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# Nature and health inequalities in the face of climate change

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27/06/17

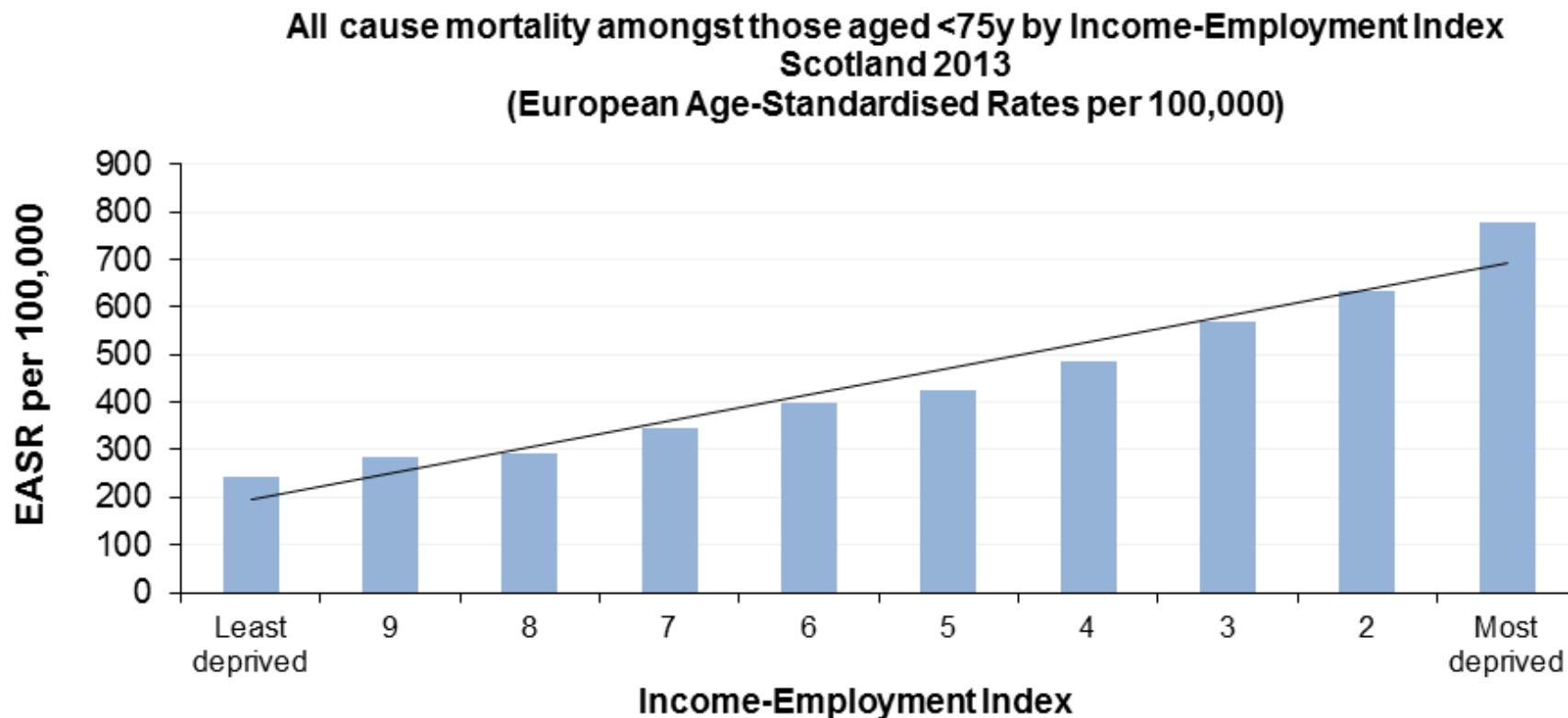
It's late in the afternoon. It's been a long day.  
Don't worry. I have just 2 ½ ideas in this talk



My intention is to season ALL our discussions with ideas about inequality, complexity and systems thinking

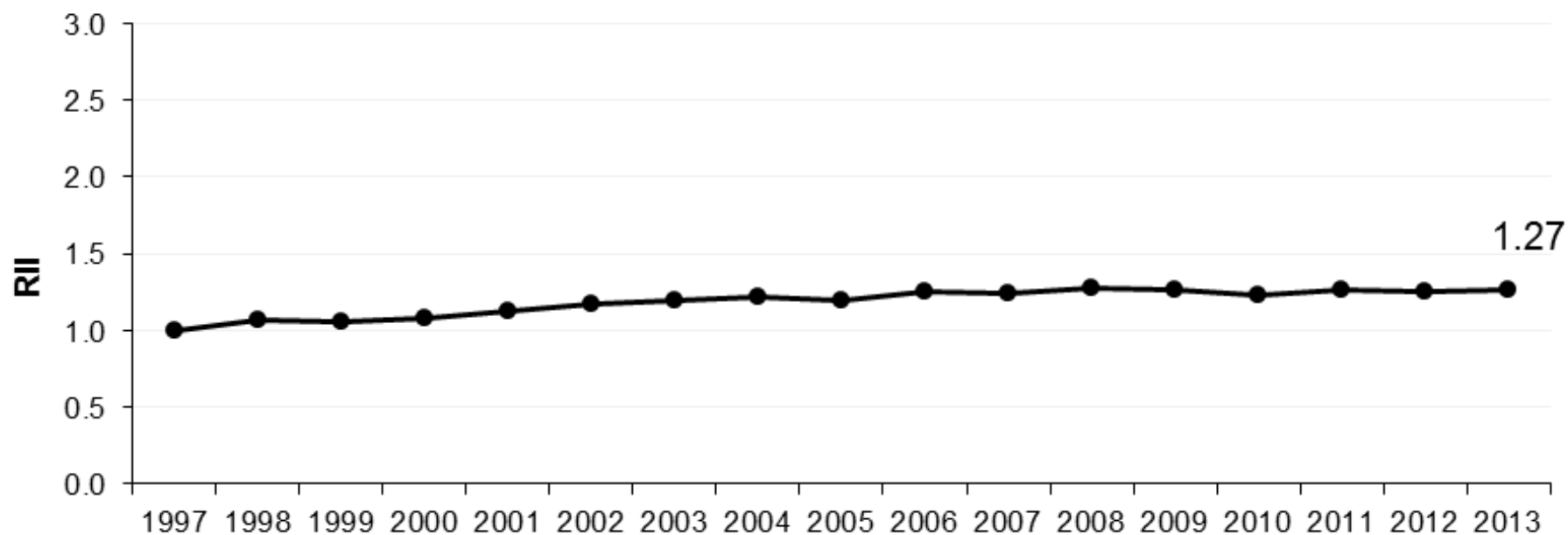


There are local, regional, national and global health inequalities



We're making little progress in reducing them

**Relative Index of Inequality (RII): All cause mortality <75y  
Scotland 1997-2013**



No infant has the  
power of deciding  
at what period of time,  
or in what part  
of the world,  
he shall come into  
existence.

