

Short Communication

Global governance of biofuels: a case for public-private governance?

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Abstract. With this paper, we examine the current state of global governance of biofuels and assess the potential regulatory and non-regulatory mechanisms for such governance. We ask two questions: a) what are the current efforts and initiatives towards the global governance of biofuels; and b) which form of global governance is more likely to emerge in the field of bioenergy. We come to the conclusion that institution building through private governance and non-state actor partnerships can offer a viable and effective means of governance. However, the primacy of partnerships and networks in global governance also means a number of pitfalls to avoid, especially with regard to legitimacy and inclusion. Drawing lessons from the fields of forest and marine policy, we close with a number of policy recommendations for better private initiatives and partnerships for global governance of biofuels.

Keywords. Private governance, biofuels, partnerships, legitimacy.

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1. Introduction: the Rise of Biofuels

A bio-economy is a new buzzword in the global public policy community. A bio-economy can be broadly defined as a socio-economic system where biomass is used for the production of materials previously derived from fossil fuels. One of the major tenets of a bio-economy is the production and use of bioenergy, which have gained global prominence in the first decade of the new millennium (FAO, 2008). The first decade of the 20th century has seen the six-fold increase in the production volumes of biofuels from 18 billion litres to 110 billion litres (UNEP, 2009). According to the World Energy Outlook (2013), this trend will grow and the use of biofuels will triple by 2035. It would then represent eight per cent of all road-transport fuel consumed (*ibid*).

Despite the fact that oil prices have been high in the last decade, the price of bioethanol and biodiesel mostly remain higher than conventional petroleum (Rathenau Institute, 2011). This explains why bio-energy requires support from nation-states through man-

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dates of blending, production and subsidies to the industry (Bailis and Baka, 2011). As a result, government programmes have been launched in support of biofuels (Jenkins, 2008; Kircher, 2012), and international public-private partnerships, academic and practitioner conferences, workshops and university curricula are established worldwide (e.g. Levidow *et al.*, 2013). By framing biofuels as a solution to the looming climate change, greater energy security and new economic opportunities in agriculture, prominent global actors such as the European Union (EU), the European Commission (EC), the governments of the US, UK, Brazil, India support some form of a transition to a bio-economy (Rathenau Institute, 2011).

The political-economic system around biofuels is characterised by global production, consumption and movement of capital and demands a global form of governance. Relatively few studies to date have examined the extent of governance of biofuels, and those which have, emphasize the prevalence of national level regulation and the *ad hoc* and discordant state of global initiatives (e.g. Bastos Lima and Gupta, 2013; McCormick *et al.*, 2012; Bailis and Baka, 2011). Scholars increasingly realize that some form of global governance of biofuels is necessary (e.g. Scarlat and Dalemand, 2011; Bastos Lima and Gupta, 2013). For example, Bastos Lima and Gupta (2013) made a case for global 'non-governance' of biofuels and called attention to more research in this field. Given the policy importance of the bio-economy transition as pushed by the European Commission, the US and the BRIC (Brazil, Russian, India, and China) countries, and the controversy which biofuels spurred in terms of their sustainability, global governance indeed needs more policy and research attention.

With this policy commentary, we examine the current state of global governance of biofuels and assess the potential forms for governance to emerge. We ask two questions: a) what are the current efforts and initiatives towards the global governance of biofuels; and b) which form of global governance needs to be pursued and how. Section 2 discusses various types of global governance mechanisms from the International Relations literature; section 3 reviews the existent global governance mechanisms in the area of biofuels. Section 4 makes the case for institution building through multi-stakeholder partnerships and makes policy suggestions on strengthening it based on parallels with the areas of water and forest resources. Finally, section 5 discusses the policy implications and conclusions of the commentary.

2. The global environmental governance

The concept of *global governance* was introduced in the field of international relations a few decades ago, and has since emerged as a burgeoning academic and policy field (Rosenau, 1992; Pattberg, 2005; Biermann and Pattberg, 2008). The rise of this concept is linked to the process of globalization and the realization that many policy issues cross state boundaries and need to be tackled transnationally. Global governance allows us to move beyond the traditional dichotomies of national versus international and public versus private governance (Pattberg, 2005), and emphasizes the non-state actors and networks in managing public policy issues as opposed to government hierarchies (Rosenau, 1992).

