Towards an ontological politics of comparative environmental analysis: the Green Economy and local diversity

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Towards an ontological politics of comparative environmental analysis: the Green Economy and local diversity

Tim Forsyth[1] and Les Levidow[2]

[1]Department of International Development, London School of Economics and Political Science, Houghton Street, London WC2A 2AE, UK. t.j.forsyth@lse.ac.uk

[2]Development Policy and Practice, Open University, Milton Keynes MK7 6AA, UK. L.Levidow@open.ac.uk

Abstract

This paper contributes to comparative environmental politics by integrating comparative analysis with debates about ontological politics and Science and Technology Studies (STS). Comparative environmental analysis makes two tacit assumptions: that the subject of comparison (e.g. an environmental policy framework) is mobile and can be detached from its contexts; and that studying this subject in more than one location can identify its diffusion and implementation anywhere. These assumptions are sites of ontological politics by predetermining (or restricting) environmental outcomes. Environmental analysis needs to consider how far its own comparative acts might reify supposedly global frameworks rather than acknowledge how different localities appropriate and give meaning to them in diverse ways. The concept of civic epistemologies illustrates how domestic politics are organized around supposedly global concepts, rather than how global concepts diffuse around the world, as illustrated here by a comparative analysis of the United Nations' Green Economy Initiative.

Introduction

There's an old story about two monks watching a flag blowing in the breeze. The first monk says: "the flag is moving." The second replies: "the wind is moving." A passing abbot intervenes: "it is not the flag, nor the wind, but your mind that moves."

Comparative environmental analysis can be somewhat like the monks' story. In order for comparison to identify similar or different outcomes of an environmental policy framework, it must distinguish between flags and wind through a multi-step methodology. First, it needs to identify a subject that can be analyzed at a distance. Second, the subject has to be geopolitically mobile, i.e. having various states of existence in different locations. And third, the subject has to be separable from (or independent of) local contexts in order to reveal relationships between the global subject and different contexts where it occurs. Comparative environmental analysis therefore depends on dual assumptions about i) mobility, the extent to which the subject can be detached from and circulate between contexts, and ii) representation, the ability to know when the subject exists, separately from its context.

Here we argue that these implicit assumptions warrant critical scrutiny because comparative environmental analysis often confuses flags and wind. In other words, comparisons often look for the existence of specific, pre-defined environmental subjects in different locations, while missing how local contexts define and drive diverse pathways to widely varying outcomes. These local outcomes can be very different from the supposedly global subject under comparison, but still used to demonstrate the mobility of that subject. Comparative environmental analysis needs clarity about *what* is

being compared; *how* and *by whom* this is identified; and how some comparative approaches may hide these questions. Such scrutiny and clarity are necessary for extending the past insights of comparative analysis within political science within global environmental politics.

In order to discuss this dilemma, we draw upon the growing debates about ontological politics, and apply this to the United Nations' Green Economy Initiative. Ontological politics have been defined as "conflicts involving different assumptions about 'what exists'"[1] and has been discussed within social science in recent years, largely complementing debates within Science and Technology Studies (STS). As we will show here, ontological politics is useful for comparative environmental analysis by drawing attention to the implicit politics by which comparative analysis defines its subject, or marshals evidence for subjects. We consider this theme by asking how far comparative environmental analysis might—in effect—reify concepts that appear to be global, but where sufficient differences exist in different localities to question whether the concepts can be called global. Using the analogy of the monks' story, various studies point to the growth of the Green Economy Initiative in different countries, but perhaps this is seeing the flag of the United Nations Environment Programme flying around the world, rather than local winds, or the mindsets that emphasize flags over wind.

In order to overcome these challenges, we draw from debates within STS about how concepts circulate between contexts. In particular, we argue that one common means of analyzing circulation—Actor Network Theory (ANT)—needs to be tempered by an analysis of how localities appropriate and give meaning to global frameworks rather than simply adopt frameworks as though they are mobile and detached from contexts. To fill this gap, we use the alternative concepts of co-production and civic

[1] Blaser 2013, 547.

epistemologies to demonstrate the culturally specific ways of knowing through which localities or contexts identify their own paths to environmental outcomes, rather than adopt a freely circulating concept that is often the subject of comparative environmental politics.[2] Instead, our paper shows aims to show how comparison itself, without due consideration, can reify the appearance of mobility, and reduce attention to different (and possibly more important) local responses and meanings given to environmental policy.

