Challenges and gaps in assessing impacts of climate change on health in rural areas

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Background paper: three sets of general challenges

1. Untangling the relations between climate change, sustainable development, poverty, and health
2. Representing rural areas in scenario-based climate-health impact assessments
3. Assessing health impacts in scenario-based assessments

Challenge 1.1: The health impact community, in collaboration with other disciplines, should consider developing health impact assessments that specifically aim to consider the interactions between progress on the Paris Agreement (as well as more pessimistic climate futures) and the 2030 Agenda, in order to assess the health implications of future pathways, with a particular focus on groups who may most benefit or be most harmed.

Challenge 1.2: As well as further developing assessments that predict the impacts of poverty on health, additional assessments based on specific causal mechanisms by which poverty affects health may help show which types of actions to reduce poverty are likely to have the greatest health benefits, thus also reducing causal feedback from ill health to poverty.

Challenge 2.1: Health researchers and modellers should attempt to better represent development in assessments (including its uneven distribution), by rapidly adopting newly available SSP scenario data.

Challenge 2.2: Health researchers and modellers should explore means of representing the qualities of rural areas that are likely to shape the climate-health relation, perhaps by developing typologies in order to balance real-world heterogeneity and model parsimony.

Challenge 2.3: The climate change impacts community could consider developing socioeconomic scenarios that assume structural conditions support the development of vibrant rural communities, where agriculture remains a significant source of employment, perhaps via agroecology.

Challenge 3.1: When developing empirically-based health assessment models, researchers should critically assess the quality of apparently robust historical data to avoid drawing misleading conclusion about health impacts and policy priorities; this may be particularly pertinent to many rural areas where data may be based on extrapolations.

Challenge 3.2: Given the inherent complexity of the relations between health, climate change, and development, health researchers should consider (i) consciously adopting an 'open' approach to science (by, for example, exploring unforeseen turns in results), and (ii) combining insights from quantitative predictive models with insights from qualitative explanatory models, the latter being potentially useful in rural areas with limited data availability.

Challenge 3.3: The differences between futures with lower and higher carbon emissions do not begin to vary widely until around the 2050s; in order to assess threats to progress made under the SDGs, and to help ensure ongoing progress, it is necessary to develop detailed socioeconomic scenarios that extend beyond 2030 and represent the most vulnerable groups, and to utilise these scenarios in health assessments.

Challenge 3.4: New interdisciplinary approaches to health impact assessments could be developed jointly with specialists from other disciplines to allow the investigation of processes shaping health that may be systematically excluded from existing multidisciplinary models, particularly those processes that may unevenly impact on poorer communities.

Challenge 3.5: Global-level assessments potentially offer different insights than those conducted at local-level; new insights into health in rural areas may be gained by attempting to incorporate relevant global processes – particularly those that influence patterns of poverty and inequality - into global-level assessments.

Challenge 3.6: In health assessments of climate-related disasters, as well using approaches that view people as being vulnerable to hazards, consideration should be given to adopting alternative approaches that more firmly locate the causation of vulnerability in society with hazards being one cause amongst many; such an approach may allow better assessment of the interactions between future climate and development pathways, particularly the implications for the most vulnerable populations.

Key messages: what we know

Climate change:

- poses a major threat to health, and impacts are already being felt

  (e.g. heat-related, labour productivity, infectious diseases, nutrition, flood losses)

  (Smith et al, 2014; Watts et al, 2018)

- may directly influence progress on ~1/2 of the ~50 health-related SDG targets

  (including those related to poverty and nutrition)

- but, there has been limited health-related research on livelihoods, poverty or rural areas

  (Hoegh-Guldberg et al, 2018)

Climate change (inc Paris) and sustainable development (under the 2030 Agenda):

- mutually conditioning in synergistic and contradictory ways (as are health and poverty)

  (e.g. climate change mitigation may benefit of harm poor communities; changed consumption patterns when lifted out of poverty may increase CC) (Roy et al, 2018)

- to date, most CC-health impact assessments have given greatest attention to climate

  - spatially and temporally high-res climate data - vs - lower-res and limited-scope socioeconomic data -

Key messages: filling the gaps in policy-relevant research

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1. Health assessments that give equal attention to climate and development

- Climate impacts modified by social factors - vs - social processes modified by climate change
- Many processes driving both climate change and uneven distributions of health, income & vuln.