From the outset, global governance has been conceptualized in the form of international *regimes* (Conca, 2006; Biermann *et al.* 2009). International regimes are more than

formal international agreements; these are the set of norms and rules, which guide the behaviour of actors and provide stability to a certain arena of international relations without immediate legislative enforcement (Conca, 2006). Regimes exist in many areas of transnational environmental governance; examples include the Montreal Protocol for the protection of the ozone layer, the Kyoto Protocol of the United Nations Framework Commission for the Climate Change (UNFCCC), and the Basel Convention for Control of Transboundary Movements of Hazardous Wastes and their Disposal (UNDP, 2003). At the same time, the policy areas where efforts to build an international regime have failed also abound, as with freshwater resources, forests, and soil management (Conca, 2006). In view of this, some authors have argued that global governance should be viewed broader than only international regimes and include institution-building through academic and policy conferences, global assessments, reports, and public-private partnerships and global networks (e.g. Biermann *et al.*, 2009; Pattberg 2005; Gupta 2009; Mukhtarov, 2007). A notable form of global institution building takes place through the spread of certain norms, practices and models across political jurisdictions (Mukhtarov, 2014). In such areas as global water governance and innovation management, researchers have studied the mechanisms and outcomes of such spread of institutions as a form of global governance (Dobbin *et al.*, 2007; Mukhtarov, 2014; Mukhtarov and Gerlak, 2013).

The third form of governance in addition to regimes and institution building is the international market. Market-based instruments are common in establishing certain forms of governance, as with the greenhouse gas emissions and the biodiversity offsets and payments for ecosystem services (e.g. Bouma *et al.*, 2012). However, letting international market decide on bioenergy issues is questionable due to the market externalities this may trigger, such as land-grabs and that of associated resources, such as water (Mehta *et al.*, 2012); the hikes in food prices and concerns with food security and social justice (Rathenau Institute, 2011). The market governance of biofuels is the current status quo, and regulated by only national level legislation, which is arguably insufficient for the environmental protection. In the words of the Brundtland Commission, "The Earth is one but the world is not", and for an effective environmental protection, the whole life cycle of biofuels has to be regulated globally (The World Commission on the Environment, 1987: 27, cited in Conca, 2006: 10). Below we assess the current initiatives around biofuels against other two forms of global governance.

3. Global initiatives to govern biofuels

The latest reports of international organizations, such as FAO, suggest that the policies for biofuel subsidies need to be reconsidered given the uncertainties around their impact on climate change, land use change in producer countries and effects on the environment at large (FAO, 2008). Recent research has further raised questions on whether large-scale production of biofuels contributes to the social and environmental objectives set out by the Millennium Development Goals (Bailis and Baka, 2011: 828). Some critics of biofuels have claimed that the food price hikes of 2008 are directly linked with the increased global biofuel production (Rathenau Institute, 2011). Furthermore, the public and academic debates around biofuels are polarized as to what constitutes a bio-based future (Levidow *et al.*, 2013). One divergent view of such future is the agro-industrial vision of the bio-based

economy where large-scale biofuel production is encouraged; and another is the agro-ecological vision, where biofuels are produced at a local scale (Levidow *et al.*, 2013; Schmid *et al.*, 2012). Putting global initiatives in place where views are polarised is a policy challenge.

According to Bastos Lima (2009), the international efforts to govern biofuels can take three forms: through the reports and studies on biofuels ordered and conducted by multinational organizations such as the UN, FAO and UNEP; through networks, forums and partnerships to promote the bio-fuels, such as the bio-energy associations and the Be-Basic research consortium; and through the roundtables and networks whose primary goal is to establish international certification and sustainability standards for biofuels. All of these forms rely on non-state actors and their initiatives (Bailis and Baka, 2011). Among those non-state actors, three groups of actors can be distinguished: the private sector actors such as the World Bioenergy Association (WBA), and the Global Bioenergy Partnership (GBP); environmental groups, such as the Friends of the Earth (FoE), World Wide Fund for Nature (WWF); and scientific networks, such as the Nuffield Council on Bioethics (NUFF) and the Scientific Committee on Problems of the Environment (SCOPE).