The allure of comparative environmental analysis

As a field, global environmental politics commonly focuses on how environmental regimes form, and accordingly on the relative progress of different nation states or territories in adopting environmental policies. Mark Purdon notes that comparative environmental analysis can help "open the black box" of domestic politics in order to understand different drivers of national governments' willingness to participate or not in global policy.[3] He notes that the comparative method is one of the basic scientific methods "of discovering empirical relationships among variables" in order to establish "general propositions."[4]

Comparative environmental analysis can also indicate the diversity of responses to global environmental challenges. Steinberg and VanDeveer, for example, note:

> Systematic comparisons of domestic environmental politics allow us to move beyond ill-defined exhortations to "save the planet" toward a greater

[2] Jasanoff 2005, 255; Miller 2008.; also see Steinberg and VanDeveer 2012, 4.
[3] Purdon 2015, citing Victor 2011, 8.
[4] Purdon 2015, citing Lijphart 1971, 682-683.

> understanding of the vast array of social responses to environmental problems in diverse countries around the globe.[5]

Indeed, the same authors later state that comparative environmental analysis helps to "gain insights into the cause-and-effect relationships that lead states and social actors to practice or ignore environmental stewardship."[6] But what is assumed about the latter concept?

Another well-cited example of cross-national comparison of environmental values by Dunlap and York[7] sought to analyze how different countries were adopting post-materialist values in order to indicate progress towards environmental policy. The research asked respondents questions such as whether they approved of ecological or nature movements; plus other inquiries such as whether they would pay more tax to prevent environmental damage—or if they believed protecting the environment should prioritized higher than economic growth. The authors concluded about developing countries:

> environmental activism in these countries is often reflective of widespread public sentiment. Clearly, both environmental activism and public support for environmental protection have become global phenomena and are no longer—if they ever were—limited to the wealthy nations of the world.[8]

Yet, despite the scholarship of these studies, they beg important questions. The above studies do not explore who defines or legitimizes visions of "environmental stewardship." Similarly, by asking simply about public support for "ecological values,"

[5] Steinberg and VanDeveer 2012, 29.
[6] Steinberg and VanDeveer 2012, 29.
[7] Dunlap and York 2008, 2012.
[8] Dunlap and York 2012, 108.

the question neglects how these may have various forms within and/or across contexts; likewise for various forms of "economic growth." As in this study by Dunlap and York, comparative analysis has been used to illustrate and explain the dissemination of environmental values as "global phenomena." But the various ways in which values can be defined—and the diversity of pathways to achieve them—seem to be hidden unwittingly in the overall objective to demonstrate optimism about environmental values spreading around the world.

Ontology and globalizing assumptions

Our critical questions above raise concerns about the ontological politics at play by referring to conflicts about how "environment" or "ecological values" are defined by actors, generally in tacit ways. Comparative environmental analysis often keeps the differences tacit, through ontological assumptions about a geopolitically mobile subject (as above) and/or through insufficient attention to its diverse forms, when representing environmental outcomes in different contexts around the world.

In turn, these challenges also demonstrate what STS debates have called co-production, i.e. knowledge-generation occurring simultaneously with visions of social order (and vice versa).[9] Co-production can demonstrate how social values influence what is identified and measured as appropriate (environmental) performance. It can also be used to analyze how frameworks of environmental analysis can separate those outcomes from local contexts.

[9] Jasanoff 2004.

One early analysis of co-production within global environmental politics focused on the assumptions underlying the 1972 *Limits To Growth* report. It had ominously predicted, "Short of a world effort… the outcome can only be disaster."[10] But according to the co-productionist analysis, this outcome could only be projected by assuming that citizens around the world adopt a "rational choice" response to resource scarcity, such as by competing for resources or failing to adopt means of mitigating consumption. Accordingly, the authors argued that the *Limits To Growth* model could only co-exist with a parallel (but implicit) model of individual behavior—which was not justified by research on social behavior in different locations.[11]

Another early co-productionist analysis was Agarwal and Narain's famous criticism of the World Resources Institute assertion that China, India, and Brazil were among the top six countries responsible for anthropogenic climate change on the grounds of current rates of fossil-fuel use and deforestation.[12] Agarwal and Narain argued instead there was a need to consider other aspects: per capita energy use; historic deforestation; and whether fuels were used for livelihoods or high-consuming lifestyles. This study demonstrated the principle of co-production because it showed how supposedly neutral cross-national comparisons of global climate-change policy also carried parallel (and implicit) normative assumptions about appropriate origins of emissions, assumptions which—allegedly—overlooked international inequalities in development.

