

2011 International Congress of IIAS

“Global Problems and National Regulations: Challenges to
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Theme 3 New Trajectories to the Rising Need of Regulatory Regime

Paper Title: Diversity of environmental authority and climate change

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Abstract: Under the existing conditions of global interdependence and loss of trust in national authorities, conventional national environmental authority has limited institutional capacity and legitimacy to effectively distribute authority and provide climate solutions. On the other hand, we observe the emergence of municipal environmental authorities made up of public-based, market-based, and people-based authorities directly involved in municipal climate policy and governance. These emerging sources of authority should neither be adhered to as the ultimate solution to global climate problems left unanswered by international and national authorities nor rejected as having no institutional, legitimate and accountable basis. Drawing primarily on official policy documents and interviews, this paper uses the diversity of municipal climate adaptation authorities in Rotterdam, the Netherlands, to investigate how various forms of authority deal with the implementation of measures to reduce current and future vulnerabilities to the impacts of climate change and how lack of integration between different levels of governance can render adaptation programmes relatively ineffective. The paper concludes that regardless of the strength of state authority, emerging *loci* of authority are diluting state political authority to play a more leading role in climate adaptation, and thus effective policy implementation can result only from state and non-state authorities working in tandem with each other.

Key words: environmental authority; globalization; governance; climate adaptation; Rotterdam

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Diversity of environmental authority and climate change

1. Environmental authority in transition

negotiations, encompassing multiple discourses, meanings and agendas, deriving from different social groups, including sciences, economics, technology, social justice, politics and governance. These facts are contributing to the thought that nation-state environmental authority is just one model of environmental protection.

Nowhere is this more apparent than in the governance of climate change. The international climate regime has largely abdicated its authority after the failure of recent international negotiations, most notably the United Nations Conference on Climate Change (UNCCC), held in December 2009 in Copenhagen, where too many competing, and sometimes opposing, voices and agendas were laid on the table. National authorities are beginning to face a deficit of political capital due to a lack of trust from the electorate, the constraints posed by globalization, and an ideological shift, which proposes that the state ought to be an enabler rather than a driver of climate governance. Furthermore, national authorities are only able to avail themselves of inadequate processes and institutions that are poorly designed to deal with the kind of long-term action required by climate governance. Municipal authorities, together with municipal market-based and people-based authorities are, thus, getting increasingly involved in providing and managing climate regimes and action plans (Bulkeley & Newell 2010).

If we are witnessing the emergence of alternative environmental authorities, how do we analyze such diversity in the governance of climate change? In addressing this question, this article draws on the case study of Rotterdam in order to illustrate the diversity of environmental authority in governing adaptation. More specifically, the article attempts to draw on theoretical concepts in order to investigate recent trends in climate change authority; elaborating on the concept of environmental authorities and providing an analytical framework; drawing on this framework to analyze current developments of climate adaptation in the city of Rotterdam, a

pioneer of governance-type environmental authority (de Graaf and van der Brugge 2010); and finally drawing conclusions on the diversity of environmental authorities that can be observed today.

2. Trends in climate change authority

The issue of global warming and climatic alterations to the earth, oceans and atmosphere resulting from anthropogenic sources of greenhouse gases (GHG) reached public consciousness in the 1980s, following the coinage of the term ‘global warming’ by Stephen Schneider in 1976. By the late 1980s, a political response to the science was emerging on the international stage when the Intergovernmental Panel on Climate Change (IPCC) was given the mandate in 1988 of monitoring peer-reviewed scientific publications on climate change, assessing the risks for the biosphere and humankind, and reporting periodically on its work to policy-makers from the IPCC’s 194 members. The IPCC published major reports in 1990, 1995, 2001, and 2007. Each of the four IPCC reports has been the focal point of animated debate over the reality and consequences of anthropogenic climate change as well as, most intensely, over the the reduction of CO₂ emissions from the burning of fossil fuels (Smart, in press). The acknowledgement is today that climate change presents uncertain global risks, and demands urgent global responses (Nicholls et al. 2007; Stern Review 2006; Kluger 2006; Miller 1997). Trends in climate governance have been for authority to be diverse and distributed at different territorial levels of government and among a multiplicity of actors (Bulkeley & Newell 2010).

At the *international level*, climate authorities ratified the 1992 UN Framework Convention on Climate Change (UNFCCC) and its 1997 Kyoto Protocol undertaking to reduce GHG emissions. Disagreements on legally binding emissions targets and paying for the costs of

climate change mitigation have besotted UN meetings. For example, in 2007, the US argued that if the larger national polluters cannot agree, there was no hope of reaching a broader international accord for the Thirteenth Meeting of the Conference of Parties (COP13) and the Third Session of the Meeting of the Parties to the Kyoto Protocol (COP/MOP3) held in Bali, Indonesia, in December. The meeting was supposed to agree on stronger action against global warming when the first phase of the Kyoto Protocol expires in 2012.¹ Nevertheless, the big 16 polluters agreed with the US that large and mandatory emissions cuts – and, thus, perceived reductions in economic growth – are unacceptable. Instead, they would opt for voluntary, national emission reduction targets as well as initiatives to reduce pollution in sectors of their economies that are fossil fuel-intensive and are major sources of GHG.