  (e.g. unequal access to the opportunities whose emissions have driven climate change*)
- Rapid assessments using newly available data; longer-term: develop spatially explicit social data
- Develop optimistic scenarios with vibrant rural communities, perhaps represented using typologies
- Strengthen interdisciplinary work:
  - co-develop models rather than join them together
  - represent key global-level processes that influence spatial patterns of poverty and health

2. Adopt multiple approaches to modelling

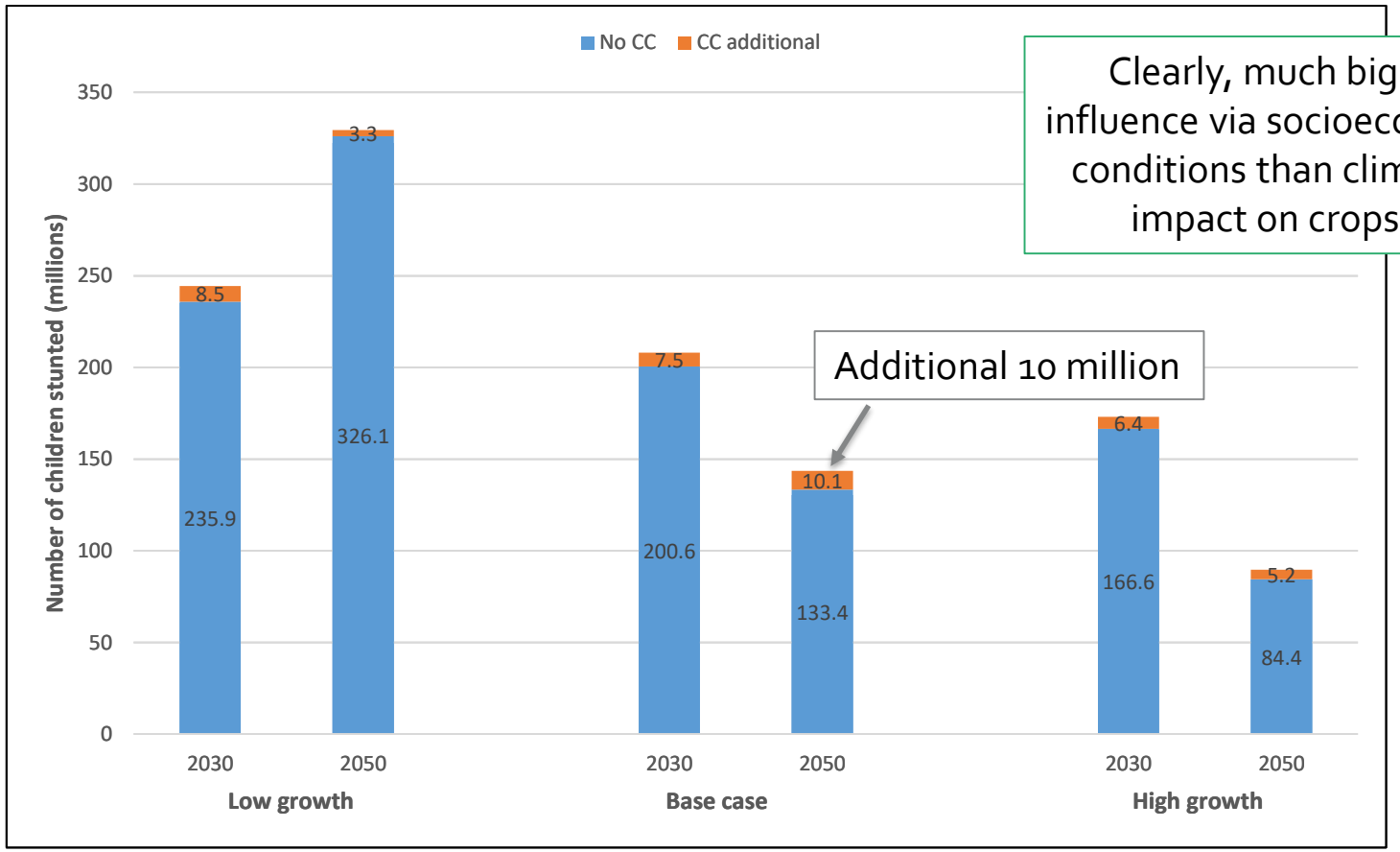
- Models to predict (to identify potential priorities) and models that explain (to identify mechanisms so as to assess and guide interventions, and, allow better representation of data-poor areas)
- More explicit consideration of theory

