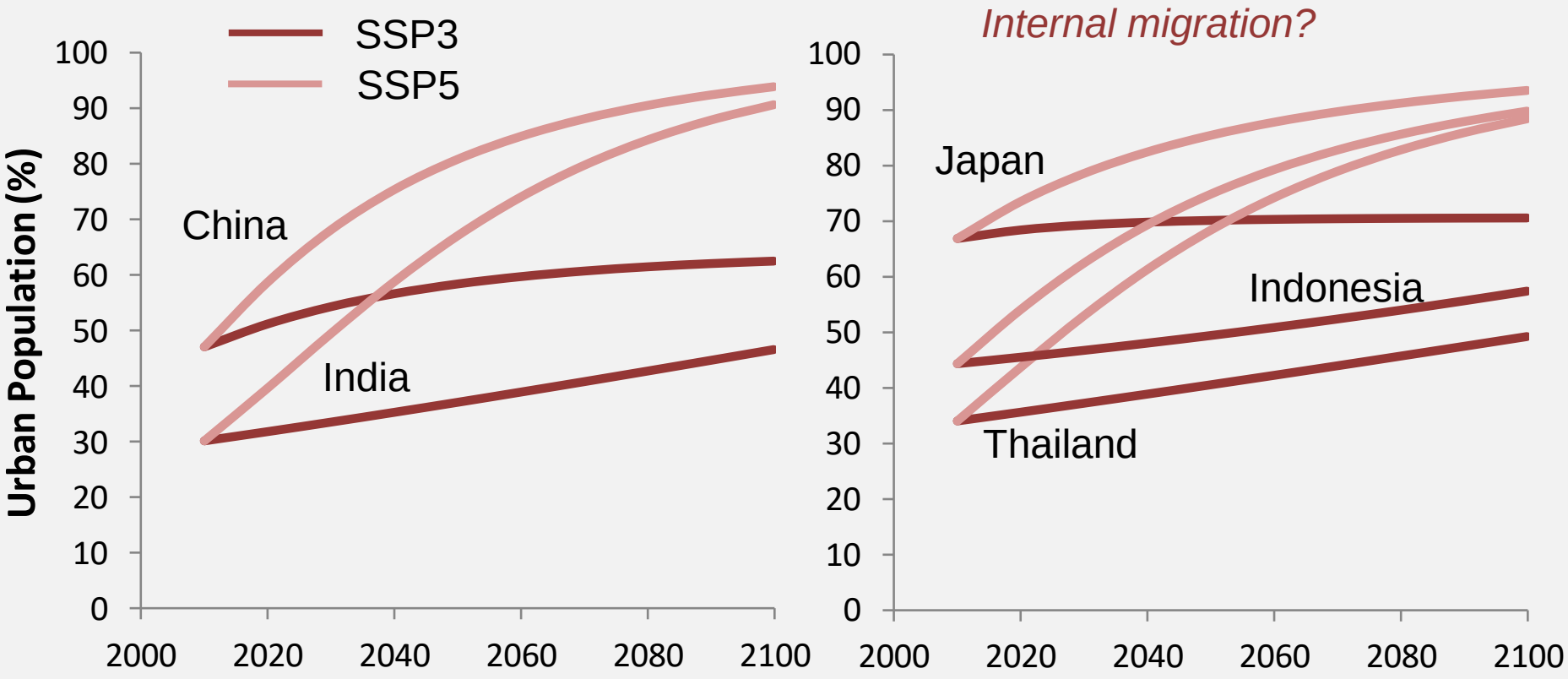
O'Neill et al., 2015.