STS approaches to cross-national environmental comparisons aim to identify the implicit social norms that—in turn—shape measurements of how different countries adhere (or not) to standards of environmental performance. So, for example, when Keck and Sikkink claimed that international advocacy coalitions among environmental NGOs

[10] Meadows et al 1972, 195.
[11] Taylor and Buttell 1992.
[12] Agarwal and Narain 1991, criticizing WRI 1990.

and campaigners in different countries allow "ecological values to be placed above narrow definitions of national interest,"[13] this statement gives insufficient attention to what "ecological values" mean, and how far they are indeed internationally accepted. Similarly, the aforementioned questions posed by Dunlap and York imply a necessary choice between economic growth and ecological values, thus making ontological assumptions about what both concepts mean. This framework pre-empts the possibility of actors reframing the concepts as compatible.

Comparison *and* diversity

Through such blindspots, comparative environmental analysis might contribute to a normative form of cultural globalization if it seeks to analyze by comparing national adoption of environmental values that are predefined in culturally specific ways, or without sufficient awareness of what alternative values are being excluded. To avoid this blindspot, comparative methods need to become more aware of the underlying models of mobility and representation of environmental outcomes. But how to achieve this awareness?

Within STS, actor-network theory has been used as a framework to consider how concepts or "facts" circulate between contexts when the conditions that first identified these items are recreated at different sites. Bruno Latour,[14] for example, argued that Pasteur's scientific experiments on anthrax changed practices across France on the tacit assumption that progress could be made only when the same laboratory-type conditions were replicated in distant places in the field. From this framework arose the concept of "immutable mobile," i.e. an object that remains stable between contexts

[13] Keck and Sikkink 1999, 215.
[14] Latour 1987.

because the social conditions that uphold them are replicated in each location.[15] In this sense, uncritical approaches to comparative environmental analysis implicitly look for actor networks that can enhance the circulation of immutable mobiles in different contexts; evidence for them is equated with global diffusion.

But the actor–network framework also contains tensions and different approaches that challenge the earlier focus on immutable mobiles. One famous analysis of international comparisons of anemia showed that different countries and organizations defined and measured anemia very differently. Accordingly, the international "comparison" was made coherent only because scientists labeled these diverse measurements under the single category of "anemia."[16] By analogy, "global environmentalism" might therefore disseminate in similar ways if diverse national pathways are labeled loosely as representing the same transition, thus reinforcing academics' ontological assumptions.

Moreover, actor-network theory has been criticized for prioritizing the analysis of *circulation,* while neglecting how localities make and achieve their own environmental outcomes, which might or might not be identified and compared between contexts. According to Sheila Jasanoff:

> when actor-network theory confronts the nature of power, as if often does, it side-steps the very questions about people, institutions, ideas and preferences that are of greatest political concern. Who loses and who wins through the constitution of networks? How are benefits and burdens (re)distributed by or across them? How willing or unwilling are participants to change their behavior or beliefs because of their enrollment into networks?[17]

[15] Latour 1986, 12.
[16] Mol and Law 1994; Law 2011.
[17] Jasanoff 2004, 23.

Pursuing the above questions, STS has elaborated the concept of civic epistemologies, i.e. how localities identify and legitimize norms of behavior, as well as making them visible within global initiatives.[18] Civic epistemologies have been defined as the "national cultures of rationality."[19] They offer a means of identifying local influences on environmental values or different pathways for adopting global policies.