  (e.g. vulnerability "located" in hazards vs society*; causes of hunger in food producers-consumers)

*Ribot, 2014

Undernutrition: socioeconomic vs climate change

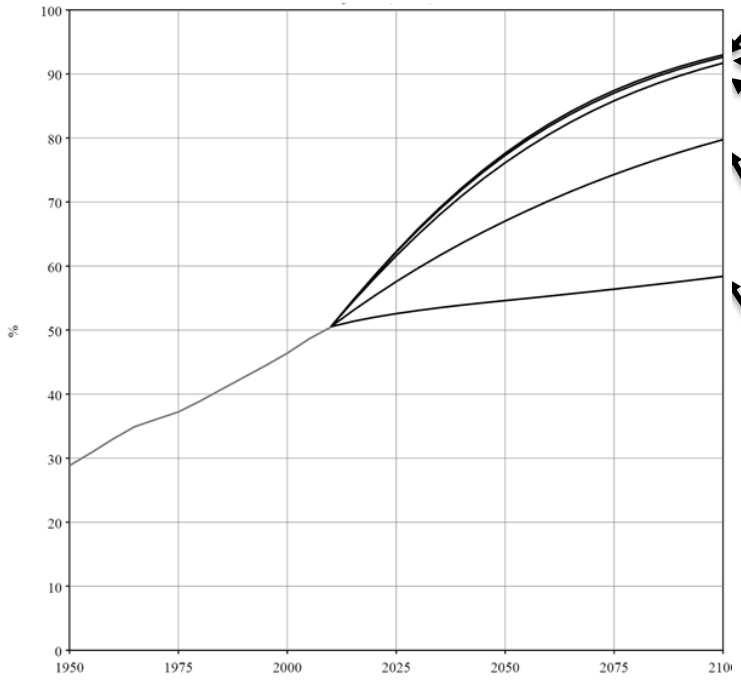
Undernutrition in futures with social change, with and without climate change



Climate scenario: A1b (mod to high emissions)
Socioeconomic scenarios: low growth, 'business as usual', and high economic growth

Source: based on results from Lloyd et al (2014), WHO

Socioeconomic scenarios: urbanization



% urban: 1950 - 2100

Source: IIASA SSP database V0.9.3

SSP5: Conventional development

SSP1: Sustainability

SSP4: Inequality

SSP2: Middle of the road

SSP3: Fragmentation

- >90% by 2100 under "optimistic" scenarios
- Vibrant rural communities?
- Slums?
  - currently, ~1 billion people
  - growth rate exceeds rate of urbanization
  - *Cities as sites of ec growth & exclusion**

