



## Editorial

## Progress in global environmental change

## 1. Two Decades of Global Environmental Change

This issue marks the twentieth anniversary of Global Environmental Change. Those 20 years have also marked the period of global environmental agreements, with 2012 two decades since the Rio Earth Summit, the zenith of optimism about the ability of 200 countries to enact meaningful collective action for environmental sustainability. However, the crisis of the environment is more acute, more intransigent and more widespread than ever, despite scientific knowledge being greater than ever.

Rockström et al. (2009), for example, suggest that we may have already exceeded the planetary boundaries for three aspects of human-induced environmental change: climate change, biodiversity loss and changes to the global nitrogen cycle. But as contributions to this journal have always stressed, global change is manifest at numerous and inter-related scales. Hence, the carbon economy has consequences far beyond its impact on the global carbon cycle. As we write, the unfolding crisis of oil spilling into the Gulf of Mexico demonstrates that fossil fuel dependence has significant unintended consequences on ecosystems and societies where they are extracted. The monetary value of ecosystem services in the highly productive Mississippi delta has been estimated as \$31,000 per hectare (Talberth and Posner, 2010). These ecosystems and this unpriced value are under threat in both the short and long term. Residual oil will likely diminish the value of ecosystem services from marshes, wetlands and in the coastal waters for decades to come. In the immediate term, primary production in the delta areas has been significantly affected, impacting on fisheries and biological systems directly, even leaving aside the toxic legacy of the oil (Talberth and Posner, 2010). Similar impacts are witnessed decades after the deliberate oil spills in Kuwait in 1990 and the Exxon Valdez spill in Alaska in the late 1980s. Yet these impacts may be modest in comparison to those related to long term oil contamination in the Niger Delta, which has received far less attention on the global stage. The governance of risk at global scales and within jurisdictions, particularly with regard to the intractable economic reliance on fossil fuels, remains, in our opinion, the greatest challenge of global change. Hence, despite 20 years of realisation of the problem and insights from across political science, economics, geography and other disciplines, not much real progress can be discerned in terms of action.

But the notion of progress itself is problematic. Can the world progress in ways other than those manifest in material outcomes? Pogge (2008) has confidently asserted that moral progress is real and within our grasp. He cites issues such as the principles of

universal suffrage and the abolition of slavery as examples of how progress can be measured, even if both gender equality and slavery are widely breached around the world. The counter claim suggests that phenomena such as the abolition of slavery happened only when it was in the interests of capital to allow this to happen. But Pogge (2008) and others insist that such phenomenon can only be rationally explained as changes in moral order and that the same progress can potentially be brought to bear on the eradication of poverty globally.

The primary mechanism by which moral progress can be made would appear to be the reduction of the moral distance between actions and consequences for individuals. Is there evidence for such action? Singer (2009) makes the case that there is no moral distinction between saving a life through direct action and taking action to avoid harm for those with whom individuals have no direct relationship. He dismantles objections to this universal notion of responsibility for others that are frequently raised: citizenship, diffusion of responsibility, or lack of direct causation in actions to consequences. Rifkin (2009) deploys a similar argument and examines empirically how moral distance has been reduced—through growing empathy between people as the sphere of human relations has expanded from kinship and tribe to the whole of humanity.

Rifkin argues that this expansion in knowledge about our neighbours and societies has unfortunately been possible only with a massive expansion in the use of energy resources. He portrays this evolution as a tension between empathy and entropy. The younger generations in particular, Rifkin argues, are being propelled 'to global cosmopolitanism and a universal empathic sensibility' (p. 554) via engagement with the world through new media, such as Facebook, and global mobility. It is easy to get carried away with such arguments. Do people empathise with the world's ecosystems that they engage with remotely through television and print? Can moral distance be reduced through vicarious consumption of the environment? Psychologists such as Kahn et al. (2009) have suggested, for example, that the substitution of technological nature for 'real' nature has in itself a negative impact on individual well-being. Further, the case is not proven that empathy and the reduction of moral distance are straightforward, for example, the contrasting response to oil contamination in the Gulf of Mexico and the Niger Delta. Rather, attachment to place and a localisation of 'what people care about' are equally powerful forces to the cosmopolitan tendencies of modern life. Attachment to place has been underemphasised and overlooked in global change debates about adapting to change and in individual's relationship with technology. Devine-Wright (2009)