Negotiations about the post-2012 international climate change regime that took place in Copenhagen in 2009 and in Cancun in 2010 have not reached a viable resolution. In Copenhagen one of the reasons consensus within the climate change debate was difficult to arrive at was because of the numerous ideological representations, concerning what climate change is and what are its impacts. To integrate so many different voices of not just national governments, but the whispers of the different environmental NGOs, academics, lawyers, scientists etc. that reflected in the official stances taken by governments, was indeed a formidable and to some extent impossible task. COP15 in Copenhagen brought together not just 194 executive leaders and politicians but representative voices of the numerous public-sector, business, and civic organisations. As Stavins (2009: n.p) mentions,

¹ The 1997 Kyoto agreement requires 36 industrialised nations to reduce their greenhouse gas emissions by an average 5 per cent below their 1990 levels, by 2012. To encourage a new global deal, the European Union is offering a unilateral cut in EU emissions of 20 per cent below 1990 levels, by 2020.

Going into Copenhagen, the challenge was very great, largely because of fundamental economic (and hence political) realities... Given legitimate concerns about issues of efficiency, on the one hand, and distributional equity, on the other hand, it was not surprising that the industrialized countries (particularly the United States) insisted that China and other key emerging economies participate in a future agreement in meaningful and transparent ways, nor that the developing countries insisted that the industrialized countries foot much of the bill.

As a result of the sometimes opposing but always differing views that were exchanged and negotiated at COP15, some degree of incompleteness and vagueness could almost be expected of the resulting Accord. The competing voices of the different stakeholders involved in the climate change debate carried over to Cancun in November 2010 at COP16, where the resulting compromise text stated a need for deeper cuts in emissions without specifying what mechanisms should be put into place for achieving this goal, creating an escape route with the lack of secure wording that required any legally binding actions.

At the *supranational, national and regional levels* other sources of authority have been involved in climate governance individually or through transnational networks (Fisher 2004; Bodansky 2005). For example, individual US states such as California have taken their own initiatives while a unified, federal system is being advocated for. The US Climate Action Partnership launched in 2007 by 10 blue chip companies and four NGOs called for strong federal action to combat climate change. In the EU, the European Emissions and Trading Scheme (EU-ETS) is a regulatory initiative that covers over 11,500 energy-intensive installations such as electricity, oil, metals, building materials and paper across the EU which represent close to half of Europe's emissions of CO₂. Linked with the EU-ETS, the Clean Development Mechanism

(CDM) established by the Kyoto protocol allows EU member-states to carry out emissions reduction projects in developing countries which produce certified emissions reductions (CERs) which are certified by the UN. In Asia, Japan is the only country with a legally binding reduction target under the Kyoto Protocol. Japan, however, is not expected to meet its Kyoto Protocol target successfully through purely domestic action and it is likely to have to resort to purchasing emission reduction credits in order to comply (Watanabe 2006). Asia is also home to two of the world's fastest growing economies as well as largest polluters – China and India.

India, the sixth biggest polluter of GHGs enforces the 'common but differentiated responsibility' principle wanting a 40% cut in developed country emissions by 2020. China, currently the biggest polluter of GHGs, also signed on the Kyoto Protocol as a developing country, demands developed nations to provide 1% of their GDP to other nations to help them adapt to climate-change, and provide low carbon technology. Stating in their official policy:

The key is that the governments of the developed countries should endeavour to reduce and eliminate barriers to technology transfer, and adopt guiding and incentive policies and measures, thus playing an effective role in promoting technology transfer.

(China's Policies and Actions for Addressing Climate Change, 2008: 49-9)

The US on the other hand, the second largest polluter of GHGs, insists that *developing* nations like China and India must not be exempt under the Kyoto Protocol, and demands they slow down their emissions, agreeing themselves to reduce emissions by not more than 17% by 2020, and that too would be dependent on support from Congress. While the African Union (AU), a grouping of 52 states, while accounting for less GHGs emissions as compared to the EU,

China and US, and perhaps one of the most at risk from climate-change impact, demand that richer countries to be legally bound to cut emissions, a prospect that nations like India and US oppose. The above is perhaps the briefest possible overview of just some points of contention between only select key players. The debate is only made further contentious as more nations, and their concerned socio-political parties, get involved. Even the status of developing nations is a point of contention between Annex I and Annex II parties, as

Brazil, China, and India explicitly oppose any reclassification of developing countries with higher emissions and higher capacity into a separate group, including through a ‘graduation’ process, and are averse to the idea of taking on binding caps. The exact language of their positions may reflect subtle differences. Brazil simply refers to the need to “maintain the difference, both in intensity and legal nature, between the contributions of developed and developing countries.”