SSP Population, Asia



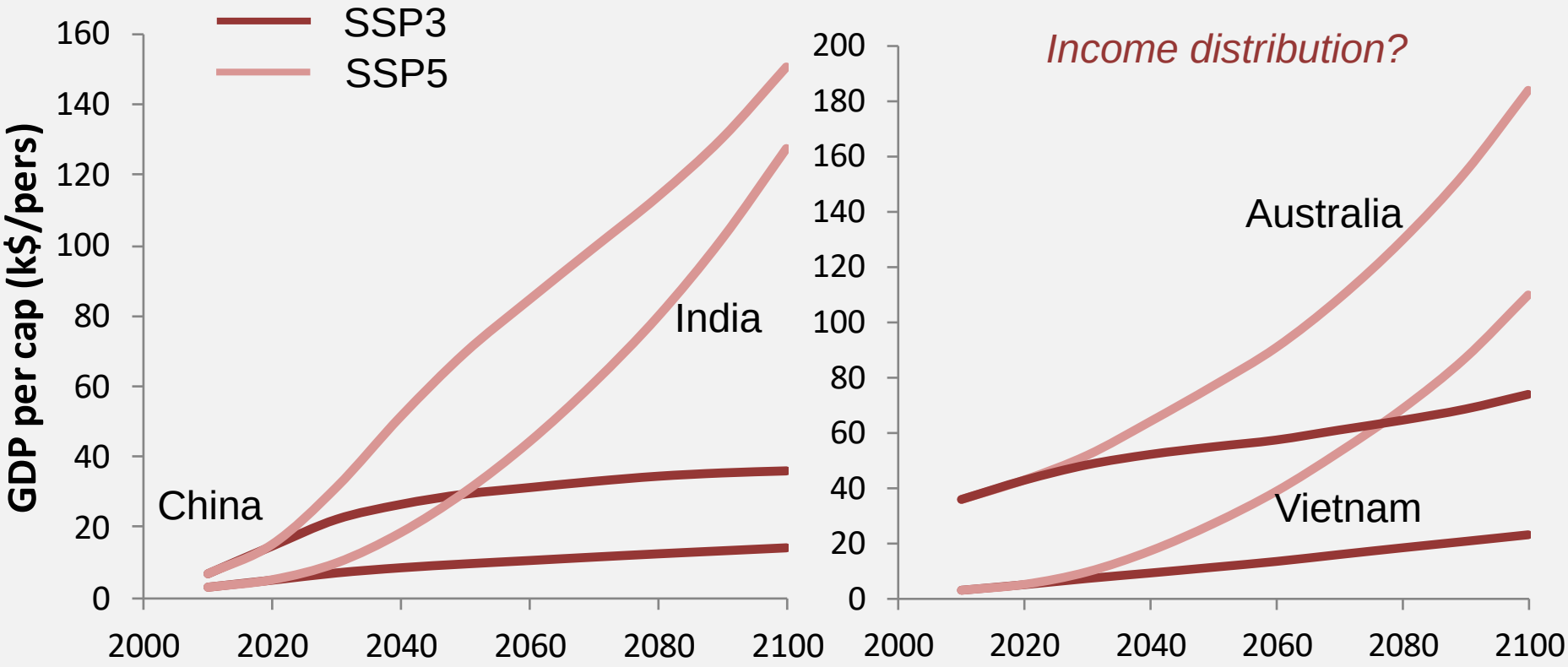
Based on KC and Lutz, 2015.