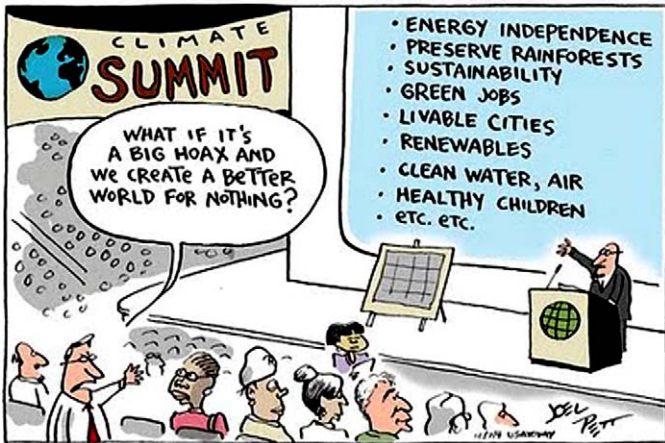


Fig. 1. Progress in global environmental change?  
©Joel Pett. All rights reserved, reprinted with permission.

shows, for example, that people are prepared to protect their place, even if such place protection is in opposition to pro-environmental behaviour such as siting of wind farms.

It is easy therefore, to despair at a lack of progress on two counts. First, material progress towards environmental sustainability as measured through ecosystems and biogeochemical systems, pollution loads, and from emerging new and re-emerging old diseases, most often points in the undesirable direction. Second, the very idea of progress in society is difficult to sustain, when as Hamilton (2010) suggests, we are in denial of many problems and wedded to a model of progress that emphasises prosperity through growth, rather than serious consideration of alternatives (Jackson, 2009). Fig. 1 illustrates this apparent paradox. In this context, then, is interdisciplinary research on global environmental change missing the point? The essays from this special Anniversary issue question directly the relevance and potential contribution of the global framing of environmental change.

## 2. The case against global environmental change

Global environmental change has a certain seductive appeal. It appeals to large scale rhetoric ('saving the planet') and large scale control. But, as discussed above, the distancing of decision-making from its consequences leads to a de-personalised and sometimes de-politicised view of history and human agency. The earth has, however, many physical and biological systems which truly are global and planetary. This creative tension has been at the heart of debates in the global change research community, with the case 'against' global environmental change being made from the perspective of the human scale of action and consequence of these larger processes. In the essays that follow, Hulme (2010), Berkhout (2010) and Ostrom (2010) all highlight, in one way or another, the dangers of exclusive focus on the global framing of environmental change. Hulme suggests that scientific methods seek to universalise knowledge, but that science also tends towards a 'globalising instinct of knowledge construction about environmental change'. He illustrates this charge by demonstrating how global knowledge is reified, how knowledge-making is globalised and concludes that such tendencies also support a globalisation of values. The ultimate example of global values is that of ecosystem services and the universal value of carbon emitted to the atmosphere or avoided and for which global markets have been created through global institutions. Some would see the positive value in globalising knowledge and values in these ways. Yet Hulme (2010), reflecting perhaps the sentiments

of Scott (1998), suggests that the global gaze of governments renders the human scale invisible. The outcome of such invisibility is that ecosystems are valued only for their instrumental functions and that global power relations, played out through global markets and institutions, underemphasise the values of place, identity and community that actually constitute and constrain how humans interact with their environment.

If global institutions for managing environmental problems were successful, perhaps we could forgive their universalising tendencies. Ostrom (2010) argues, however, that global scale institutions do not pass muster and are sclerotic and slow to deal with evolving slow onset disasters and crises. It is not enough to assume that scarcity of resources, or the threat of large scale disaster will magically generate the demand for global co-operation where none existed before. Ostrom argues that climate change discourses have been dominated by such globalised institutions and have not been able to learn from or interact positively with the states, communities, individuals and associations that have in their grasp the solutions to the decarbonisation of modern society. Patt (2010), for example, has argued that regional governance of energy is necessary to initiate a transformation of the energy system away from fossil fuels. A polycentric approach might therefore encourage experimentation and learning, and might also facilitate individual action and commitments. This may be one step in overcoming distance.