Its relevance to comparative environmental analysis goes beyond merely cognitive aspects. As Steinberg and VanDeveer note: "[national] variance [in environmental performance] is due in part to differences in the way that science is organized in distinct national settings."[20] But civic epistemologies emphasize the extra-cognitive, normative shaping of environmental responses, beyond simply adherence to internationally defined standards. Crucially, civic epistemologies are also defined as "the dimensions of political order that each state seeks to immunize or hold beyond question"[21] and the ways by which "the commingling of *is* and *ought* takes place."[22] Consequently, civic epistemologies offer insights to the variety by which different locations interpret and respond to environmental policies, rather than adopt pre-defined environmental values and outcomes. These locations can be national or sub-national contexts, but also any scale where knowledge claims are made and contested in coherent terms.

Example: The Green Economy

The United Nations Environment Programme (UNEP) defines a green economy as:

[18] Daston 2000; Barry 2012.
[19] Winickoff 2012, x.
[20] Steinberg and VanDeveer 2012, 4.
[21] Jasanoff 2012, 10.
[22] Jasanoff 2012, 19. (Emphasis in original).

> One that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon resource efficient and socially inclusive.[23]

The Green Economy Initiative (GEI) was launched by UNEP in 2008 as a means of integrating economic development with sustainable development. It was based on the achievement of three key objectives: a new economic management to avoid the misallocation of resources; an acknowledgement of how population growth and consumption threaten scarce resources; and a commitment to assist poorer and more vulnerable people, such as in developing countries. UNEP also identified five key enabling conditions for establishing a Green Economy:[24] to work against the implicit subsidies of underpriced resources (such as air and water as sinks for uncosted pollution); appropriate pricing for resources and all other inputs in an economy in order to avoid underpricing resources; encouraging investment in resource-efficient research and development; higher levels of efficiency; and environmental regulation to pre-empt resource scarcities, and to redirect economies away from unsustainable activities.

Various non-governmental organizations and academics have criticized the GEI, however, on the grounds that it does not adequately transform current economic practices, leaves intact the "brown economy" or even extends neoliberal globalization. For example, within the GEI framework, the Natural Capital Declaration of Chief Executive Officers from financial companies undertook to incorporate natural capital into their balance sheets.[25] A network of civil society organizations, however, stated the Declaration "is based upon a fatally flawed understanding of the root causes of crises

[23] http://www.unep.org/greeneconomy/AboutGEI/WhatisGEI/tabid/29784/Default.aspx
[24] UNEP 2011, 22-23.
[25] BankTrack 2012; IISD 2012, 8.

(imperfect valuation of 'Natural Capital and Ecosystem Services') and proposes an equally flawed solution to them (proper pricing)."[26]

The GEI has also generated different international comparisons that illustrate the implicit political challenges of comparative environmental analysis. For example, a new global network of researchers and practitioners recently published the *Green Growth in Practice: Lessons from Country Experiences*, which drew lessons from nine countries including Morocco, Kenya, Bangladesh, South Korea, Singapore, Brazil, Mexico, Costa Rica, and the USA.[27] Although the report refers to "green growth," the links with the GEI are clear: "Green growth is becoming an attractive opportunity for countries around the world to achieve poverty reduction, environmental protection, resource efficiency and economic growth in an integrated way."[28]

Although implying various national means towards the same objective, the report indicates the diversity of pathways adopted.[29] For example, "China has committed to green growth in its 12th Five Year Plan. Actions include investing in natural resource management, with the aim of creating one million new forestry jobs and reducing rural poverty." By contrast, "Korea has adopted a green growth strategy to drive economic competitiveness through development and use of advanced technologies. The government is investing in innovation and deployment programs for 27 priority technologies guided by a Green Technology Roadmap with the goal of becoming the world's 7th largest economy by 2020." Meanwhile, in Japan, the government has created a Comprehensive Strategy focused on four areas: Green, Life, Agriculture, and Small and Medium Enterprises. Japan thereby aims to "construct a resilient and adaptable socioeconomy and demonstrate model solutions to the world by addressing energy

[26] BankTrack 2012. See also: Bina 2013; Brand 2012ab; Fuentes-George 2013. Mirowski 2013.
[27] GGBP 2014.
[28] GGBP 2014.
[29] All citations are from GGBP 2014, 13-23.

constraints and an aging society; and build local communities driven by individuals and entrepreneurs supported by local agriculture to reap the benefits of a new kind of growth."