SSP Urbanization, Asia



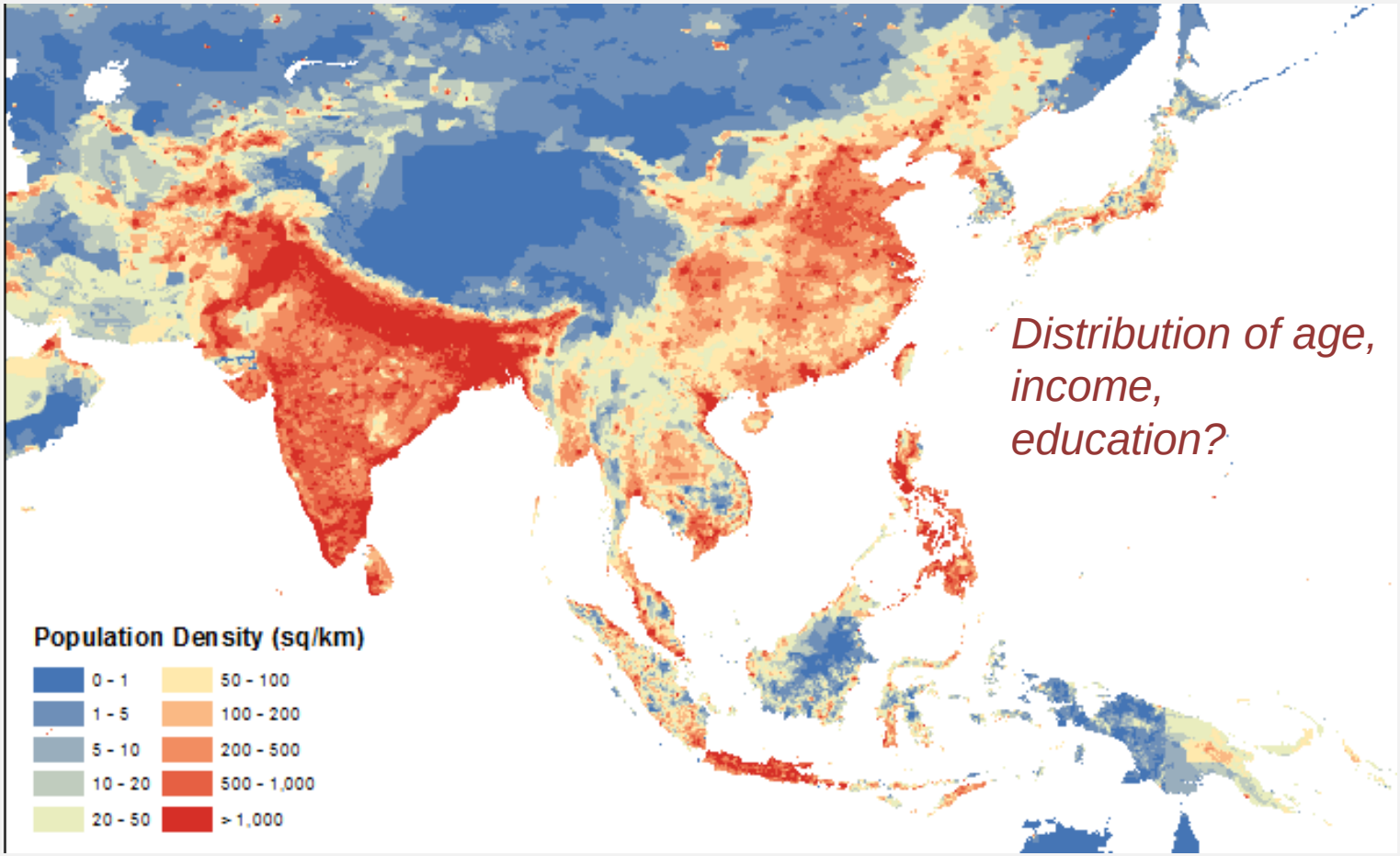
Based on Jiang and O'Neill, 2015.

SSP per capita GDP, Asia



Based on Dellink et al., 2015.

Spatial Population Scenarios
Asia region, 2100, SSP3



Based on Jones and O'Neill, 2016.

Needs for Asian scenario elements

- Narratives
  - Asia-specific trends in societal/demographic development
- Migration
  - Current and projected changes in internal and international migration
- Income distribution
  - Current and projected changes in income inequality within Asian countries
- Spatial population characteristics
  - Current and projected spatial distributions of age structure, education, income
- Consumption patterns
  - See Tiantian's talk

Vision: “Asian SSPs”

New or refined scenarios of demographic and social changes over next 50+ years in Asia

Collaboration across institutions

Provide a basis for studies of societal change, climate change, and sustainable development in the Asian region

Extra Slides

Narratives methodology

Adaptation challenges

SSP5=Low

Average Wealth
Extreme Poverty
Governance
Water Availability
Innovation Capacity
Coastal Population
Educational Attainment
Urbanization
…
Quality of Healthcare
Availability of Insurance