## 3. Challenges for global environmental change

These issues present many profound challenges for the journal. As Berkhout (2010) points out, the role of science, and its norms, attitudes and practices are being re-defined in our field. Berkhout calls for the defensive posture displayed by science of old to be replaced by positive new collaborations, involving changes in the ways in which principles of science are applied. He uses the recent controversies surrounding climate science to examine what may have changed in the relationships between science, politics and the media. He identifies three important shifts; procedures within climate science have been opened to public scrutiny, climate science has become more deeply politicised as politicians and countries make greater commitments to climate policy, and new media have allowed the entry of many new sometimes influential voices into the climate debate. Whether and to what extent these changes will effect marked and prolonged change in wider modes of interaction between science, policy and the media is too early to say. Results from recent surveys of North Americans' interpretations of climate change suggest that whilst in January 2010, in the wake of intense media coverage, there was a large increase in the proportion of those dismissive of climate change by June 2010 it showed a modest decrease (Leiserowitz et al., 2010). However, ongoing review of IPCC (InterAcademy Council, 2010), critiques (Henderson-Sellers, 2010) and greater scrutiny (Hulme and Mahony, 2010) are likely to lead to changes in its processes and possibly the reception of its findings. Increased openness in processes will extend to all international scientific assessments and raise similar questions about process, expert judgement and legitimacy of representation. The prospects of deliberate interference in the earth system through geoengineering will compound these challenges many times over.

Science must be open to public scrutiny and our journal can contribute towards informed public debate and discussion on the magnitude and dynamics of environmental change, its impacts and societal responses. To do this we should do all that we can to foster a geography of inclusion and to facilitate the exposure of plural views and perspectives. Turner's essay (2010) discusses these issues in the context of sustainability science and the necessity to build bridges between specialisms – and specialists – in

environmental change. Tuner uses the framing of sustainability science and its component pivots of coupled human–environment systems, environmental services and trade-offs to compare the concepts and understandings of vulnerability and resilience. He suggests that understanding trade-offs may be one way towards a more useful science of coupled human–environment systems.

#### 4. Progress in global environmental change

Since 1990 global population has grown from roughly 5.3 to 6.8 billion and sustained global economic growth, accompanied by total and per capita increases in consumption in many parts of the world, not least in Brazil, Russia, India and China. However, our world remains riven by differences in access to resources and per capita consumption both between and within countries. A review of the most highly cited papers in this journal shows significant contributions across five broad themes: the drivers and impacts of systemic and cumulative change, cross-cutting concepts such as vulnerability and resilience, approaches to management, control and policy, and different perspectives on climate change.

The scientific community has clearly documented and quantified global environmental change with increasing precision and improved models to understand the future consequences of our actions, although large uncertainties remain. The community has also developed tools to quantify our footprints and the effects of our lifestyles beyond our immediate surroundings (Rees, 1992; Hoekstra and Hung, 2005) and we have far greater potential to understand our interconnectedness across scales, in both biophysical and socio-economic terms, which as Rifkin (2009) suggests may cultivate increased empathy. But it is perhaps at the interface between individual and collective perceptions and action that research has progressed the least but where there is the greatest potential to address the challenges we understand so well. Interdisciplinary research on global environmental change must engage further with psychological and behavioural sciences and ethics to understand motivation and behavioural change in its socio-economic and political context and the forms of institutions and governance that can foster new technologies and ideas of progress.