(Goltz 2009: 10)

There is no pan-Asian effort to tackle climate change at the moment, although the Asia-Pacific Economic Cooperation (APEC) has placed climate change on its agenda and the 2007 annual summit of the Association of Southeast Asian Nations (ASEAN) adopted climate change and sustainable development as the summit theme (Associated Press 2007; ASEAN 2007).

At the *city level*, urban and transnational sources of climate authority are increasingly evident. For example, in 1993 the Cities for Climate Protection (CCP) programme was established by the Toronto-based International Council for Local Environmental Initiatives (ICLEI) working on the premise that GHG emissions are caused by activity that is embedded in specific spatial circumscriptions. The programme enlists local governments whose combined

emissions of GHG represent 10% of the global total, shares information and provides technical assistance and regionally specific tools to assist local governments in reducing GHGs. The Clinton Climate Initiative, a project of the Clinton Foundation, was launched in 2006 and later partnered with the Large Cities Climate Leadership Group (C40), a major initiative linking cities. The Southeast Asian Network of Climate Change was formed under the auspices of the UNEP to build capacity in national ministries, municipal bureaus and sectoral agencies related to climate change such as energy, transport, waste-to-energy, etc (UNEP 2010). Apart from these urban environmental authorities, NGOs such as Climate Crisis Coalition and the Climate Group are also seeking to widen the circle of individuals and groups engaged in the governance of climate change. These global transnational networks that are often also localized engage other urban actors besides urban authorities not only in the developed world but increasingly in the developing world as is the case with the C40 group and the Resilience Network. Global metropolises of strategic political and economic significance have also become urban sources of climate regulatory authority driven by mayors that are genuinely committed to curbing emissions or used climate change as political capital. Research suggests that to sustain the impact of city leaders' initiatives, a firmer institutional framework that beefs up their capacity is needed in the long run. This may be provided by transnational networks that offer resources and political platforms within which city leaders can operate (Bulkeley and Kern 2006: 2253).

The above trends show a reconfiguration in climate authority across multiple territorial levels and between public and private actors. How we can analyze such diversity of authority in the regulation of climate change?

3. Diverse *locus* of environmental authority: state and non-state authorities

Environmental authority has traditionally been associated with national governments attempting to influence the behaviour of the market and of citizens. As it involves governments determining standards of pollution control, and then using bureaucrats –backed up by legislation – to enforce its rules, national environmental authority is thought to be easy to administer and enforce. Nevertheless, national environmental authority is often weak due to state failure and implementation deficit. Problems are particularly heightened when the task of implementation is passed down from one level of government to another. In the face of state failure and implementation deficit, voluntary regulatory action like green consumption, the uptake of environmental management standards or environmental agreements by individuals, voluntary organizations and business associations is increasingly growing (Jordan et al 2003a: 211). When this happens, environmental authority is dispersed amongst private actors who agree between themselves to ban a particular substance, set a particular standard and so on. These agreements contribute to a governance-type environmental authority as they foster cooperation between public and private authorities that set high standards and tough targets while providing flexibility of territorial and sectoral application.

Market-based environmental authority has existed since times immemorial in the form of business associations, syndicates and chambers of commerce that regulate the market and prevent the interference of government in the market (Cutler et al 1999). Their operation tends to be highly efficient, economical, a manifestation of the historical expansion of markets and, arguably, of the loss of state sovereignty due to global interdependence. In the case of climate governance, the market, largely accepting the science and threats posed by climate change, has responded to public pressure by creating new market opportunities to respond to public concern

about climatic changes. For example, businesses readily support the transition to a ‘low carbon economy’ given their expectation that there will be many winners (Hale 2010: 260). But although business associations and coalitions tend to verbally support specific government action, often their statements have no direct impact on the companies they represent, in addition to the fact that businesses tend to respond to public sentiment, which, like a weather ban, often changes direction.

People-based environmental authority exists in the form of voluntary organizations, local community groups, trade unions, cooperatives and citizens’ issued-specific alliances. It aims at regulating private behaviour in relation to waste, energy efficiency, purchasing ethical goods and services although the impact of these people-based sources of authority is difficult to measure. Even though little comparative data is available on public attitudes to climate change, Globscan, (Hale 2010: 262) finds that while there is an increased trend in public support for the seriousness of the climate change, there is little support for mitigating measures like environmental taxes, taxes on fuel, road-use charges and wind farms. It appears that a more effective approach is finding the support from networks and communities to which people have strong personal affiliations and by bundling the issue of climate change to poverty, housing, health, security and welfare. The traditional mechanisms of people-based regulatory authority have been advocacy groups. There is a further trend that calls for investing in leadership and innovation for social mobilization that connects climate change with other issues like the new types of jobs, resource security, and avoidance of mass migration, and inter-generational conflicts. A way to understand this increasing diversity and distribution of environmental authority is to identify the factors that affect it.