Mitigation challenges

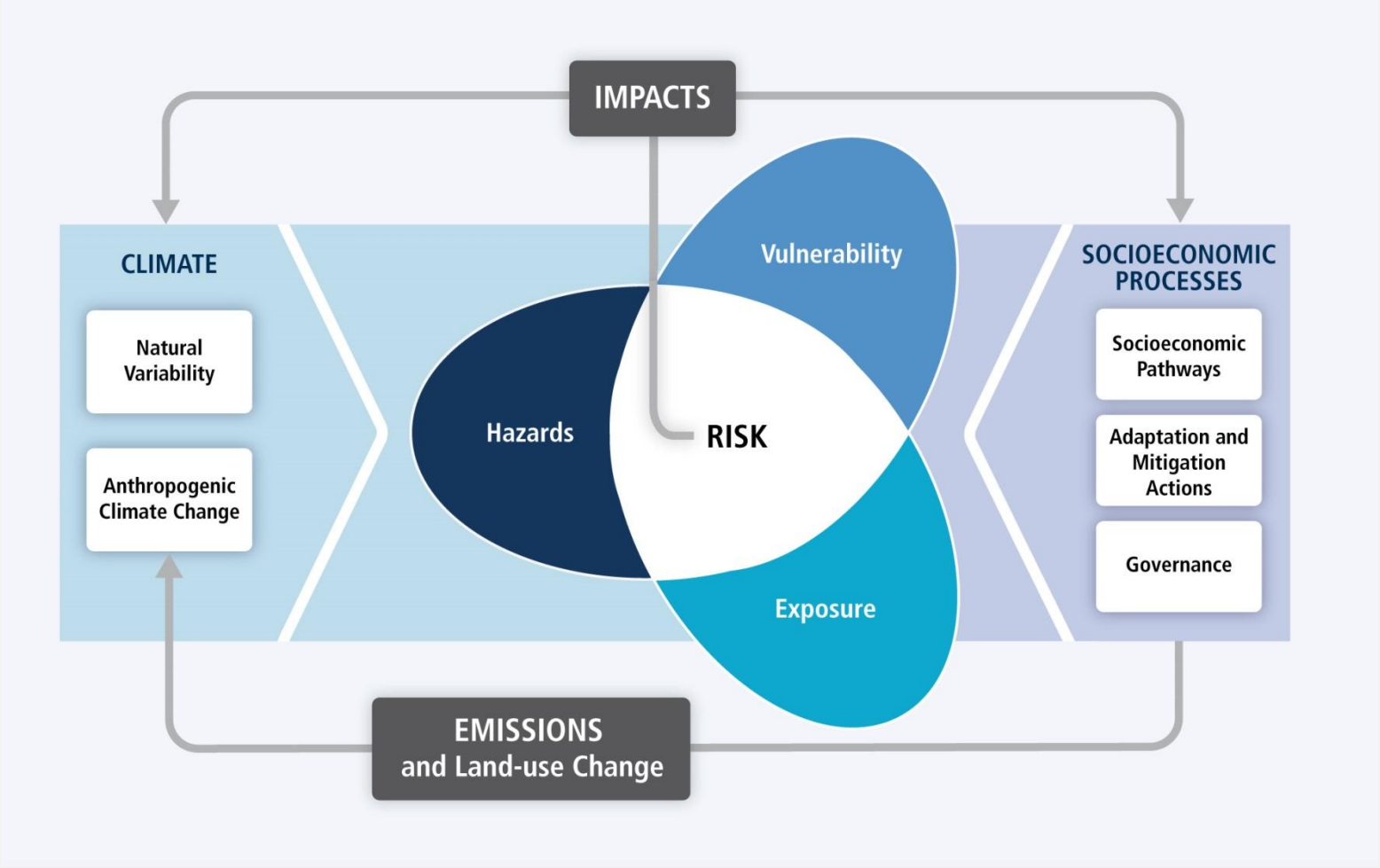
SSP5=High

Population
Carbon Intensity
Agricultural Productivity
Energy Intensity
Energy-related Tech. Change
CCS availability
…
Effectiveness of Policy Institutions
Energy Tech. Transfer
Diet

Declining importance

Schweizer & O'Neill, 2014.

Conceptual framework: Determinants of risk and impacts



IPCC WG2 SPM

Regional SSP Extensions

“European SSPs”

Socioeconomic scenarios for the Eurasian Arctic

Food and climate scenarios for Africa, Asia, Latin America

“Asian SSPs”?