Robert Owen  
(1771-1858)

This matters.

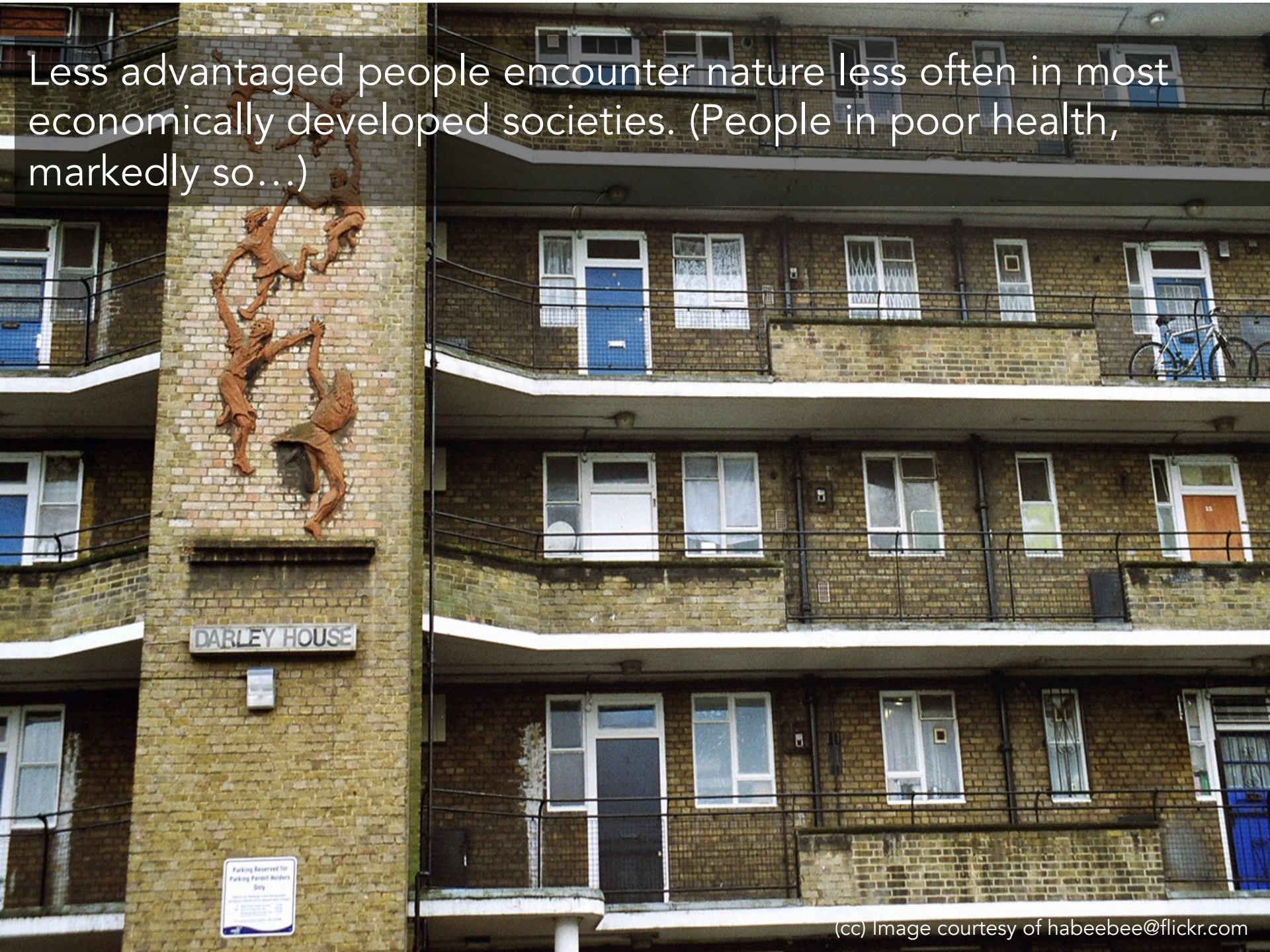


Contact with nature can be healthy (salutogenesis).