The non-state initiatives mostly converged around the issue of environmental social certification of biofuels as products and production processes (Bailis and Baka, 2011). Examples of global initiatives include The Roundtable on Sustainable Palm Oil, The Roundtable on Sustainable Biofuels, Bonsucro, and the Roundtable on Responsible Soy, as well as the Roundtable on Sustainable Biofuels (RSB), and Better Sugar Cane (BSC) (Scarlat and Dalemand, 2011). These initiatives represent the form of global private governance, which have been created by the agri-business and aim to establish the international standards for biofuel trade (Bastos Lima and Gupta, 2013; McCormick *et al.*, 2012).

Such an upsurge in the private initiatives can be explained by the lack of inter-state agreements on biofuels. The recent UN efforts to create a regime on biofuels, such as the High-Level Conference on World Food Security in 2008, have not led anywhere (e.g. Bastos Lima and Gupta, 2013). Such “deficit” of global governance is alarming (FAO, 2008; Bastos Lima and Gupta, 2013), and scholars have called for governments to link the biofuel negotiations to international negotiations on climate change and WTO (Scarlat and Dalemand, 2011), or to international water or energy negotiations (Bastos-Lima and Gupta, 2009). At the same time, the formation of an interstate regime is formidable given that the authority of states has been eroded in the last few decades, the knowledge and perceptions about the impacts of biofuels are highly contested and uncertain; and the production, trade and consumption of biofuels happen at a global level making multi-party government negotiations extremely challenging (Conca, 2006). The failures of regime building efforts in other areas, such as freshwater and forests, indicate the new reality where private forms of global governance gain importance and need to be fostered.

The private governance of biofuels, however, presents certain challenges, such as the legitimacy of certification schemes and rules set by roundtables and led by private actors (Bernstein and Cashore, 2007; Bailis and Baka, 2011). In addition, critics claimed that science, and often economics and land use planning, become the most important sources of legitimacy in such type of global governance surpassing the questions of ethics and possible value conflicts (Mukhtarov and Gerlak, 2014). There is a lack of accountability of voluntary initiatives and partnerships and there are concerns about the extent to which social and environmental movements and actors from the global South participate (Bastos Lima

and Gupta, 2013; Mukhtarov 2007). Having studied two such certification schemes, namely, the Roundtable on Sustainable Palm Oil (RSPO) and the Cramer Commission criteria, Partzsch (2009) claimed that these initiatives failed to include actors from developing countries, and lack mechanisms of control and accountability. Awareness raising and capacity building programmes at national and local scales are necessary to strengthen the legitimacy of the voluntary schemes at large.

In a separate analysis of legitimacy of RSPO, Schouten and Glasbergen (2011) suggested that legitimacy could be approached from multiple dimensions, such as legality, moral justifications, and consent or acceptance. They claimed that RSPO is facing the tension between building internal legitimacy with its diverse actors whose opinions need to be taken seriously in compromised decisions, and external legitimacy with the influential environmental and social movements and NGOs. While RSPO has fared relatively well in terms of internal legitimacy, it has not been able to ensure acceptance of influential external actors (Schouten and Glasbergen, 2011: 1898). They suggested that the legitimacy of RSPO and private governance institutions more generally need to be studied 'bottom-up' in order to understand how legitimate they are at the local level where the production processes take place.

From this brief literature analysis, we can conclude that the current forms of global governance in biofuels converge on non-binding institution-building led by the industry in partnership with states, universities and, to a lesser extent, civil society actors. There is no international regime for biofuels and it is unlikely to emerge given the complexity of negotiations. At the same time, the prevalence of non-state institution building raises questions about the legitimacy, accountability and equal representation of various actors in such fora. The task of a researcher and policy-maker engaged in this area is thus to explore how private forms of governance of biofuels may be strengthened through multi-stakeholder partnerships.

4. Private governance: lessons from forestry and marine policy

The challenges faced by the voluntary schemes of certification of biofuels are typical problems of private global governance. There is an emerging stream of literature, which analyses the role of private actors in global governance and the mechanisms to encourage their legitimacy, accountability and transparency (e.g. Pattberg, 2005, 2007). Lessons can be drawn from other areas of governance, such as forest management, freshwater resources and marine policy to help build or improve the existent partnerships and initiatives in biofuels. Successful examples of private governance initiatives include the Forest Stewardship Council (Pattberg, 2005), the Programme for the Endorsement of Forestry Certification (PEFC), and the Marine Stewardship Council (MSC) (Kalfagianni and Pattberg, 2013).