Evaluating SSPs for Asia

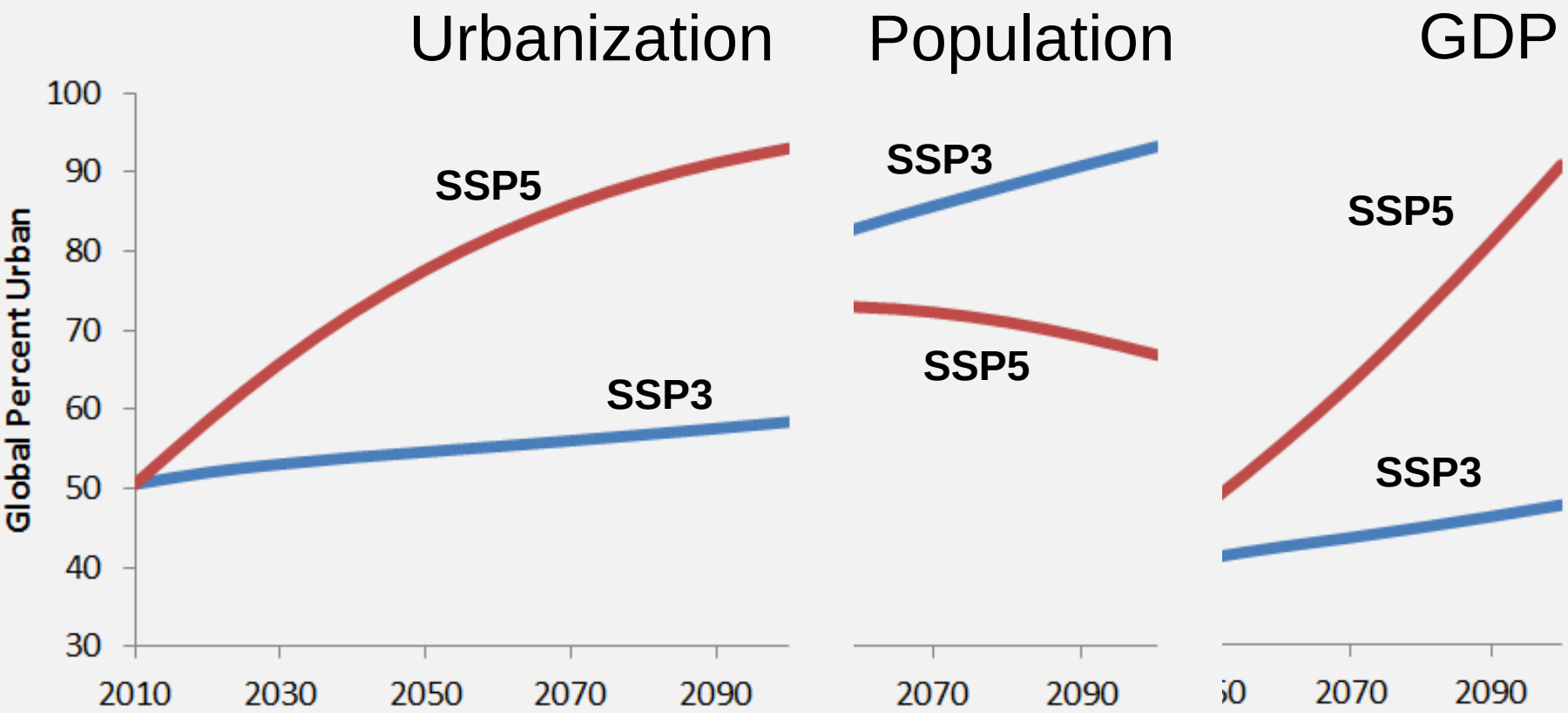
Narratives

- What aspects of society (especially demographic) would determine challenges to adaptation/mitigation in Asian countries?
- Are new or more detailed narratives for Asia required?

Quantitative elements

- Are appropriate ranges of population, age structure, educational attainment, urbanization, spatial population represented in SSPs in Asian countries?
- Are new or modified projections for Asia required?

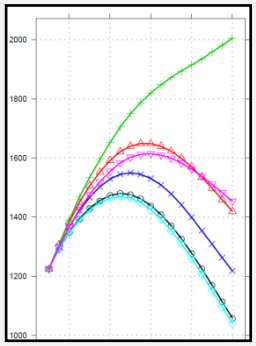
Quantitative elements



Jiang and O'Neill, 2015. KC and Lutz, 2015. Dellink et al., 2015.