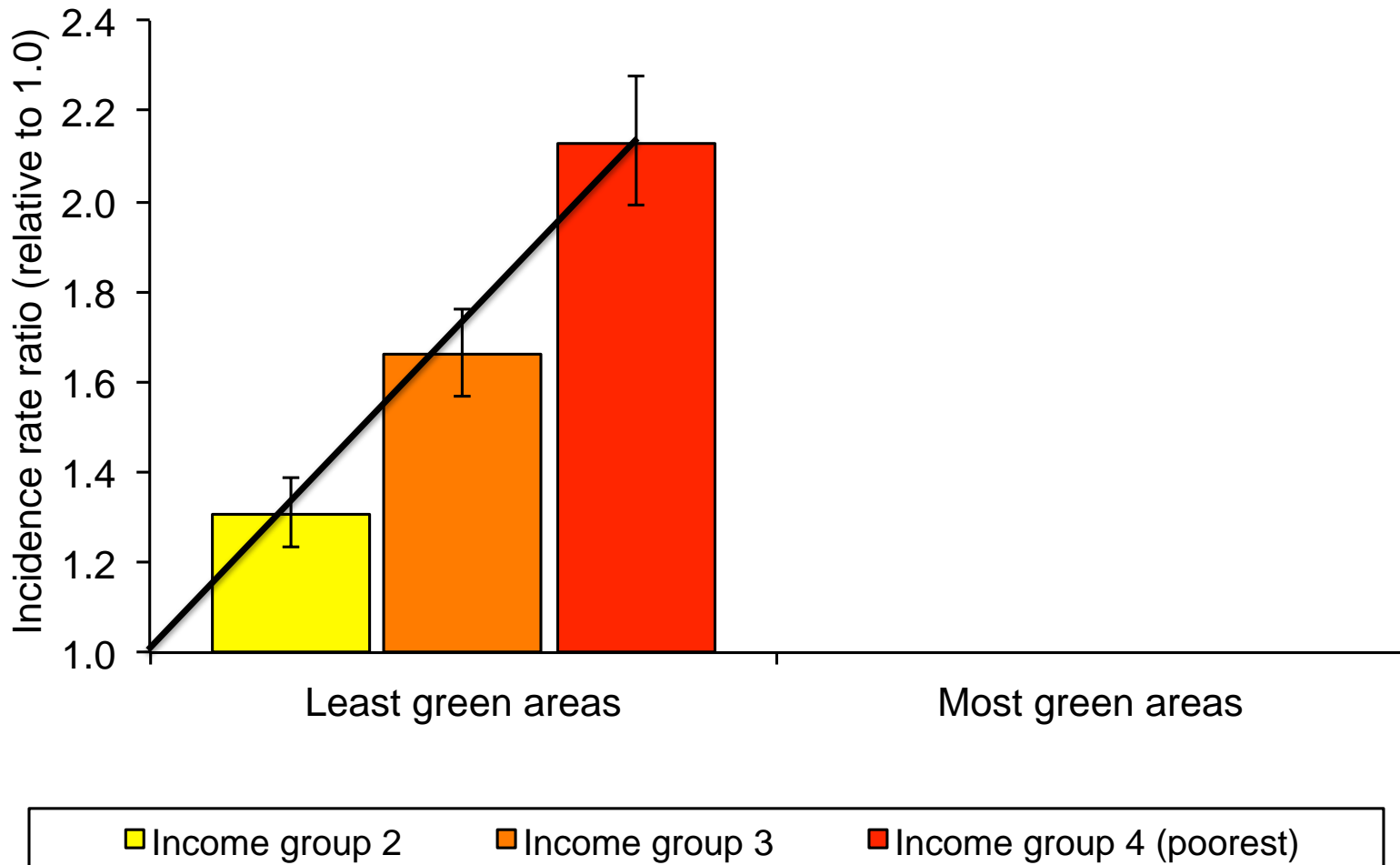




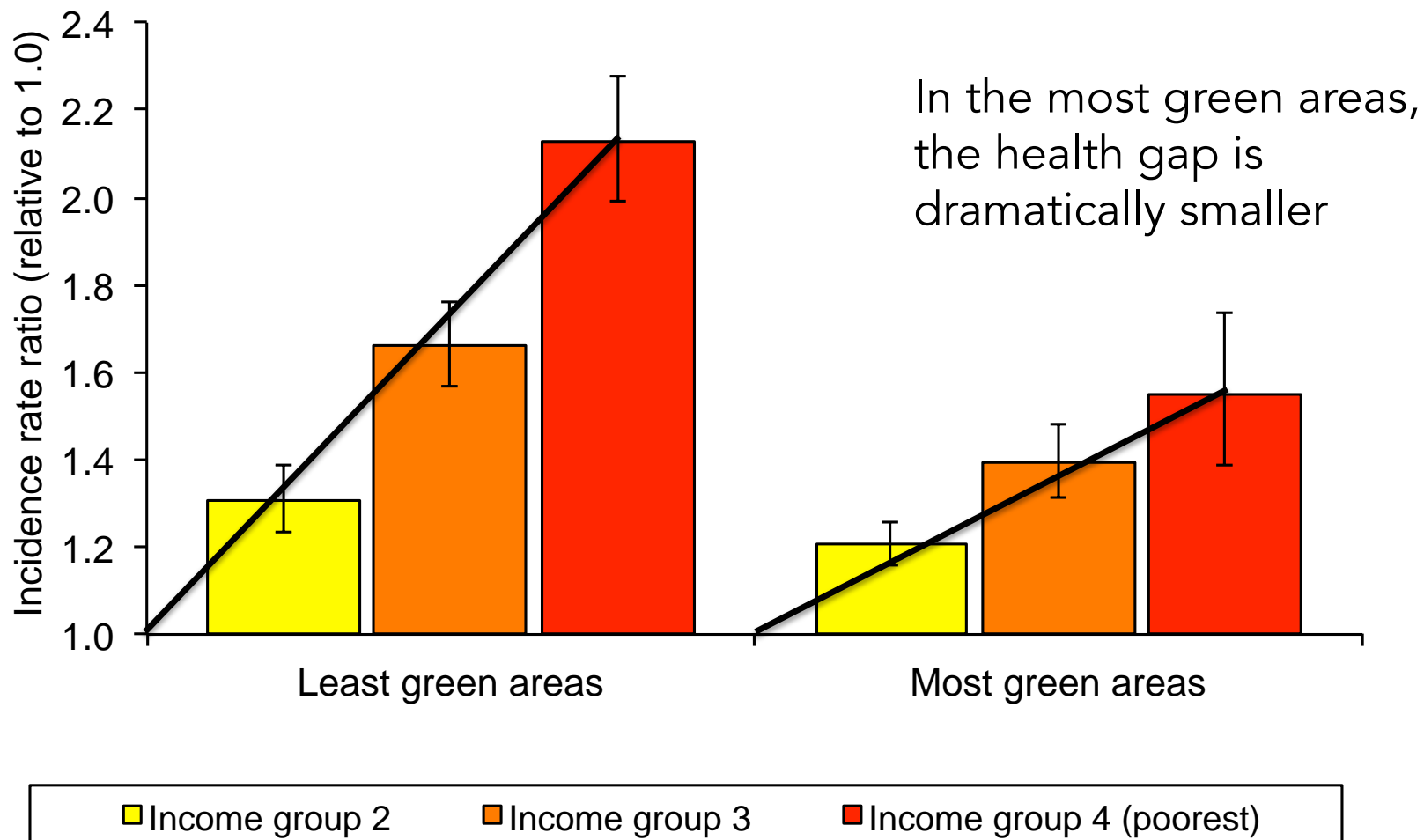
Less advantaged people encounter nature less often in most economically developed societies. (People in poor health, markedly so...)



But, better access to / more contact with nature seems to benefit disadvantaged groups to a greater extent.



Perhaps because of equalised access to a salutogenic resource, or perhaps restoration ~ stress?



Modest evidence. Perhaps 10+ papers have found this 'effect'.  
Lack of experimental / longitudinal evidence. Biodiversity?