A valuable lesson comes from the field of freshwater governance, where the efforts to build an international regime have failed at the 1992 Earth Summit and other high-level international meeting including within the United Nations (Conca, 2006; Gupta, 2009). A more successful path of governance has been taken by the growing number and diversity of discourses and social movements as driving forces of an emerging world order in the field of freshwater resources (Gupta 2009; Mukhtarov and Gerlak, 2013). Conca (2006: 7)

referred to this as “a plethora of institutional forms that do in fact constitute the global governance of these problems”. Similarly, the global governance of biofuels is more likely to succeed promoting diverse and seemingly discordant non-state actor based institution-building initiatives and discourses rather than targeting an inter-state agreement (Shubert and Gupta, 2013; Conca, 2006). This may eventually culminate in a formation of an international regime, which will build upon the strengthened institutions and state and non-state actors. In such a manner, we treat the efforts of regime-formation and institution building as complementary, but place more emphasis on institution building as a more promising avenue to create a lasting system of rules.

Another lesson comes from the field of forest governance and is the success of Forest Stewardship Council (FSC), a standard-setting partnership of private actors, environmental groups and experts, which brought together former adversaries. FSC in addition to its standard-setting function also facilitates institution building at the global level, brokers knowledge and norms and provides an arena for actors to learn and share experiences (Pattberg, 2005). The success of FSC has encouraged the development of Marine Stewardship Council (MSC), which is now an established and successful organization (Pattberg, 2006). Furthermore, the structure and organization of FSC may provide lessons for private initiatives in biofuels. The tripartite system of organization within FSC is an interesting model in which business, social and environmental interests are equally represented in the General Assembly, which in turn, elects the Board of Directors, an executive branch of FSC. The participation of actors from the South and North is equal and therefore contributes to the external and internal legitimacy of FSC. This in turn enhances the reputation of the council as impartial and contributes to consumer confidence in purchasing the products with an FSC label (Pattberg, 2005).

A further lesson from the FSC experience is that it has multiple functions in the world of forest governance and is not limited to sustainability certification. In addition, it sets rules of what is considered as sustainable forestry and the ‘regulatory rules’ on the style of communication, conflict resolution and suchlike. Furthermore, FSC has been instrumental in brokering knowledge and norms more broadly and to provide the necessary environment for learning in various types of networks it facilitates and is part of (Pattberg, 2005).

More lessons for private biofuel governance may be drawn from the area of marine policy. In their study of private governance of marine ecosystems, Kalfagianni and Pattberg (2013) found that MSC and the Aquaculture Stewardship Council (ASC) differ in rule-setting work in a way that more stringent standards promoted by MSC resulted in less adoption of these standards and are mostly limited to the rich North, whereas the ASC standards, being more relaxed, are more widely spread. The same relationship exists in forestry, where the FSC standard being stricter than that of Programme for the Endorsement of Forest Certification (PEFC), has attracted less membership and is not as widely used (Kalfagianni and Pattberg, 2013). Thus, the less stringent rules may be more conducive to membership in such organizations. Drawing attention to the example of GlobalGAP, the European based sustainable agriculture certification initiative which also benchmarks the national versions of GAP from outside Europe, such as MexicoGAP and NewZealandGAP, Kalfagianni and Pattberg (2013: 131) further suggested that standard-setting may also happen at the national level with later acceptance at the global level. This allows for taking a stepwise approach to global governance as an emerging cumulative form of national level regulations and voluntary standard setting.

5. Conclusions

In the introduction to this paper, we have posed two questions: a) what are the current efforts and initiatives towards the global governance of biofuels; and b) which form of global governance is more likely to be successful? Concerning the first question, we observed that there is a diversity of initiatives at both national and international levels. However, the current drive for biofuels happens through the mandates and incentives of nation-state actors; and those international efforts are in the form of voluntary partnerships and mostly in the area of sustainability reporting, which has to do with the jurisdictional constraints in that legislation in one nation neither applies nor is enforceable in another.

Secondly, we believe that private forms of governance, largely, through partnerships with governments, is the future centrepiece of the biofuel governance. Pursuing global governance through institutions means fostering multi-stakeholder partnerships between multinational corporations, states, research institutions, environmental and social movements as well as representatives of local and regional governments and individual stakeholders. The sustainability standards will have to be pushed and adopted by the agri-business in close cooperation with the states, social movements and environmental groups and other actors. The task of the international community, more specifically, the politicians, business leaders and researchers, is therefore to ensure this in a manner that allows all involved actors to speak out and be heard in decision-making.