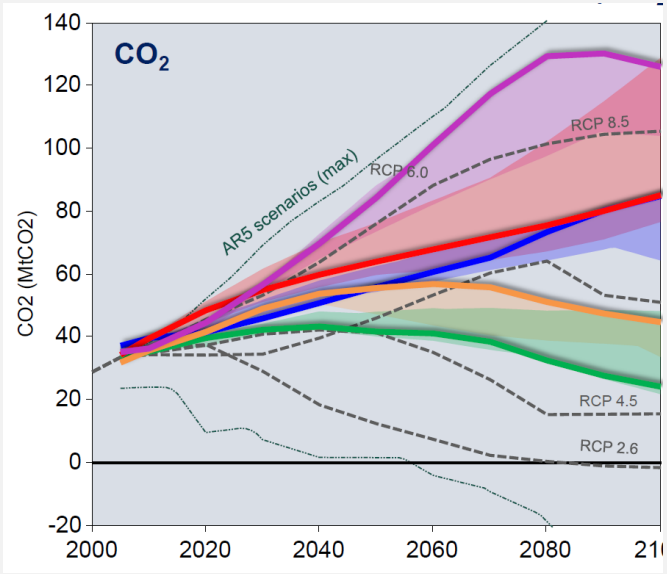
Applications: Emissions and Land Use

SSPs



Household consumption patterns?

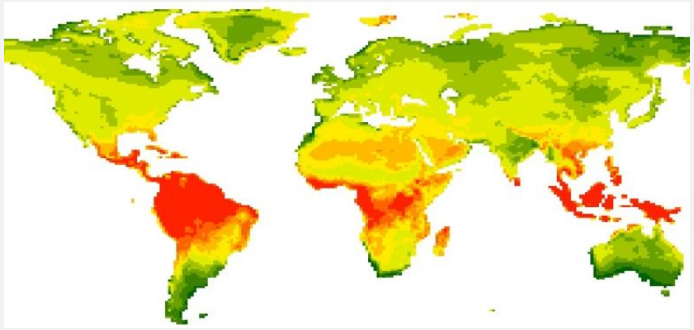
Energy, Land use, Emissions



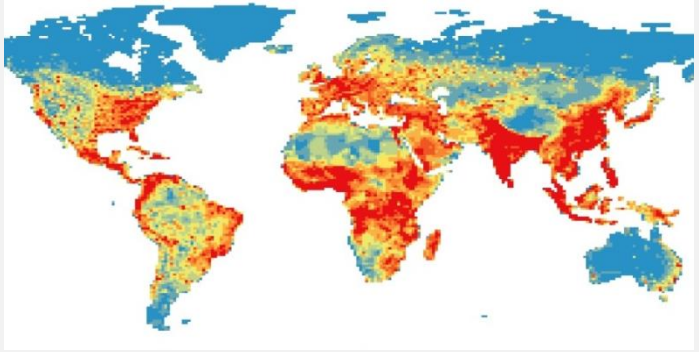
Riahi et al., 2016.