**IDEA 1:** Natural environments may be **equigenic**. They may act to create health equality by breaking or weakening the usual conversion of disadvantage to relatively poor health.

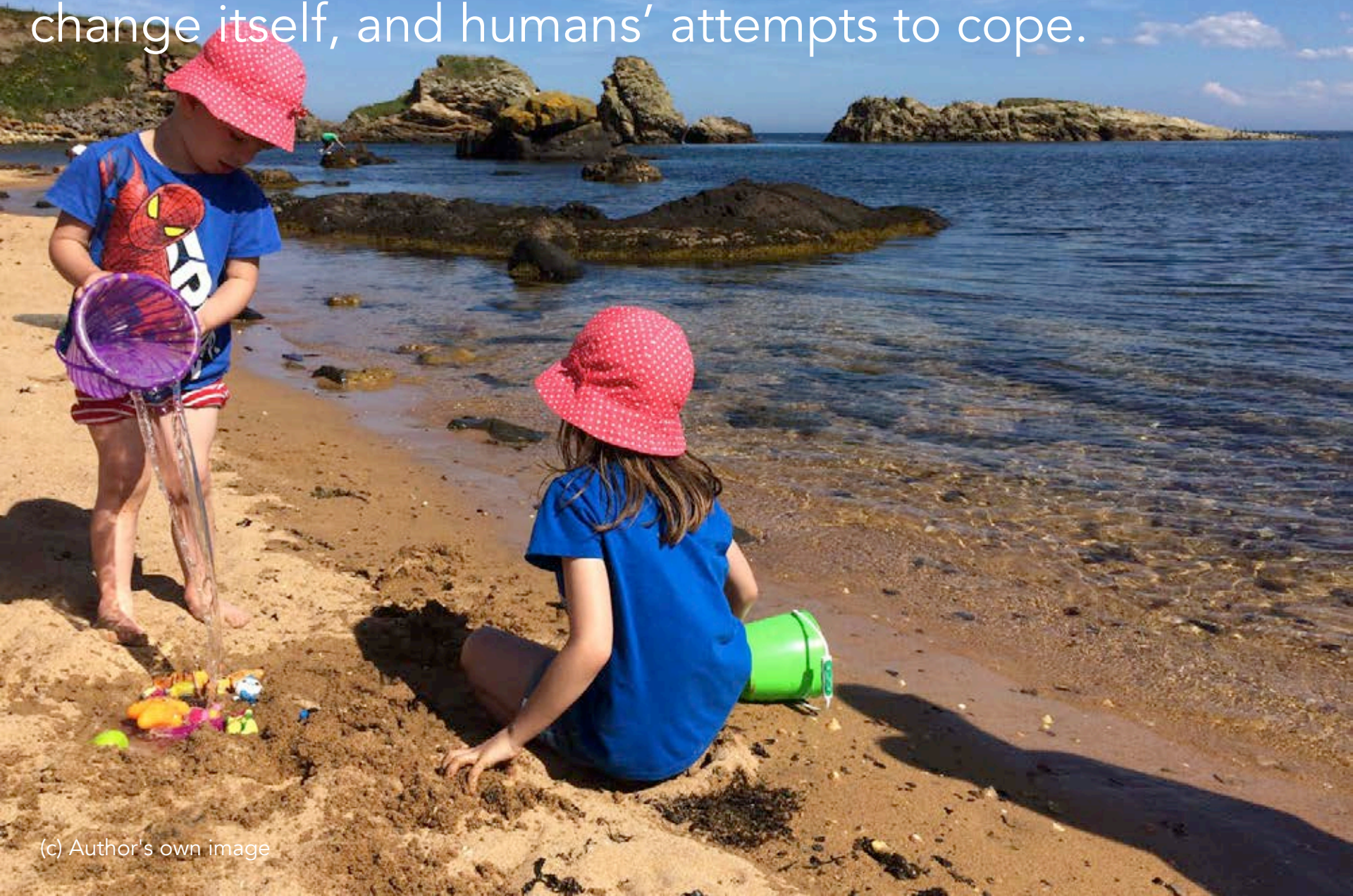
Climate is changing everywhere



Promising a mix of threats...



...and opportunities. These stem from both the climate change itself, and humans' attempts to cope.