*Source: de Vijver (2015), Lancet

Outdoor labour lost under high climate change

Source: Watts et al (2015), Lancet

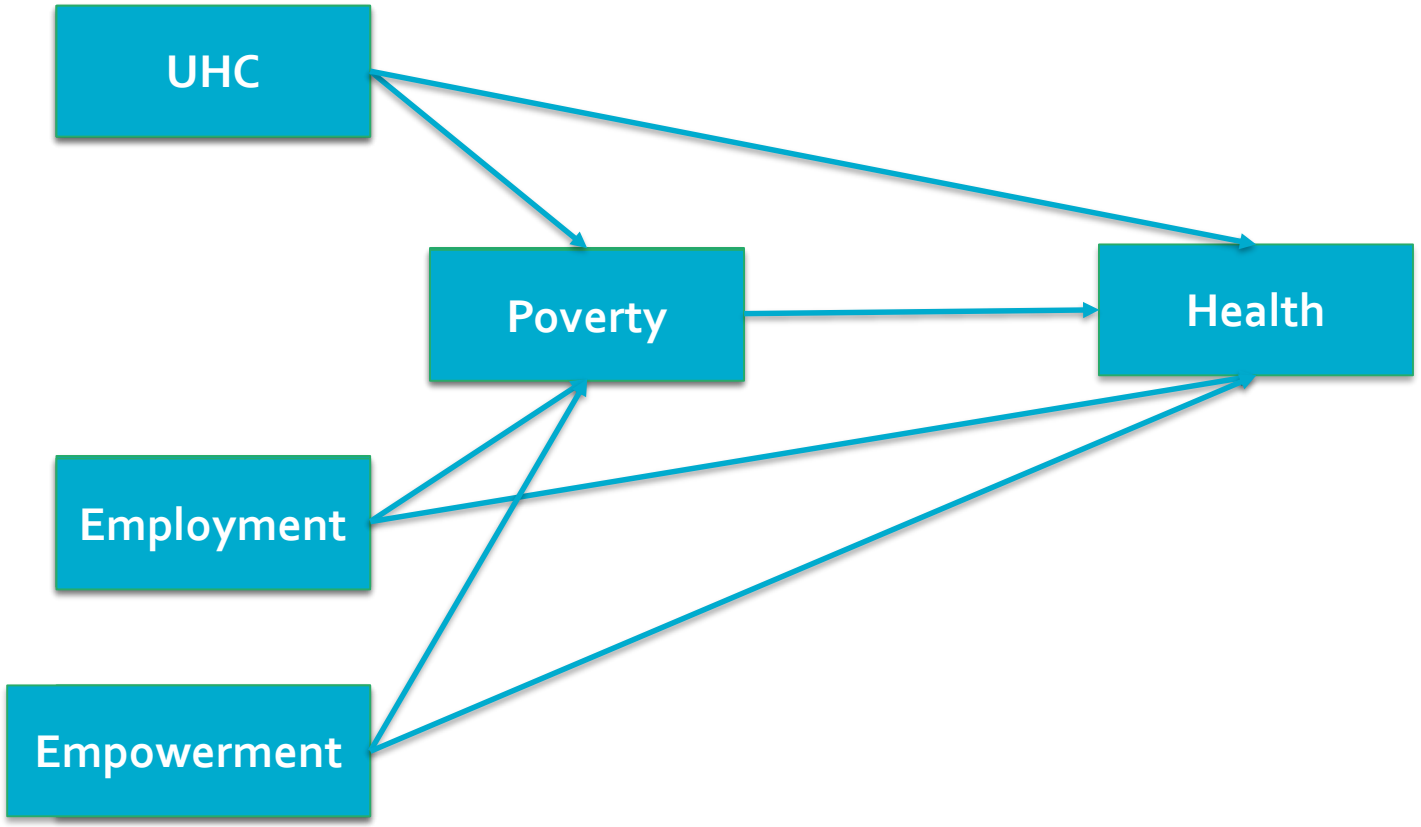
Quantitative prediction vs explanation

When you cannot measure it,
when you cannot express it in numbers,
your knowledge is of a meagre and unsatisfactory kind.
Lord Kelvin

When you can measure it,
when you can express it in numbers,
your knowledge is still of a meagre and unsatisfactory kind.
Jacob Viner

Quoted in Sayer, 1992

Quantitative prediction vs explanation



Figures are intended to be for illustrative purposes only

Source: based on Chiolero (2018), Lancet