However, private and non-state governance also have pitfalls. The issue of legitimacy of partnerships led by the private sector, and that of their accountability and transparency need to be discussed in academic and practitioner circles and studied further. Another important issue is inclusion of less privileged actors in partnerships and giving them voice in decision-making process in order to enhance the democratic decision-making, the external legitimacy and reputation of these partnerships. Without legitimacy, neither the partnerships, nor the sustainability criteria or certification schemes, which they develop will be accepted by the major actors involved in global biofuel policy.

Looking at other areas of global environmental governance, such as forests, freshwater resources and marine ecosystems can be useful for fostering such legitimacy and acceptance. Surely, global governance of forest and water resources is different from that of biofuels. Water and forest resources are primary resources, whereas biofuels are derived from biomass, which in turn comes from forests, agriculture and requires water. Nevertheless, we believe that successful examples of private and multi-stakeholder governance from forest and marine governance may provide models for sustainable biofuels, including certification and standard setting. Further research exploring these comparisons is a promising area to pursue in order to foster multi-stakeholder partnerships and institutional forms of governance of biofuels at the global level.

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References

- Bailis, R., and Baka, J. (2011). Constructing Sustainable Biofuels: Governance of the Emerging Biofuel Economy. *Annals of the Association of American Geographers* 101(4): 827-838.
- Bastos Lima, M., and Gupta, J. (2013). The Policy Context of Biofuels: A Case of Non-Governance at the Global Level? *Global Environmental Politics* 13(2): 46-64.
- Bastos Lima, M. (2009). Biofuel Governance and International Legal Principles: Is it Equitable and Sustainable? *Melbourne Journal of International Law* 10(2): 479-492.
- Bernstein, S., and B. Cashore. (2007). Can non-state global governance be legitimate? An analytical framework. *Regulation & Governance* 1: 347-371.
- Biermann, F., Pattberg, P. van Asselt, H. and Zelli, F. (2009). The Fragmentation of Global Governance Architectures: A Framework for Analysis. *Global Environmental Politics* 9(4): 14-40.
- Biermann, F., and Pattberg, P. (2008). Global environmental governance: Taking stock, moving forward. *Annual Review of Environment and Resources* 33: 277-94.
- Bouma, J., KJ. Joy, VK. Lan, L.A. Ramirez, and M. Steyn (2012). Poverty, livelihoods and the conservation of nature in biodiversity hotspots around the world in *Nature's Wealth*. Cambridge: Cambridge University Press.
- Conca, K. (2006). *Governing water: Contentious transnational politics and global institutions building*. Cambridge: MIT Press.
- Dobbin, F., Simmons, B. and Geoffrey, G. (2007) The global diffusion of public policies: social construction, coercion, competition, or learning. *Annual Review of Sociology* 33: 449-472.
- FAO (Food and Agriculture Organization). (2008). *Biofuels: Prospects, Risks and Opportunities. State of Food and Agriculture*. Rome: Food and Agriculture Organization.
- Gupta, J. (2009). Driving Forces in Global Freshwater Governance. In: D. Huitema and S.V. Meijerink, eds., *Water Policy Entrepreneurs: A Research Companion to Water Transitions Around the Globe* (Cheltenham: Edgar Elgar, 2009), p. 52.
- Haas, P. (1989). Do Regimes Matter? Epistemic Communities and Mediterranean Pollution Control. *International Organization* 43(3): 377-403.
- High-Level Conference on World Food Security. (2008). *Declaration of the High-Level Conference on World Food Security*. Rome: FAO.
- Jenkins, T. (2008). Towards a biobased economy: examples from the UK. *Biofuels, Bio-products and Biorefining* 2: 133-143.
- Kalfagianni, A., and Pattberg, P. (2013). Fishing in muddy waters: Exploring the conditions for effective governance of fisheries and aquaculture. *Marine Policy* 38: 124-132.
- Keck, M. and Sicking, K. (1998). *Activists beyond borders: Advocacy Networks in International Politics*. Ithaca: Cornell University Press, 228.
- Kircher, M. (2012). The transition to a bio-economy: national perspectives. *Biofuels, Bio-products and Biorefining* 6: 240-245.
- Landeweerd, L., P. Osseweijer, et al. (2009). Distributing Responsibility in the Debate on Sustainable Biofuels. *Science, Engineering and Ethics* 15: 531-543.
- Levidow, L., Birch, K., and Papiouannou, T. (2013). Divergent paradigms of European Agro-Food Innovation: The Knowledge-Based Bio-Economy (KBB) and an R&D Agenda. *Science, Technology and Human Values* 38(1): 94-125.