A comparative analysis requires some difficult questions: How (much) do any of these objectives demonstrate a distinctive shift from pre-existing national technological and social policies in these countries? Is all this a gradual diffusion of the GEI to different countries around the world? Or is this an optical illusion, based on how governments and expert agencies write reports about the green economy? As in the monks' story, it is important to consider the extent to which evidence depends on the eye of the beholder.

In terms of evaluating evidence, consider this example:

> Ethiopia used a broad analytic framework for assessing green growth benefits. An Integrated Assessment Model was used for macro-economic impact such as the loss of GDP from climate change impacts in the agriculture and energy sectors. The benefits (and costs) of each option were assessed using multiple criteria that ranged from economic cost-benefit ratios, to qualitative assessments of the benefits for biodiversity and poverty reduction. A relatively basic spreadsheet-based analysis was used to assess sector specific benefits.[30]

Does this description suggest that evidence of green growth in Ethiopia was the work of an enterprising analyst in front of a computer, rather than transitions in economic investments and behavior? Also, some other examples of "national" progress seemed based on individual projects rather than new national policies. For example, the report cites the example of a World Bank funded watershed management project in Karnataka,

[30] GGBP 2014, 19.

India, which "employed a systems approach, with a focus on soil and water conservation and sustainable resource use, and used participatory planning and implementation to improve local livelihoods, gender equity, and community capacity."[31]

Another study compared the GEI in Malawi, Mozambique, and South Africa. Echoing the concerns of Agarwal and Narain , this study argued that a literal adoption of the GEI would reduce the opportunities for these countries to gain economic competitive advantage—by restricting local development of fossil fuel deposits—but also "generate substantial domestic resistance, especially among the poor."[32] For example, in South Africa, coal supplied 81 percent of installed electricity capacity in 2011, but 94 percent of domestic demand in total because of the low load-bearing capacities of renewable energy.[33] In Malawi, there was popular and government resistance to the GEI proposal to end subsidies on agriculture fertilizer because these were considered essential to local food security.[34]

Meanwhile in Mozambique biofuel from the jatropha plant has been promoted as an opportunity to employ unskilled labor and reduce dependency on imported oil; but it might also increase deforestation because it requires a larger disturbance of currently unplanted land. By contrast, ethanol from sugar cane offers a higher production of energy but less scope for hiring unskilled labor. It is therefore unclear how green growth can achieve its combined objectives of alleviating poverty and reducing environmental degradation.[35] Such choices are further complicated by plantation-scale biofuel development, which divert scarce water from food crops, as criticized by local

[31] GGBP 2014, 27.
[32] Resnick et al 2012, 215.
[33] Resnick et al 2012, 219.
[34] Resnick et al 2012, 222.
[35] Resnick et al 2012, 216.

NGOs.[36]

The above observations highlight how cross-national comparisons have asked mainly to what extent different countries have adopted the GEI as a central, allegedly transferable framework. But the analysis can be read instead as diverse pathways to different outcomes. (Indeed, it can also indicate local concerns about the GEI framework). Taking this comparative analysis at face value implies that the GEI is a globally mobile, comparable outcome—contrary to its great diversity. It also implies that progress can be identified by measuring its adoption, thus obscuring the normative criteria and accountabilities driving its local versions.

Conclusion

Comparative environmental analysis can be a powerful explanatory tool and in turn a political tool for pursuing better futures. But such analysis can be blind by conflating movement of a flag, of the wind and the mind of the beholder, as in the monks' story. This paper has argued that comparative environmental analysis should consider how far the act of comparison itself can reify supposedly global concepts as mobile, transferable frameworks—rather than see how localities appropriate or give meanings to these and other environmental frameworks. Comparative environmental analysis therefore should not simply identify the different factors driving national or sub-national levels of participation in global environmental policies, but also ask how the act of comparison (and the selection of evidence to demonstrate differences) can reify or hide how different localities identify and respond to environmental initiatives.

[36] Friends of the Earth International 2010.