#### References

- Berkhout, F., 2010. Reconstructing boundaries and reason in the climate debate. *Global Environmental Change* 20, 565–569.
- Devine-Wright, P., 2009. Rethinking NIMBYism: the role of place attachment and place identity in explaining place-protective action. *Journal of Community & Applied Social Psychology* 19, 426–441.
- Hamilton, C., 2010. Requiem for a Species: Why We Resist the Truth About Climate Change. Earthscan, London.
- Henderson-Sellers, A., 2010. Circling from virtuous to vicious: how the IPCC stopped helping and began hindering adaptive behaviour. In: 2010 Climate Adaptation Futures Conference. Gold Coast, July Abstract (accessed at 14th July

- 2010) [http://www.nccarf.edu.au/conference2010/wp-content/uploads/3968-YRD-NCCARFConfProgram2010\\_WEB.pdf](http://www.nccarf.edu.au/conference2010/wp-content/uploads/3968-YRD-NCCARFConfProgram2010_WEB.pdf).
- Hoekstra, A.Y., Hung, P.Q., 2005. Globalisation of water resources: international virtual water flows in relation to crop trade. *Global Environmental Change* 15, 45–56.
- Hulme, M., 2010. Problems with making and governing global kinds of knowledge. *Global Environmental Change* 20, 558–564.
- Hulme, M., Mahony, M., 2010. Climate change: what do we know about the IPCC? *Progress in Physical Geography* 34, 1–14.
- InterAcademy Council, 2010. <http://reviewipcc.interacademycouncil.net/> (accessed at 14th July 2010).
- Jackson, T., 2009. *Prosperity Without Growth: Economics for a Finite Planet*. Earthscan, London.
- Kahn, P.H., Severson, R.L., Ruckert, J.H., 2009. The human relation with nature and technological nature. *Current Directions in Psychological Science* 18, 37–42.
- Leiserowitz, A., Maibach, E., Roser-Renouf, C., Smith, N., 2010. Global Warming's Six Americas, June 2010. In: Yale Project on Climate Change, Yale University and George Mason University, New Haven, CT. (accessed at 14th July 2010) In: <http://environment.yale.edu/climate/files/SixAmericasJune2010.pdf>.
- Ostrom, E., 2010. Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change* 20, 550–557.
- Patt, A.G., 2010. Effective regional energy governance—not global environmental governance—is what we need right now for climate change. *Global Environmental Change* 20, 33–35.
- Pogge, T., 2008. *World Poverty and Human Rights*, 2nd ed. Polity, Cambridge.
- Rees, W.E., 1992. Ecological footprints and appropriated carrying capacity: what urban economics leaves out. *Environment and Urbanisation* 4, 121–130.
- Rifkin, J., 2009. *The Empathic Civilization: The Race to Global Consciousness in a World in Crisis*. Tarcher, New York.
- Rockström, J., Steffen, W., Noone, K., Persson, Å., Stuart Chapin, F.I., Lambin, E.F., Lenton, T.M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., Wit, C.A.D., Hughes, T., Leeuw, S.V.D., Rodhe, H., Sörlin, S., Snyder, P.K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R.W., Fabry, V.J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., Foley, J.A., 2009. A safe operating space for humanity. *Nature* 461, 472–475.
- Scott, J.C., 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. Yale University Press, New Haven.
- Singer, P., 2009. *The Life You Could Save: Acting Now to End World Poverty*. Random House, New York.
- Talberth, J., Posner, S., 2010. *Ecosystem Services and the Gulf Disaster*. World Resources Institute, Washington, DC. Available at <http://www.wri.org/stories/2010/07/ecosystem-services-and-gulf-disaster> (accessed at 14th July 2010).
- Turner II, B.L., 2010. Vulnerability and resilience: coalescing or paralleling approaches for sustainability science? *Global Environmental Change* 20, 570–576.

W. Neil Adger\*

*Tyndall Centre for Climate Change Research,  
School of Environmental Sciences,  
University of East Anglia,  
Norwich NR4 7TJ, UK*

Katrina Brown

Declan Conway

*School of International Development,  
University of East Anglia, UK*

\*Corresponding author. Tel.: +44 1603593732  
E-mail address: [n.adger@uea.ac.uk](mailto:n.adger@uea.ac.uk) (W.N. Adger)

16 July 2010