3.1. Global interdependence and locus of authority

The argument that the locus of authority is shifting from the national level to the global level has been put forward by Sassen (1994, 2006). She attributes this shift to the effects of globalization felt in the partial replacement of state authority by market authority, in the delinking of authority from national territory, in the trend of market authority governing public goods, and in a tendency of state authority also being shared with networks of civil society be it global, regional or municipal. Castells' (1996, 1997 a & b) impressive research also aims at explaining the modern, global world of network society and the consequential dispersion of authority. He suggests a differentiation between spaces where highly mobile networks reside (space of flows) and spaces where highly localized communities and local identities reside (space of place) and how the former impact on the latter. To his understanding, states are just nodules in the network web of power on which they also have to be grounded. Urry (2003) is more radical in his explanation of how national state authority is affected by global interdependence. He doubts the governance-like era and rather chooses to argue that networks are impermeable (rather than interdependent) to nation-states.

Finally, for Beck (2005) nation-states are strategic actors performing in the theater of flowing exchanges between state and non-state actors. States reinvent themselves and build relationships with other states and non-state actors. Failing this, private actors occupy the unattended space with their private regulations (market actors) and moral regulations (civil society actors). Unless national states shed their attachment to their local identities and are ready to fly to where the highly mobile networks reside, they will miss the opportunity offered by the transnational arena in terms of power and authority. Yet, merely participating in these transnational arenas is not enough. If states are to engage in a 'cosmopolitan state strategy', they

should develop a new ideal that contributes to a 'common human awareness of the global', Beck (2005: 82) concludes. This new ideal is made felt by the explicit spelling of risks such as climate change as side effects of the so called first modernization (that of the industrial revolution) but also by the explicit recognition of successful environmental governance and risk control experiences such as the whole array of municipal networks, standardization regimes, and the poignant images of, for example, the 2010 oil spill off the Gulf of Mexico, the 2011 floods in Pakistan and Queensland, and the devastating 2011 tsunami in Japan.

3. 2. Authority and environment

The change, relocation, diversity and distribution of environmental authority away from the national sphere is even more keenly felt in the regulation of environmental issues due to the fact that most environmental problems center on the global commons (e.g. depletion to the ozone layer, decline in groundwater levels, depletion of fisheries, so on) or on cross-national boundaries and require international cooperation and coordination for formulating and implementing solutions (Bryner 2004: 70). In the governance of climate change this is evident in the emergence of city networks and epistemic communities that provide the political, scientific and technological authority to govern climate change. All this has resulted in the national environmental authority losing its monopoly and the growing importance of regional and municipal governmental and non-governmental forms of environmental authority. Here, Sassen's (2006) conceptualization of authority is analytically useful: how has environmental authority been transformed, de-territorialized and relocated in a global arena? Other scholars like Peter Self (1993) and Joseph Stiglitz (2003), have turned to the market for answers to this question on the basis that globalization is over and above an economic phenomenon. But Sassen (2006) and

Beck (2005) also recognize the role and dynamics of civil society as manifested by the authority of environmental NGOs.

In an impressive analysis by Spaargaren and Mol (2008: 353) about the greening of global consumption, it is argued that the shift of environmental authority away from state power and state geographic confines can be witnessed, among others, through, (1) the transferring of environmental authority to private confines of transnational economic networks; (2) the re-establishing of environmental authority into public-private partnerships; (3) the transferring of environmental authority to subnational and supranational political authorities; and (4) the transferring of environmental authority to individual and organized concerned citizens, networks of NGOs, and 'informal' political actors.

In analyzing the governance of climate change in a globally interdependent world, a concept of the variety of environmental authorities involved is helpful. It allows us to identify and analyze the locus of power and authority for climate governance beyond the nation-state. In the following section we illustrate how this is happening in climate adaptation in Rotterdam.

4. Environmental authority and the governance of climate adaptation: Illustrations from Rotterdam

The Rotterdam municipality aspires to be at the forefront not only in the implementation of measures to reduce its current and future vulnerabilities to the impacts of climate change, that is to adapt, but also in the development of governance-like authorities (Molenaar & Dircke 2010; de Graaf et al 2009). What is less clear is the type of authority and governance approach the city is taking to address climate adaptation. In the following sections we investigate how climate

adaptation is being governed in the city, how is environmental authority being distributed and how this ultimately impacts the reconfiguration of political authority.