Comparative environmental analysis can reify or hide diversity in environmental activities and perceptions through a tacit process of ontological politics. These politics exist in two tacit assumptions: that the subjects of comparison (such as an environmental policy framework) can be detached from their contexts; and that studying this subject in more than one location can identify its diffusion and implementation anywhere. These ontological assumptions predetermine (or restrict) the definition of appropriate environmental outcomes, thus missing how local contexts define and drive diverse pathways to widely varying outcomes. These local outcomes can be very different than the supposedly global subject under comparison, but the reasons why these local responses are different can be ignored if the objective of comparison is to demonstrate the mobility of the main subject of comparative analysis. While many proponents of comparative environmental politics have argued that this style of analysis aims precisely to identify local drivers for policy, this paper has listed examples of comparative analysis of environmental values and the Green Economy Initiative that have compressed local differences into alleged evidence for the mobility of concepts.[37] This paper has identified such blindspots and proposed a framework for avoiding them, as a basis to realize the benefits of comparative environmental politics.

As part of this framework, it is important to acknowledge that comparison itself contains various ontological politics. This is a slightly different understanding to Steinberg and VanDeveer, who have proposed that comparative environmental politics (or analysis) is a positive collaboration between "those concerned with the fate of the planet and its people and those engaged in the comparative study of political life."[38] In contrast to this statement, we argue that comparative environmental analysis (or comparative environmental politics) is not an allocation of labor between political scientists (who do the comparison) and environmentalists (who provide the concern

[37] e.g. Dunlap and York 2008; GGBP 2014.
[38] Steinberg and VanDeveer 2012, 30.

about the planet). Rather, there is a need to see how knowledge, concern, and analysis are produced together. STS Scholars of Science and Technology Studies (STS) have labeled this association co-production—or the mutual creation of knowledge with visions of social order.[39] Comparative analysis can inadvertently hide ontological differences in how localities conceptualize "the environment," its protection, their own responsibilities, etc. As an example of such differences, the United Nations Green Economy Initiative has taken diverse national forms, but despite the claims of comparative analysis discussed in this paper, it remains unclear whether these countries adopted new global norms under the Green Economy banner, or are presenting pre-existing activities and policies in order to give that appearance.

To overcome these challenges, we have proposed that comparative analysis needs to ask two additional questions: "What is" being compared? (Or, is the subject sufficiently mobile to be detachable from contexts?) And by assuming that something is mobile and comparable, are local contexts and their drivers being hidden? The civic epistemologies framework offers means to identify the local contexts, drivers and accountabilities whereby localities devise environmental norms. This framework also focuses more upon how environmental values and policies are contingently made, rather than simply circulate for adoption (or not). In this sense, we have argued that the analysis of circulation under Actor Network Theory within STS needs to be complemented by reference to the concepts of co-production and civic epistemologies. Together, the analysis of how comparison contains tacit ontological assumptions; how localities appropriate global concepts; or how researchers or other reporters portray localities as adopting global concepts; represent tacit ontological politics that warrant further investigation within the emerging field of comparative environmental analysis.

[39] Jasanoff, 2004.

REFERENCES

Agarwal, A. and S. Narain. 1991. *Global Warming in an Unequal World*. Delhi: Center for Science and Environment.

BankTrack (2012) Position on the Natural Capital Declaration, http://www.banktrack.org/show/news/banktrack_position_on_the_natural_capital_declaration

Barry, Andrew. 2012. Political situations: knowledge controversies in transnational governance. *Critical Policy Studies, 6*(3), 324-226.

Bina, O. (2013) The green economy and sustainable development: an uneasy balance?, *Environment and Planning C: Government and Policy* 31(6): 1023-47.

Blaser, M. 2013. Ontological conflicts and the stories of peoples in spite of Europe: Toward a conversation on political ontology. *Current Anthropology, 54*(5), 547-568.

Brand, U. (2012a) *Beautiful Green World: On the Myths of a Green Economy*, http://www.rosalux.de/fileadmin/rls_uploads/pdfs/Argumente/lux_argu_GreenEconomy_eng.pdf

Brand, U. (2012b) Green Economy and green capitalism: some theoretical considerations, *Journal fürEntwicklungspolitik*28(3): 118-36.

Dunlap, Riley E. and Richard York. 2012. The Globalization of Environmental Concern. In *Comparative Environmental Politics: Theory, Practice, and Prospects*, edited by Paul F. Steinberg and Stacy D. VanDeveer, 89-112. Cambridge, MA: MIT Press.

---. 2008. The Globalization of Environmental Concern and the Limits of the Postmaterialist Values Explanation: Evidence from Four Multinational Surveys. *Sociological Quarterly*, 49 (3): 529-563.