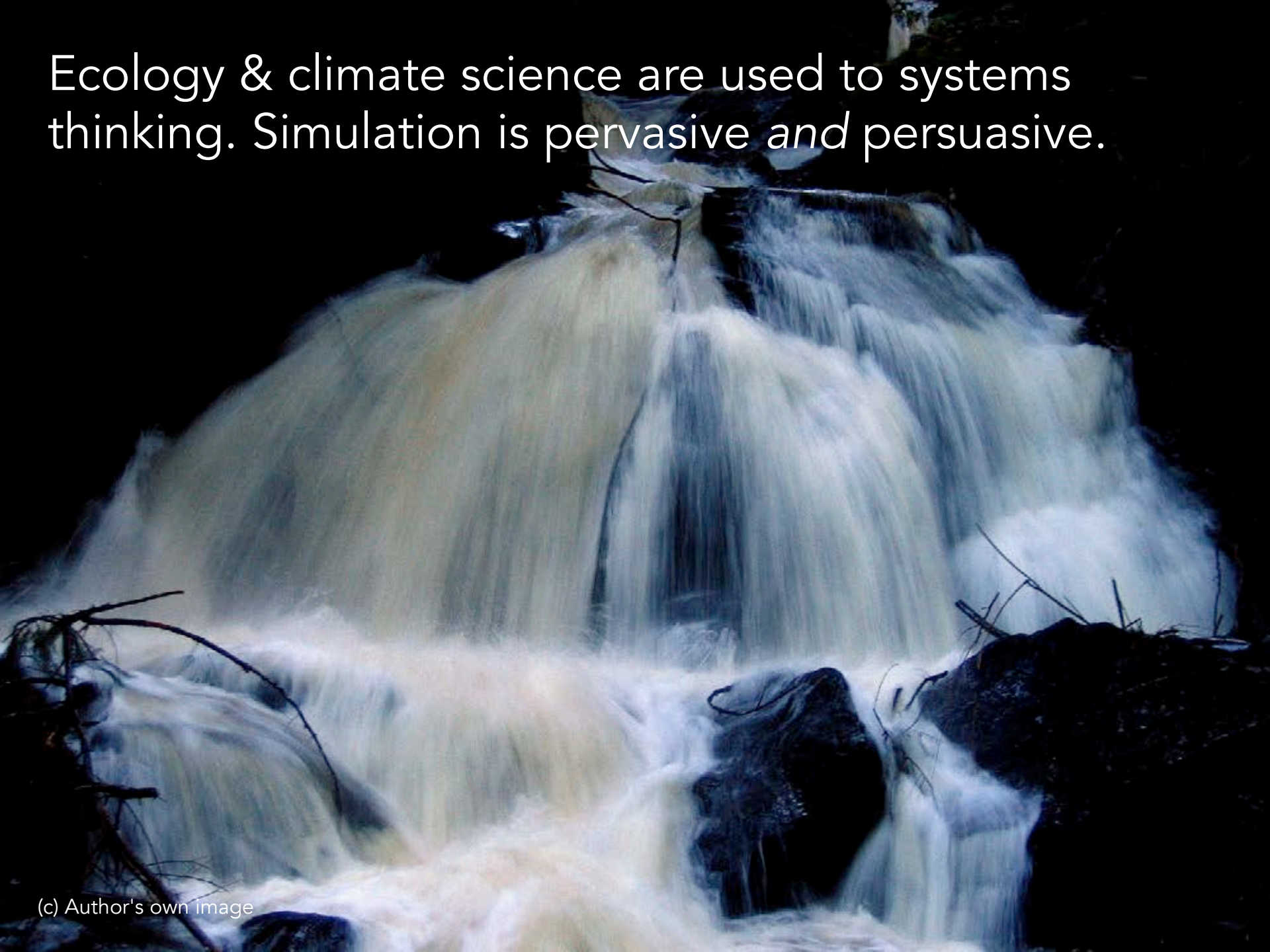






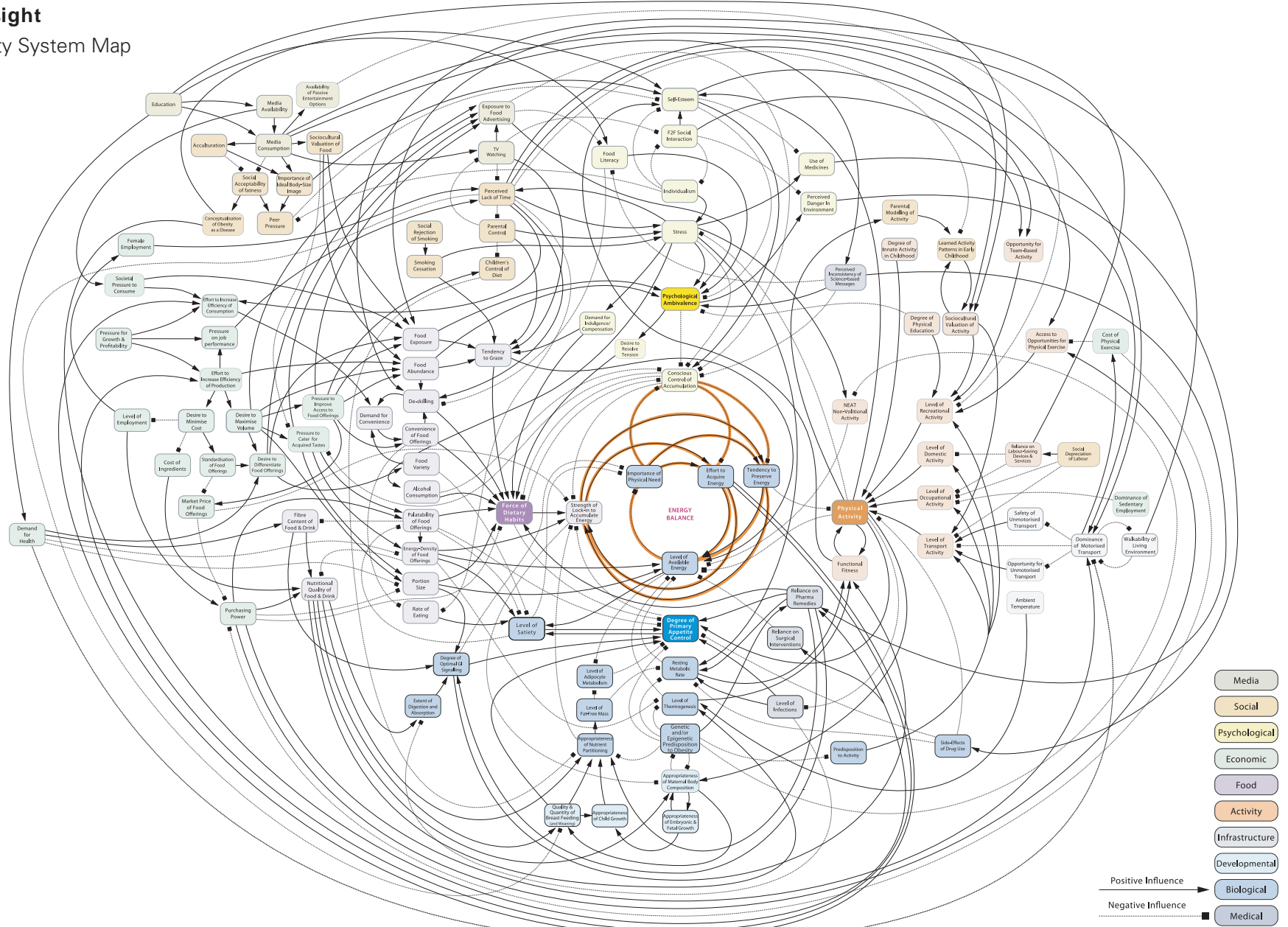
The same **system** that drives health inequalities, will create unequal adaptation and vulnerability, to climate change.

Ecology & climate science are used to systems thinking. Simulation is pervasive *and* persuasive.