4.1. Physical Vulnerabilities

Situated 6 meters below sea level in the banks of the river Nieuwe Maas, one of the channels formed by the Rhine and Meuse rivers, Rotterdam is the largest port city of Europe (Figure 1). Protected from the sea by a series of dikes, dams and storm surge barriers which together are part of the Dutch Delta Plan, Rotterdam continues to feel the effects of climate change via increased precipitation patterns of an annual average of 790 mm resulting in frequent flooding and ground water level rise. A new precipitation record was set in August 2006, when about 300 mm of rain fell in one month (Molenaar and Dircke 2010: 31).

With global temperatures increasing, the effects climate change will have on the urban water infrastructures of Rotterdam will be manifold. Although the exact rate and extent are uncertain, heavier precipitation an

To be better prepared for what the future might hold, Rotterdam has decided to pro-actively deal with the impacts of climate change via the ‘Rotterdam Climate Initiative’ (RCI) and ‘Rotterdam Climate Proof’ (RCP) – two programmes on mitigation and adaptation, respectively, that will have to maintain and strengthen the municipality’s competitive advantage on the international stage while at the same time reduce its vulnerability to climate change and make use of the opportunities that come with it. These programmes are formulated and implemented by diverse regulatory authorities of the public, private and people sector.

4.2. State authorities and non-state authorities on climate adaptation

While national authorities can no longer determine climate adaptation solutions without the support of regional and municipal authorities and non-state authorities, they stay as important governing driving forces in formulating and implementing climate plans and determining investments. Within their territory, governments have a fair amount of power and instruments to push for climate adaptation policies, for example, by determining land use zoning followed by close monitoring and enforcement; by legislating on wetland restoration; by encouraging the development of storm surge barriers, green roofs, water plazas, innovative floating structures and water storage. But state authorities face a number of obstacles in implementing adaptation regulatory actions. First, with a certain amount of scepticism still remaining about the science of climate change caused by global warming, states are vulnerable and thus reluctant to set and implement robust environmental and social restrictions. In fact, it is possible to say that political authorities often take advantage of the relatively disjointed state of climate-change science, which has been taken up separately by various scientific disciplines, such as atmospheric physics, earth science, and meteorology. And since each of these disciplines has its own concerns,

epistemology, theories, and empirical methods, the outcome is a diverse array of often conflicting representations of climate-change (Sarowitz, 2004).

Second, not all state authorities have the willingness to set adaptation measures on par or above the reduction of GHG emissions. Third, delta regions and municipalities are not only affected by their local climate change but by the global climate trend making state regulatory activities difficult. The globalization of current and future vulnerabilities to the impacts of climate change and the limitation in state authority fosters international, global, regional and municipal collaboration beyond the jurisdiction of the state. This collaboration often finds its source of authority in scientific studies, coalitions, consensus reached in conferences, and information dissemination and framing.

In the absence of strong state authorities, or indeed despite strong state authorities, that prove to be able, capable and willing to set and implement the adaptation agenda, and a hesitant international collaboration, non-state authorities are rapidly moving to the fore, alone or in partnership with state authorities. Environmental NGOs redefine and reframe climate adaptation in the public debate. They link up with large companies in various multi-stakeholder arrangements, call for renegotiations of the adaptation agenda, and provide moral authority to studies on the sustainability of deltas. These emerging private governance arrangements develop into new environmental authorities, with some legitimacy and impact on the environmental governance of climate adaptation, especially in regions where conventional state environmental authority lack capacity, are weak or even absent. How is environmental authority being distributed for climate adaptation and how this ultimately impacts the reconfiguration of political authority?

4.3. Political Strengths

The Netherlands was among the first countries to adopt a national green plan, the Dutch National Environmental Policy Plan (NEPP) with the objective of establishing coordination of policy among the various sectors and of integrating environmental considerations into the policy making process of the various ministries (Carter 2007: 309). Although the future of the NEPP is not clear today due to its inability to deal successfully with ‘wicked problems’ such as climate change, its past accomplishments can be attributed to two factors: the consensual style of Dutch politics with its emphasis on conflict resolution and searching for negotiated solutions; and the inclusion of economic actors as an essential part in the solution to environmental problems (Carter 2007). It is useful to our discussion to keep these two factors in mind as they provide the ideological and governance context within which the various environmental authorities in Rotterdam deal with climate adaptation. We first discuss visions and plans where we can find a diversity of public, private and people authorities dealing with climate adaptation.