Applications: Climate change impacts

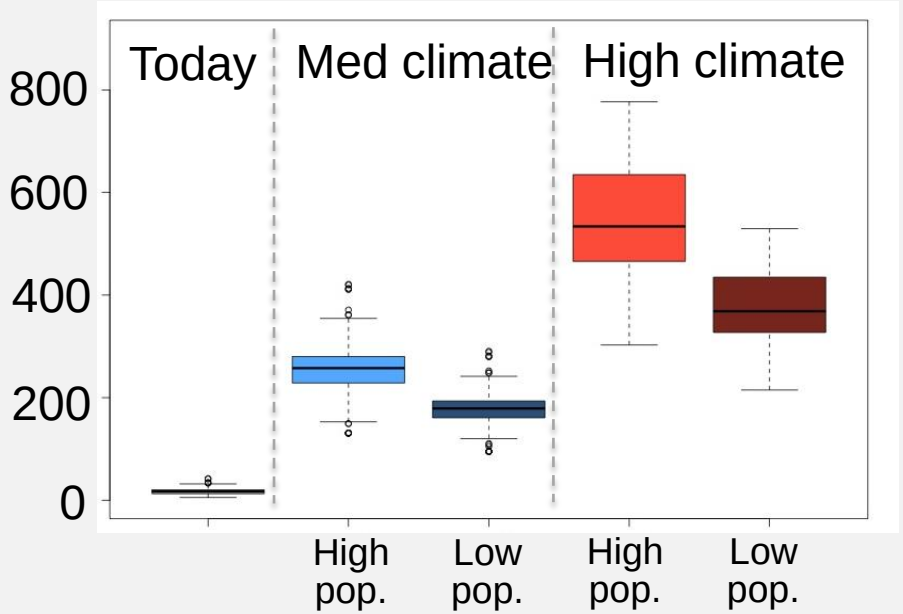
Climate model projections



Spatial population projections



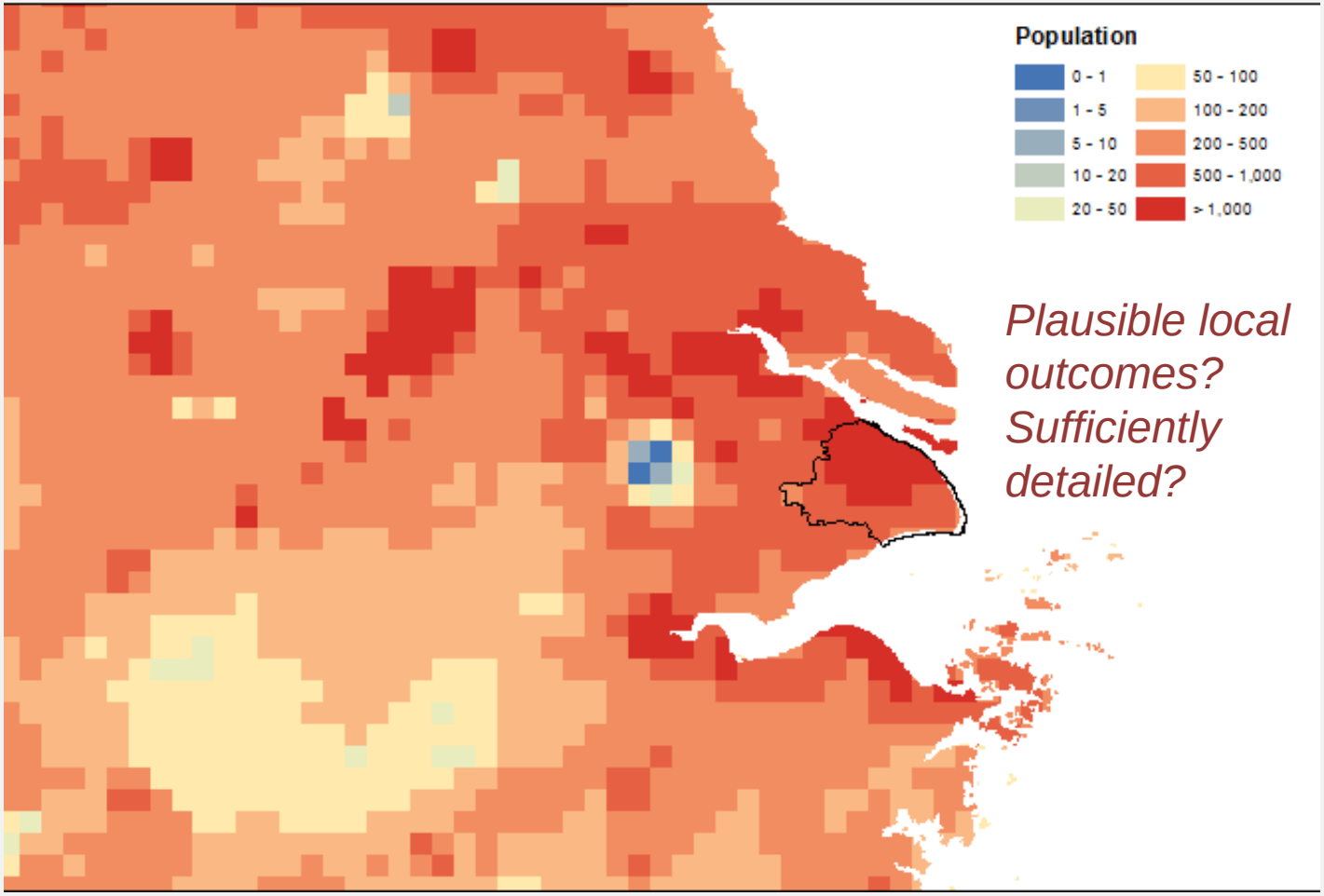
Billion person-days per year of exposure to heat waves, 2061-2080



Exposure by age, income, education?

Jones et al., in prep.

Spatial Population Scenarios
Shanghai region, 2100, SSP3



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