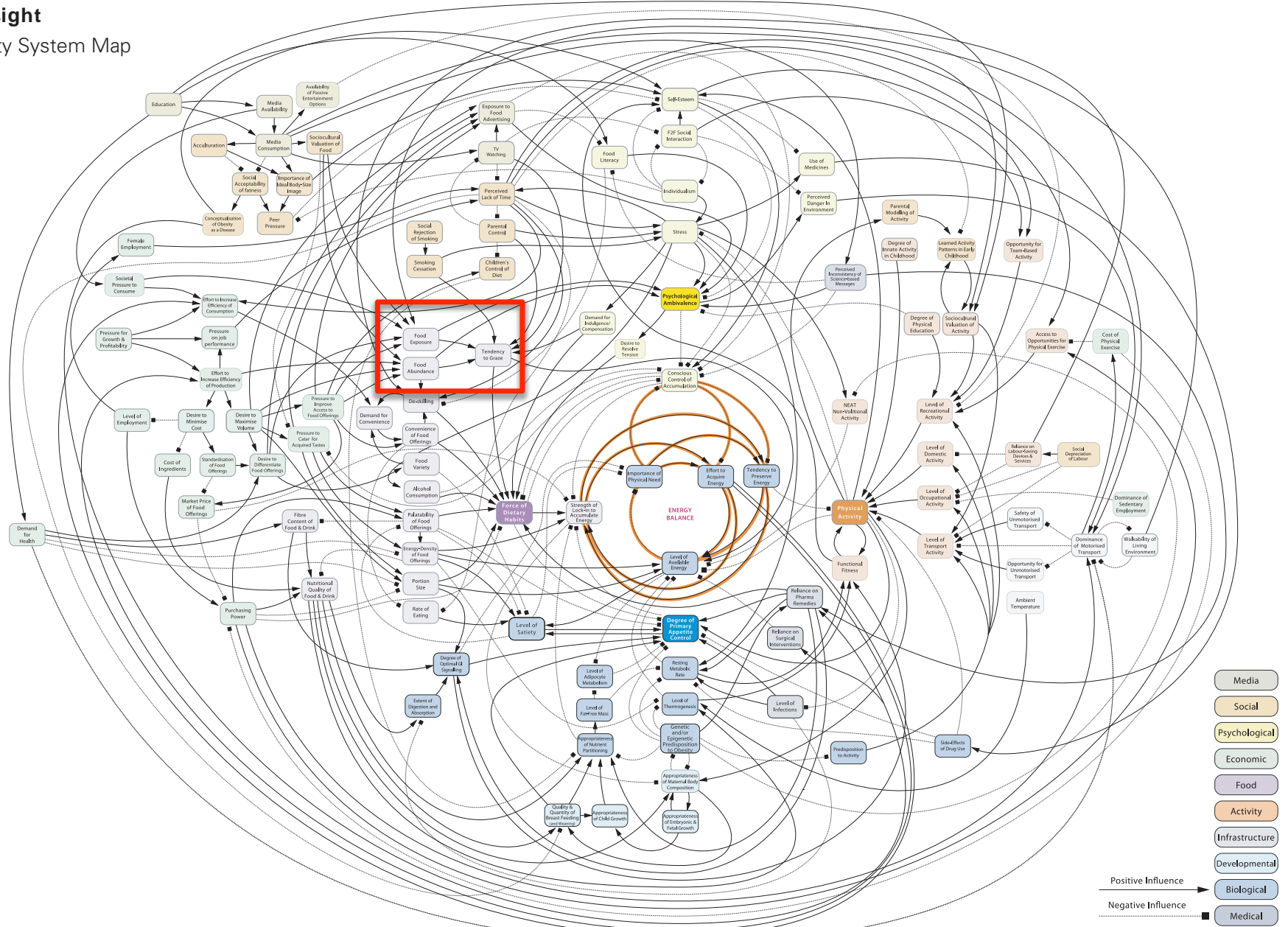
# Foresight

## Obesity System Map

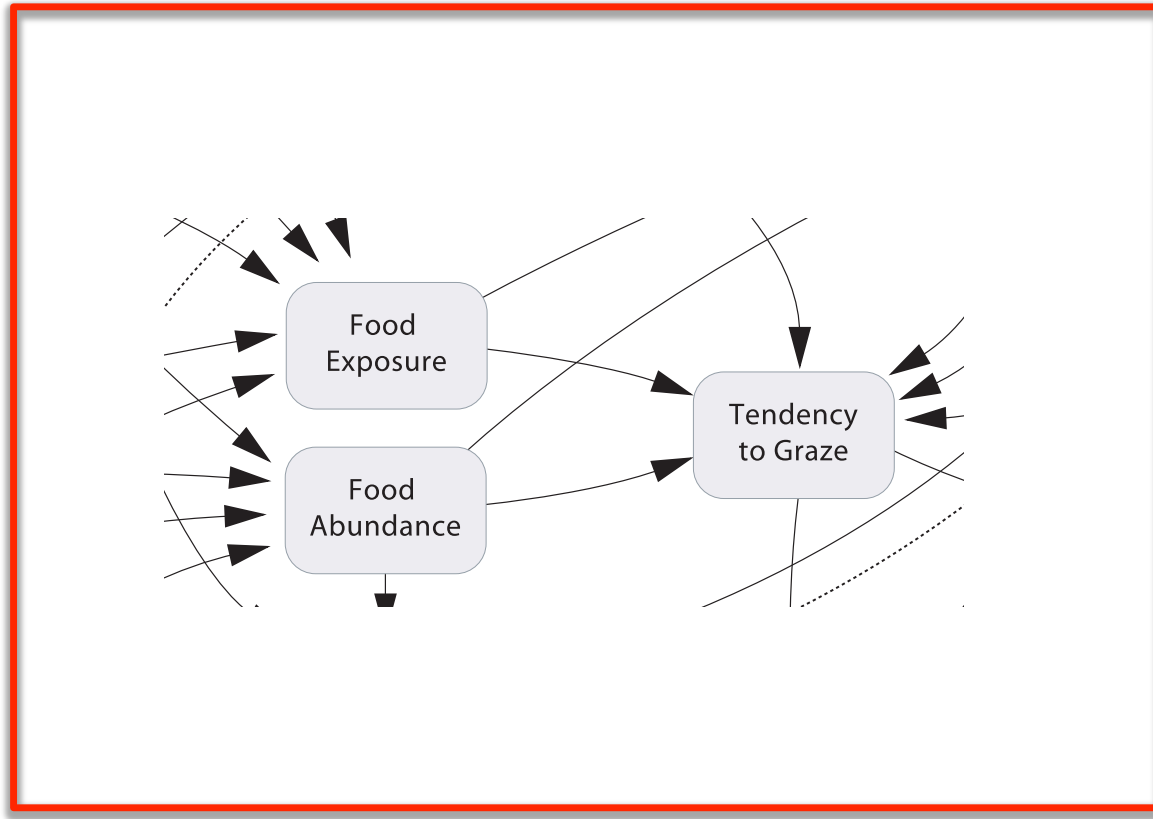


# Foresight

## Obesity System Map



Lots of science tries to isolate the relationships, to prove causal relationships / interventions (trials). Silo science in the sense that the relationships of interest are 'walled off'.