Rotterdam Water City 2035 (in Dutch: Rotterdam Waterstad 2035). This vision of Rotterdam, presented by designer G. D.Geldof and his team, at the 2nd Architecture Biennale (2005) themed ‘The Flood’ proposes a future vision of the water challenge and the urban challenge of Rotterdam with actual scale model design images (the River City, the Water Network City, the Channel City) marking the first step towards a more adaptive and water sensitive urban design approach where technology, but also people, matter. As it was prepared by the municipality of Rotterdam, the water boards and the national water authority in an informal setting, it was viewed as a safe niche within which new methods of policymaking and social practices could be developed (Geldof 2005; de Graaf & van der Brugge 2010). Part of these new methods was the development of new sources of environmental authority created by

bringing together people from the municipality departments and the waterboards. All in all, 15 people were involved in preparing the entry proposal (6 designers, 5 water management experts, 1 official from the Economic Development Department and 3 people from the waterboards). Two interviewees (2008) involved in the process reflected that devising policy in an informal and safe context gave them space for cross-fertilization of ideas, extreme creativity and a longer vision. Such an informal network and involvement of change agents then prepared the system to incrementally transiting by exploring new options and developing new strategies. The mainstreaming of ideas from this policy niche, gave rise to the submission of a 'feasible' design policy, *Waterplan 2 Rotterdam* that also combined urban design water management and climate adaptation.

Waterplan 2 Rotterdam. In 2007, the Municipality of Rotterdam (Public Works Department, Town Planning and Housing Department and Rotterdam Development Corporation), the Schieland and Krimpernerwaard Water Control Board, the Hollandse Delta Water Authority and the Delfland Water Control Board, launched the *Waterplan 2 Rotterdam (W2R)*, an implementation programme linking water and spatial development. Interviews conducted in 2008 with people involved in the plan revealed that the W2R is not only an alternative source of environmental authority to that of the national state but also a highly efficient consultation forum. For example, its structure comprises workgroups, a project office, a steering committee and regular management committees. It is particularly the *ad hoc* working groups established to research and implement specific projects that act up as powerful sources of climate adaptation authority (Interviews 2008, 2009). This is due, interviewees reflected, to the fact that the W2R successfully brokers the various contributions. For example, the Town Planning and Housing Department brings its expertise with urban development, public housing and open spaces; the

Rotterdam Development Corporation contributes expertise on spatial and economic development; and the Public Works Department manages the wastewater collection system and the municipal water policy while promoting the public interest and preparing for and executing technical interventions. Despite the integrated approach of these tasks, W2R faces the challenge of finding a way to align its plans with those of the Municipal District Water Plans (MDWP) which are responsible for sectoral water projects in problem areas and for bringing the water system up to the water and ecology standards prescribed in the EU Water Framework Directive (Interviews 2008; Stakeholder Forum 5th World Water Forum, 2009; Waterplan 2 Rotterdam 2007: 125-126). A salient challenge to the W2R ability to foster collaboration and a more integrated policy is that of making the MDWP, water and climate proof. To this aim the W2R proposes a number of actions: include water into the checklists for urban development and open spaces; align the water aspects in the zoning plans with the vision of the W2R; include prerequisites to the construction permits and development plans that can achieve the W2R objectives (Waterplan 2 Rotterdam 2007: 126).

Rotterdam Climate Proof. At the same time that the *Waterplan 2 Rotterdam* was launched, the Rotterdam City Council (an elected body that monitors the Municipal Executive Committee consisting of the Mayor and the Aldermen), in partnership with the Port of Rotterdam Authority (the manager, operator and developer of the port), DCMR (the regional environmental protection agency operating in the Rotterdam-Rijnmond industrial area) and Deltalinqs (the representative of the logistical and industrial companies operating in the Rotterdam port) launched the *Rotterdam Climate Initiative (RCI)* focusing on basic mitigation measures targeted at a 50% reduction of CO₂ emissions by 2025, compared to 1990 levels. On par with RCI, the *Rotterdam Climate Proof (RCP)*, an adaptation programme, was also launched. Interviews (2008,

2009), revealed that RCP focuses on reducing the vulnerability to climate change by formulating and designing a strategy in which the city adapts to changing circumstances. RCP takes a three-pronged approach to adaptation: knowledge for climate, action, and marketing (communication and collaboration). When analyzing the activities under the knowledge and marketing approaches of RCI, one discovers alternative sources of environmental authority.

For example,

innovative initiatives of the RCP include but are not limited to: green roofs, new waterfronts that generate new leisure possibilities, floating buildings and alternative forms of water storage. The activities of RCP are clustered in 5 main themes: water safety, accessibility, adaptive spatial development, urban water management and city environment. In sum, Rotterdam prepares itself to adapt to the expected changing circumstances by increasing its resilience and flexibility.

By recognizing that water could and should contribute to solve urban problems by upgrading neighbourhood quality, urban water management in Rotterdam was able to develop a climate adaptation strategy by creating urban development strategies that are sensitive to water issues. This approach of linking water infrastructure to urban development is known as ‘Water Sensitive Urban Design’ (WSUD) and reflects a new paradigm in which water and infrastructure design are integrally considered in the early stages of urban planning (Wong 2006). The shift in urban water management in Rotterdam is part of a larger transition in water management in the Netherlands from a sectoral and technological approach towards an integrated and interactive approach (der Graaf et al 2005). However, the development of the WSUD in Rotterdam is seen as a response to the experience of flooding water and the expected droughts that are the result of anticipated climatic changes. Many organizations are involved in managing the Rotterdam water system and related urban planning activities. Table 1 presents the involved stakeholders, the level of governance, their responsibilities and activities.

