Cross-scale challenges of the Anthropocene

**Brief abstract/summary**
As the world becomes more interconnected, resilience depends on maintaining diverse response capacities to global changes. Interventions for sustainable development are affected by processes taking place over both larger and smaller space- and time-frames than the interventions themselves.

**Key messages**
- The world is increasingly connected: the local influences the global and vice-versa, often in new and unpredictable ways, creating risks and opportunities.
- Mapping out cross-scale connections can help identify solutions that may lie beyond problems’ perceived borders.
- Impacts of development interventions will be felt – and should be accounted for – beyond local/national borders.

A programme funded by the Swedish International Development Cooperation Agency (Sida)
Societies and ecosystems at local, regional and global scales are interconnected. Processes at global and regional scales (climate change and international fishing fleets) impact on local processes around Gulf of Guinea, and how events such as local disease outbreaks can ‘cascade’ up to affect larger systems (adapted from Galaz et al 2011). Illustration: J. Lokrantz/Azote

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The interconnected Anthropocene:
Societies, economies and ecosystems are increasingly interconnected in the human-dominated conditions of the Anthropocene. Development interventions and needs at local scales are impacted by global processes such as climate change, migration, international trade, spread of invasive species, and technology diffusion. Meanwhile, events in local places can spread outwards and upwards to affect regional or even global scales.

Recent food price spikes provide an illustration of the global-scale of energy prices, aggregate food production, and financial markets triggered shocks to societies and places around the globe. Meanwhile the global epidemic of avian influenza illustrates a local-to-global effect, where increased densities of humans and domestic animals and loss of natural wetlands in one part of the world, rapidly spread through the connectivity of the international trade in poultry and wild birds.

Globalisation contributes to specialisation and homogenisation, whereby systems, practices, processes and technologies become more similar in different places across the globe. Such homogenisation can provide increased economic efficiency in the short term, but can reduce resilience by increasing connectivity and exposure to cross-scale shocks, and by reducing the diversity of responses and sensitivities that people have to change.

How do cross-scale dynamics influence development in the Anthropocene?
In the Anthropocene, action to mitigate stressors at global or regional scales (for example reducing carbon emissions) are critical, but local interventions are also needed to build resilience to global stressors, while addressing local stressors. Local resilience requires a diversity of responses and processes, so that connected systems with different sensitivities and responses can help each other regenerate after local shocks or stresses. This is particularly relevant in the context of the Sustainable Development Goals (SDGs), which were defined at a global scale for local application: here interventions should be designed to specific development needs of particular contexts, rather than being blanket interventions applied across systems.

However, the connectivity between places and scales requires that local interventions need to be understood in

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terms of how they are connected to a larger context and longer timescale. For example, national reforestation programmes that do not address the demand and use of wood resources, may have no impact on global carbon budgets if it stimulates deforestation beyond national borders. The problem can also spill over from forests to affect political, or food systems. Similarly, local management of marine resources can fall victim to ‘roving bandit’ effects, as seafood and trading operations repeatedly divert from one stock to the next as each is overexploited. Such pressures can overwhelm local institutions and require an adaptive and cross-scale approach that addresses multiple and sometimes distant causes.

Mapping out these cross-scale connections can identify risks but also opportunities for finding synergies between solutions to local problems and development in geographically distant areas. For example, rain-fed agriculture in Pakistan and India – while vulnerable to changes in local water-cycling – could benefit from reforestation in Europe through the recycling of moisture released from the vegetation. Meanwhile, connectivity can also allow successful interventions to rapidly scale out and be reproduced (see Box).

Further reading:

**Global gambles in the Age of Humans**
People’s activities have changed the whole planet so much that they are triggering entirely new types of risks. Cutting-edge research looks at improving the odds for our gambles with the Earth, both now and into the future
Rethink article, February 2018
www.rethink.earth/global-gambles-in-the-age-of-humans/

**Women hunters in the octopuses’ gardens**
Octopus represents both food and profit for small-scale fishers who live along the shores of the western Indian Ocean. Changes in the region have implications for fisherwomen that need to be addressed by fisheries policy and management to become more gender equitable
Rethink article, June 2017
www.rethink.earth/women-hunters-in-the-octopuses-gardens/

**Amazon on the edge**
Combined pressures on the Amazon are pushing it towards a tipping point, which may be much closer than scientists previously thought. Can a new economic paradigm emerge to prevent it?
Rethink article, May 2017
www.rethink.earth/amazon-on-the-edge/

These two scientific papers highlight cross-scale and cross-system connections from three different perspectives, while using clear definitions and structures:


http://dx.doi.org/10.5751/ES-05873-180226

The following article brings the concept of response diversity into social-ecological systems thinking:

https://doi.org/10.1086/669563

GRAID insight briefs

This brief is part of a series which introduce key insights from social-ecological resilience research, and how they relate to challenges of development in the Anthropocene.

Human actions increasingly dominate the biosphere, the thin living surface of the earth on which people depend. The complex feedbacks between social and ecological processes and interconnections and between different places can lead to surprising sudden changes, as well as inertia in undesirable states. Awareness of the Anthropocene challenge and the complex behaviours of social-ecological systems highlights the need to embrace uncertainty, explore how stewardship can be supported at different scales, and for transformational change for a sustainable and just development.

For the full text of all briefs in this series visit www.graid.earth

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