Friends of the Earth International. 2010. The jatropha trap? The realities of farming jatropha in Mozambique, http://www.foei.org/wp-content/uploads/2010/09/19-foei-jatropha-eng-lr.pdf

Fuentes-George, K. (2013) Neoliberalism, environmental justice, and the Convention on Biological Diversity: How problematizing the commodification of nature affects regime effectiveness, *Global Environmental Politics* 13(4): 144-163.

GGBP. 2014. Green Growth in Practice: Lessons from Country Experiences. London: Green Growth Best Practice.

Jasanoff, Sheila. 2004. Ordering knowledge, ordering society. In S. Jasanoff (Ed), *States of Knowledge: The Coproduction of Science and Social Order* (pp. 13-45). London: Routledge.

---. 2012. *Science and Public Reason*. New York: Routledge.

Jasanoff, Sheila and Marybeth Long Martello. 2004. *Earthly Politics : Local and Global in Environmental Governance*. Cambridge, Mass.: MIT Press.

Keck, M. and K. Sikkink. 1998. *Activists Beyond Borders: Advocacy Networks in International Politics*. Ithaca and London: Cornell University Press.

Latour, Bruno. 1986. Visualization and cognition: thinking with eyes and hands. *Knowledge and Society, 6*, 1-40.

Latour, Bruno. 1987. *Science in Action : How to Follow Scientists and Engineers Through Society*. Milton Keynes: Open University Press.

Law, John. 2011. Collateral realities. In F. Dominguez Rubio and P. Baert (Eds) *The Politics of Knowledge*. London: Routledge.

Meadows, D., Meadows, D., Randers, J., & Behrens III, W. 1972. *The Limits to Growth*. New York: University Books.

Miller, Clark. 2008. Civic epistemologies: constituting knowledge and order in political communities. *Sociology Compass,* 6 (2): 1896–1919.

Mirowski, P. 2013. *Never Let a Serious Crisis Go to Waste: How Neoliberalism Survived the Financial Meltdown*. London: Verso.

Mol, Annemarie and John Law. 1994. Regions, Networks and Fluids: Anaemia and Social Topology. *Social Studies of Science*, 24 (4): 641-671.

Resnick, Danielle, Finn Tarp and James Thurlow. 2012. The Political Economy of Green Growth: Cases from Southern Africa. *Public Administration and Development*, 32: 215-228.

Steinberg, Paul F. and Stacy D. VanDeveer. 2012. Comparative Theory and Environmental Practice: Toward Doubly Engaged Social Practice. In *Comparative Environmental Politics: Theory,*

Practice, and Prospects, edited by Paul F. Steinberg and Stacy D. VanDeveer, 371-403. Cambridge, MA: MIT Press.

Taylor, P. J. and F. H. Buttel. 1992. How Do We Know We Have Global Environmental Problems? Science and the Globalization of Environmental Discourse. *Geoforum*, 23 (3): 405-405.

UNEP. 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. Nairobi: UNEP.

Winickoff, David. 2012. Preface. In *Science and Public Reason*, edited by Sheila Jasanoff, ix-xii. London and New York: Routledge.

Tim Forsyth is Professor of Environment and Development at the Department of International Development, London School of Economics and Political Science. He has researched the linkages between local development and global environment policy since the 1990s, with special reference to Southeast Asia, and concerning local livelihoods, social movements, forests, and climate change policy. He has authored numerous papers as well as *Critical Political Ecology: The Politics of Environmental Science* (Routledge, 2003); and co-authored *Forest Guardians, Forest Destroyers: The Politics of Environmental Knowledge in northern Thailand* (University of Washington Press, 2008).

Les Levidow is a Senior Research Fellow at the Open University, UK. He has been researching agri-environmental issues of technoscientific innovation since -the late 1980s, especially through EC-funded projects. Case studies have included: agbiotech, the bioeconomy, bioenergy, alternative agro-food networks, green economy and eco-innovation. As well as numerous articles, he is co-author of two books: *Governing the Transatlantic Conflict over Agricultural Biotechnology: Contending Coalitions, Trade Liberalisation and Standard Setting* (Routledge, 2006); and *GM Food on Trial: Testing European Democracy* (Routledge, 2010). He is editor of the journal *Science as Culture*.