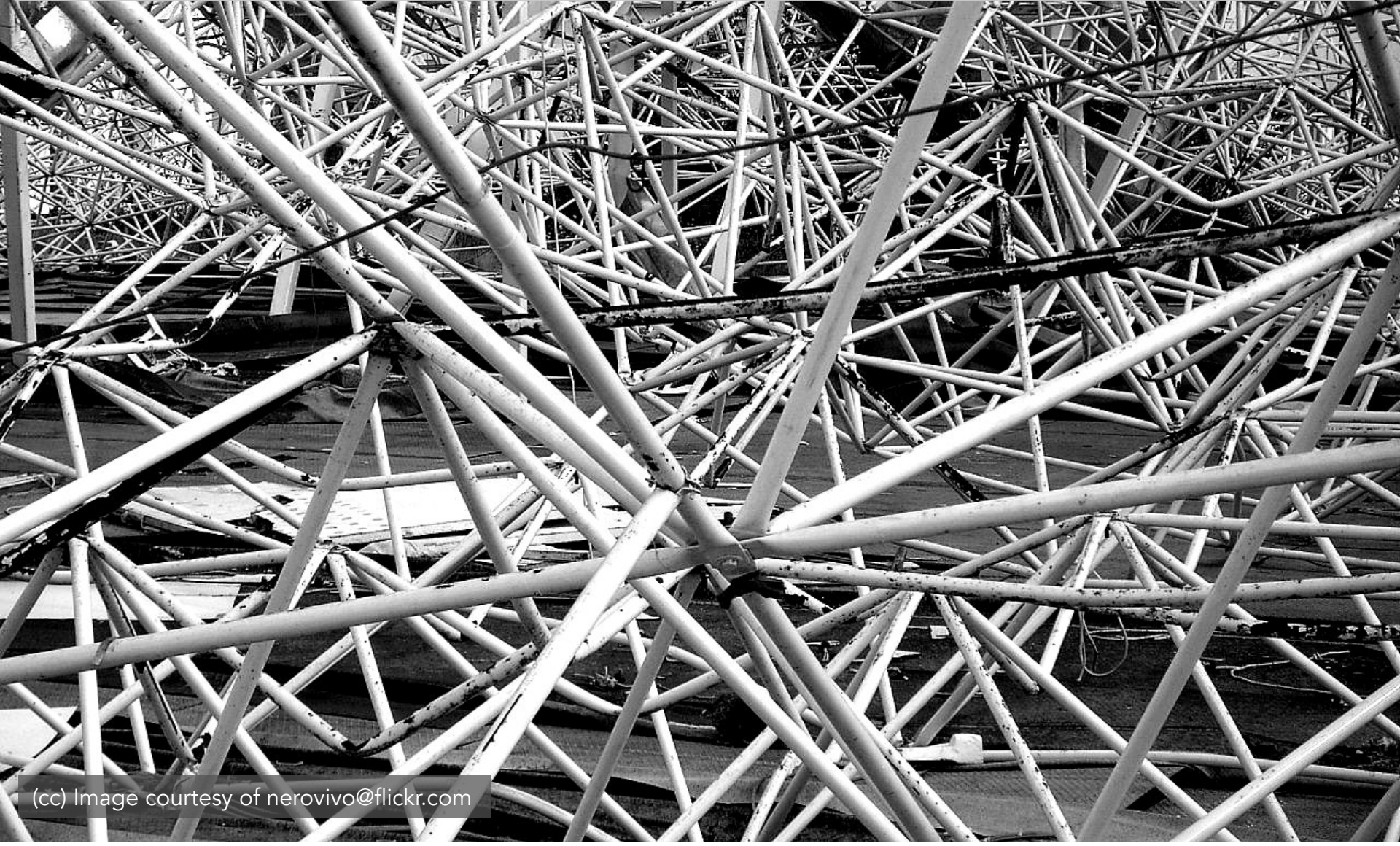
We often do this kind of science when researching how / if contact with nature affects health.



But does this approach get us where we need to go? I don't think so. To fully minimise the unequal implications of climate change, and maximise the potential for **equigenesis** from natural environments, we have to recognise it's a complex and interacting world. We do *not* have genuinely 'dependent' and 'independent' variables!



**IDEA 2:** Systems thinking is key for research into nature and human health. We need to recognise that systems have emergent properties, feedback, thresholds etc. We can use this.





We now have the tools to simulate people and their environments – to ask, *in silico*, 'what if?'. Climate and ecological science, infectious disease epidemiologists have been doing this for a long time. Non-communicable disease epidemiologists and population health scientists, not so much.



**IDEA ½:** Agent based models are simulations of how individuals interact with each other, and with their environment, allowing these interactions to lead to change in both. They are a means of modelling how individuals / groups / interactions environments coalesce into a system.