Table 1 *Relevant actors in the Rotterdam urban water governance system (adapted from der Graaf et al 2005; va der Brugge and der Graaf 2010)*

Actors	Level	Responsibility in Rotterdam	Activities
Ministry of Transport, Public Works and Water Management	national	- Flood protection and water management of main river system - Supervision on implementation of European Water Framework Directive (EWFD)	Drawing up national water policy and legislation
Ministry of the Environment and Spatial Planning	national	- National housing policy and spatial planning. Environmental affairs - Regulation on drinking water supply	- Policy and legislation on housing, spatial planning (including water retention) and environment. - Determination of drinking water quality standards
Waterboards ▪ Delfland ▪ Hollandse Delta ▪ Schieland and Krimpenerwaard	regional	- Water quantity management of main canal system and polder system - Water quality management including wastewater treatment - Flood protection	- Drawing up policy plans - Executing water assessments - Operation and maintenance of flood defence infrastructure
Municipality of Rotterdam	municipality	- Land use planning	- Drawing up legally binding Land Use Plans
Municipality of Rotterdam, department of municipal works	municipality	- Sewer system - Public space - Urban infrastructure - Groundwater management (limited)	-Drawing up municipal sewer plan - Drawing up Waterplan Rotterdam - Operation and maintenance of sewer system and other infrastructure and public space - Collecting and transporting excess groundwater from allotment boundary
Municipality of Rotterdam, department of planning, housing and urban design	municipality	- Spatial planning - Housing - Urban functions	- Designing and planning urban renewal projects and new urban areas - Drawing up spatial plans
Municipality of Rotterdam, department of economical development and project development	municipality	- Project development - Economical development - Real estate management and development	- Developing new urban areas and urban renewal projects

The successful shift in Rotterdam can be explained by an emerged collective understanding that:

- creating additional water retention capacity in existing urban areas will only be realized if water management links up with the dynamics of urban renewal;
- water retention contributes to an attractive city for residents and companies; and
- structural problems such as climate adaptation policies of cities require long term goals.

The shift itself was the result of interactions between an enabling context and the Rotterdam Water City 2035 project. The slowly emerging establishment of an inter-organizational network of the relevant authorities enabled the development of a joint vision combining the urban

challenge and the water challenge during the project. The interactions between context and project were managed strategically, and since it was a non-official policy process, more radical ideas and longer timeframes were possible than in usual policy documents, leading to reframing. Support was garnered and managed by inviting politicians to the design workshops and involving them in the success of the project, especially given that the inter-organizational network continued to exist after the project was finished.

In sum, Rotterdam urban water management experienced successful policy and institutional innovation that has led to both RCI and RCP. While it is difficult to pinpoint specific success factors that have significantly helped this city come this far, the list would certainly have to include but is not limited to:

- the commitment, either deliberately created via efficient lobbying or already present, in every layer of governance
- the links made between these different governance levels,
- the involvement of all key players, including those outside of the ‘water box’ or ‘climate change box’ such as artists, economists and planners
- involving/attracting new investors by introducing stimulating new concepts such as floating cities and green roofs

However, der Graaf and van der Brugge (2010) suggest, the institutional mechanisms to realize, operate and maintain the proposed multi-stakeholder projects are still lacking. This is currently the major challenge for realizing climate adaptation in terms of water sensitive urban development. Other pitfalls recognized to date are the possible lack of understanding from the policy makers, resulting in a lack of political carrying capacity to keep the momentum going. In addition, with such a huge problem, the finances needed are similarly large, while the funds for

climate adaptation have not been clearly earmarked yet. Finally, as with every interdisciplinary problem that involves a myriad of stakeholders not speaking the same language, the potential for miscommunication is omnipresent.

Rotterdam has proved to be a model to follow amongst other C40 Cities, especially for more emerging cities like Hong Kong, which recent data has shown is also struggling from increased risk of flooding, given its geographical location at the mouth of the Pearl River Delta in the South China Sea. With rising temperatures, its defence against storms and flooding is further threatened by the 9 to 31 cm sea level rise predicted by Guangdong Province by the year 2030, inundating coastal areas and causing more tidal surges (Pauw & Francesch-Huidobro 2010; Yim 1996). A crucial lesson to be learnt from Rotterdam is the importance of keeping governance structures for risk management programmes as transparent as possible. Hong Kong's efforts to adapt to flooding risks in the past, for example, its attempted cross-boundary cooperation through the Hong Kong-Guangdong Joint Working Group, has prevented the complete integration of all the concerned stakeholders, including the general public, thus reducing effective policy implementation, due to a lack of transparency in how the transboundary issues were tackled (Chan et al 2010). In this case, transparency could have been increased by initiating simple steps like holding public forums, conferences, or even through more efficient circulation and publication of explanatory documents. One consequence of this has been extended efforts on part of NGOs in Hong Kong, including The Climate Group, the Climate Change Business Forum, World Wide Fund, Civic Exchange, alongside with the Environment Bureau to call on the public and business sector in Hong Kong to better initiate action plans (Business Environment Council 2010).