- McCormick, K., J. McKinnon, and S. Fast (2012). Global Governance of Biofuels for Transport: Viewpoints of Key Stakeholders? ESG Lund Conference, Lund.
- Mehta, L., G. J. Veldwisch, and J. Franco (2012). Introduction to the Special Issue: Water Grabbing? Focus on the (Re)appropriation of Finite Water Resources. *Water Alternatives* 5(2): 193-207.
- Mukhtarov, F. (2014) Rethinking the travel of ideas: policy translation in the water sector. *Policy and Politics* 42(1): 71-88.
- Mukhtarov, F. and Gerlak, A. (2014) Ways of Knowing integrated water resources management: towards versatility of knowledge. *Policy Sciences* 47(2): 101-120.
- Mukhtarov, F. and Gerlak, A. (2013) River basin organizations in the global water discourse: an exploration of agency and strategy. *Global Governance* 19(2): 307-326.
- Mukhtarov, F. (2007) Global Water Governance and the Concept of Legitimacy. Proceedings of the GRSC/GARNET International Conference on "Pathways to Legitimacy". University of Warwick, Sep 17-19, 2007.
- Pahl-Wostl, C. Gupta, J. and Petry, D. (2008) Governance and the Global Water System: A Theoretical Exploration. *Global Governance* 14: 419-435.
- Partsch, L. (2009). The legitimacy of biofuel certification. *Agricultural Human Values* 28: 413-425.
- Pattberg, P. (2005). What role for private rule-making in global environmental governance? Analysing the Forest Stewardship Council (FSC). *International Environmental Agreements: Politics, Law and Economics* 5(2): 175-189.
- Pattberg, P. (2007). Private Institutions and global governance: the new politics of environmental sustainability. Edward Elgar: London.
- Rathenau Institute (2011). Getting to the core of the bio-economy: A perspective on the sustainable promise of biomass. The Hague.
- Rosenau, James N. (1992). Governance, Order, and Change in World Politics. In: *Governance without Government: Order and Change in World Politics*, edited by J.N. Rosenau and E.O. Czempiel, 1-29. Cambridge, UK: Cambridge University Press.
- Scarlat, N., and Dallemand, JF (2011). Recent developments of biofuels/bioenergy sustainability certification: A global overview. *Energy Policy* 39: 1630-1646.
- Searchinger, T. (2009). Government Policies and Drivers of World Biofuels, Sustainability Criteria, Certification Proposals and their Limitations. In: *Biofuels: Environmental Consequences and Interactions with Changing Land Use*, edited by R.W. Howarth and S. Bringezu, 37-52. Ithaca, NY: Cornell University.
- Schouten, G. and Glasbergen, P. (2011). Creating legitimacy in global private governance: The case of the Roundtable on Sustainable Palm Oil. *Ecological Economics* 70: 1891-1899.
- Schmid, O., S. Padel, *et al.* (2012). The Bio-Economy Concept and Knowledge Base in a Public Goods and Farmer Perspective. *Bio-based and Applied Economics* 1(1): 47-63.
- Stone, D. and Maxwell, S. (2005). Global Knowledge Networks and International Development: Bridges Across Boundaries. New York: Routledge.
- Schubert, S. and Gupta, J. (2013). Comparing Global Coordination Mechanisms on Energy, Environment, and Water. *Ecology and Society* 18(2): 22. <http://dx.doi.org/10.5751/ES-05440-180222>
- United Nations Development Programme, (2003). The Environmental Governance Sourcebook: Challenges, Laws, Instruments, Institutions. UNDP: Bratislava.

- UNEP (United Nations Environment Programme). (2009). *Towards Sustainable Production and Use of Resources: Assessing Biofuels*. Nairobi: United Nations Environment Programme.
- Witte, J. and Reinicke, W. (2005). Business unusual: Facilitating United Nations reform through partnerships. Global Public Policy Institute. Accessed 30 March 2007. Available from www.gppi.net.
- World Energy Outlook Factsheets (2013). How will global energy markets evolve to 2035? Available from http://www.worldenergyoutlook.org/media/weowebiste/factsheets/WEO2013_Factsheets.pdf