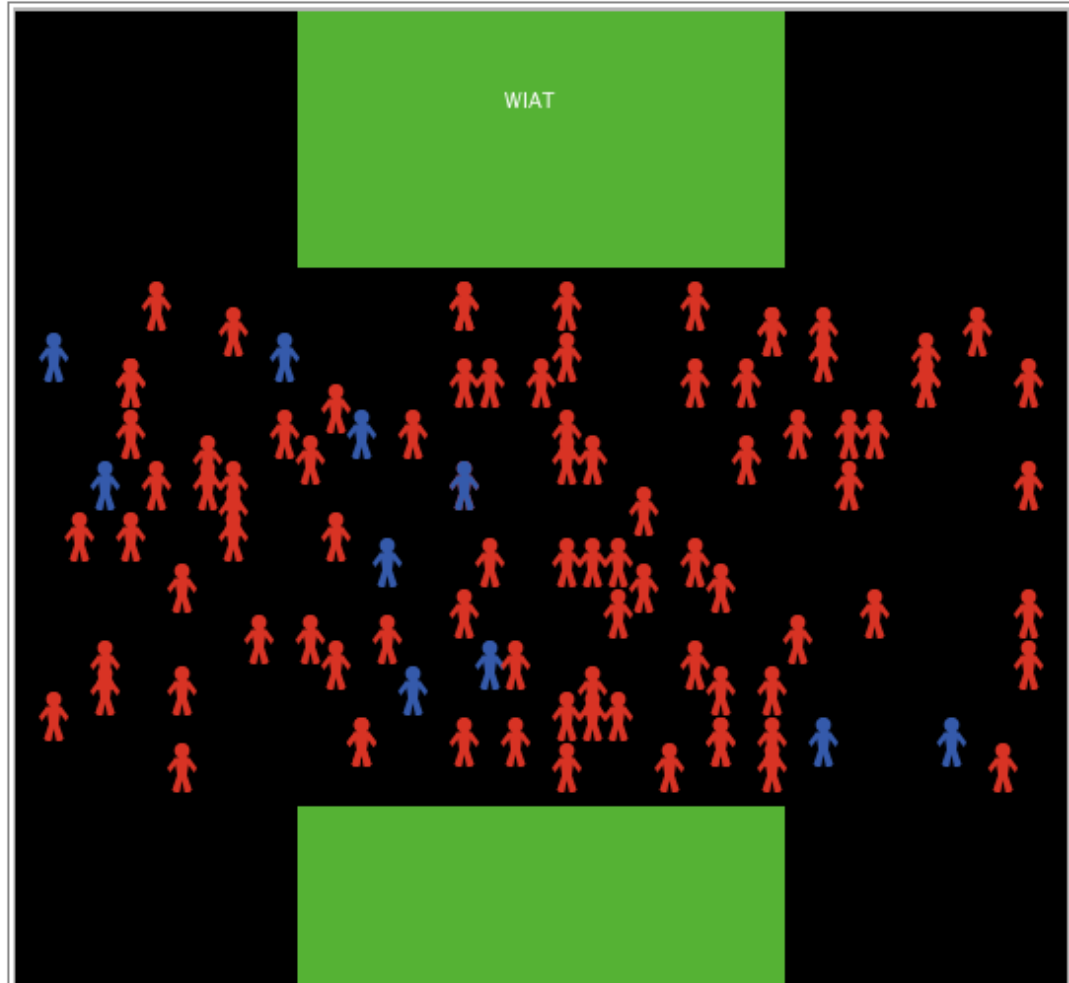
The mechanics of doing this aren't too hard. The *thinking* required, is.

ticks: 0

setup go

likely-to-visit 5

wood\_attraction\_increase 0

On maintain?  
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Command Center

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Source: author's work in progress

observer&gt;

Interface Info Code

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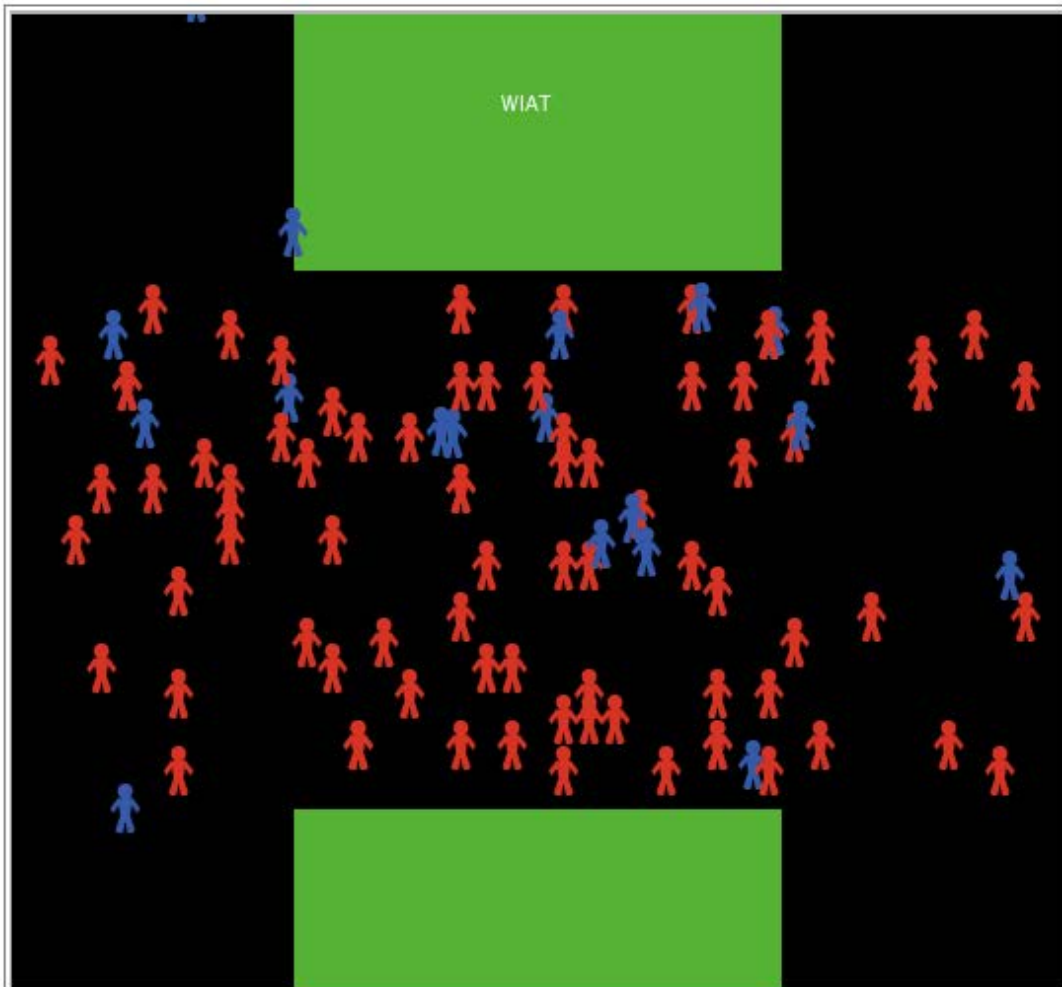
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On  
 Off maintain?



Command Center

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Source: author's work in progress

observer>

Natural environments are potentially **equigenic** (acting to narrow the health gap between richer and poorer people).



But, what produces health inequality and contact with nature, is a complex system. Climate change will alter the system (from simple weather, to human society and economy, to the environment itself).



Our job is to work together to understand this **system** and ask 'how can our response to climate change be **equigenic**?'





The ever-changing scenes  
of nature afford not only  
the most economical,  
but also the most innocent  
pleasures which man  
can enjoy.

Robert Owen  
(1771-1858)

Thank you.