Learning from Rotterdam, Hong Kong, and other cities keen at implementing effective adaptation policies, will need to work hard at defining the structures of governance for projects that manage coastal flooding. This would necessarily include creating and expanding collaboration by applying innovative solutions, whereby water management and spatial development can be linked without losing sight of the economic opportunities that adaptation to climate change offers. But more importantly, like Rotterdam, it is important cities like Hong Kong make concerted efforts to link different layers of governance, actively recruiting the involvement of all key players, including those outside the ‘water box’, to work together in a more integrated manner to more effectively implement risk management projects and programmes.

5. Conclusion

The analysis above has shown a developing trend towards governance beyond government, a shift towards governance at whatever level of social organization that means “conducting the public’s business through a constellation of authoritative rules, institutions, and practices by means of which any collectivity manages its affairs” (Ruggie 2004: 504). There has been growing acknowledgement of the critical sites of engagement (Scollon 2001) that cities are becoming in effective climate change adaptation. Generating successful urban responses towards climate change is becoming a matter of gauging and managing the complex mesh of challenges to knowledge, leadership, resources, framework conditions and political agendas, and a focus on mitigation, energy efficiency, and the use of different modes of governance (Bulkeley et al 2009).

Our research indicates that the shift to alternate authorities in climate adaptation is the key factor in the realignment of political authority. Together with private authority (of the

market), there is an increasing shift towards urban climate adaptation authority originating in civil society. As states lose environmental tasks and functions due to globalization processes, lack of state capacity, a high level of complexity, new power balances between state and market and/or changing ideology, other actors and institutional arrangements step in and seize environmental authority. Especially when market authority in environmental protection prevails, the initial reaction is always critical: we often believe that public goods such as the environment cannot be safeguarded by private market authority. But we cannot just conclude that diminishing state environmental authority always goes against effective environmental protection. What we have discovered instead is that neither state authorities, nor non-state authorities can on their own effectively implement and sustain climate adaptation programmes. Where there is an absence of strong state authorities, or indeed sometimes despite strong state authorities, that prove to be able and willing to implement the adaptation agenda, non-state authorities are rapidly moving to the fore. Environmental NGOs, in particular, are proving to be more successful in recruiting public involvement through more relevant and comprehensible redefinition and reframing of climate adaptation, that is marketing (collaboration and communication) adaptation strategies within the network of local, regional and local sources of knowledge; creating links with large corporations in the process; calling for renegotiation of environmental agendas; and providing the moral authority that state authorities seem inadequate at conveying.

Having said that, while state authorities can no longer singularly determine climate adaptation solutions without the support of regional, municipal and non-state authorities, they remain important governing agents in formulating and implementing climate plans and determining investments. State authorities source a fair amount of power and resources to push for climate adaptation policies, for example, by legislating on wetland restoration; or by

encouraging the development of storm surge barriers, green roofs, water plazas etc. What is needed, thus, is for state and non-state authorities to work in tandem with each other, for state authorities to establish coordination of policy among the various sectors, recognizing that the inclusion of economic actors is an essential part in the solution to environmental problems. Policy implementation can be most effectively realized when more developed institutional mechanisms are put into place to realize, operate and maintain proposed multi-stakeholder projects, and this is often boils down to a problem of interdisciplinarity that involves a myriad of stakeholders not speaking the same language or sharing the same agendas. While Rotterdam is yet to perfect a coordinated system of governance in the implementation of its adaptation policies, it has at least set a precedent in how cities can begin to initiate multi-stakeholder projects put forward by different governance authorities.

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Interview Logbook

Date	Interviewee
October 2008	John Jacobs. Senior Advisor. Rotterdam Climate Proof (face to face)
October 2008	Arnoud Molenaar. Programme Manager. Rotterdam Climate Proof (face to face)
November 2008	Henk van Schaik. Programme Coordinator. Cooperative Programme on Water and Climate. Delft. The Netherlands (face to face)
March 2009	Paul Reiter. Executive Director. International Water Association (group discussion, 5 th World Water Forum, Istanbul)
March 2009	Paula Verhoeven. Climate Director. Gemeente Rotterdam (group discussion, 5 th World Water Forum, Istanbul).