



*Principles
of good governance
at different
water governance levels*

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Papers presented at a workshop
held on 22 March 2011 in Delft, the Netherlands

Editing

Michael R. van der Valk and Penelope Keenan

Design

Michael R. van der Valk | CROSSVISION



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Introduction

In UNESCO's scientific programme global climate change is a central theme. More specifically Water is an important theme, not only because of climate variability and change but also because of mounting pressure on water systems and water resources due to the increasing world population and a growing middle class.

A central issue for the water sector is: how do you get out of the 'water box'? How to get the water professionals' analysis of water problems and solutions on the political agenda? An important condition to achieve this is the competency of water professionals and others involved to make connections between different perspectives: water in relation to other issues, water as a technical issue versus water as a governance issue, and water from different angles, such as the cultural perspective.

The UNESCO partners in the Netherlands support this transformation, and thus contribute to UNESCO's goal to achieve sustainable solutions for water-related problems in the context of climate change. By highlighting the social and behavioral science dimensions of water, UNESCO Netherlands contributes to UNESCO's functions as a clearing house and a laboratory of ideas. In this broader context (future) problems are identified and solutions are explored. The broad vision on water will be communicated through UNESCO's global network to (future) water professionals and policy-makers.

The workshop entitled 'Principles of good governance at different water governance levels' took place on 22 March 2011 at the Waterboard Delfland, Delft, the Netherlands. Over eighty academics, policy-makers and practitioners participated in the meeting. The meeting was organized to discuss issues of water governance at global, national and international levels. Thus the meeting

offered the opportunity to connect different perspectives and exchange views.

The central question was:

How is water governance evolving at different levels of governance and what are the implications for principles of good governance such as equity, legitimacy, efficiency, transparency and accountability?

This workshop was the second event in a series on Water in Global Change Processes organized by the partnership of the Netherlands National Commission for UNESCO, the National Committee IHP-HWRP and UNESCO–IHE Institute for Water Education. Each of the events is organized with different additional partners. In each of the meetings, an international perspective is chosen.

UNESCO workshop: Principles of good governance at different water governance levels

After the opening addresses by Adri Bom-Lemstra (Vice-chairman of the Waterboard Delfland and Chair of the Day) and Geert Teisman (Co-director at NederLandBovenWater, Chair at Research Group Governance of Complex Systems (GOCS) and Professor at Erasmus University Rotterdam), there were four keynote speeches. After each of the keynote speeches a prominent respondent was invited to trigger the debate.

- 1 *Global water governance and prospects, including evaluation of UN water*, by Joyeeta Gupta, Professor at UNESCO –IHE, Professor at Institute for Environmental Studies. Respondent: András Szöllösi-Nagy, Rector at UNESCO–IHE.
- 2 *Water and governance of systems*, by Theo Toonen, Dean of the Faculty of Technology, Policy and Management, Delft University of Technology. Respondent: Vincent van den Bergen, Directorate

for International Environmental Affairs, Ministry of Infrastructure and the Environment.

- 3 *Governance of large infrastructures*, by Jill Slinger, Assistant Professor at the Faculty of Technology, Policy and Management, Delft University of Technology. Respondent: Piet Dircke, Global Director of Water Management, Arcadis.
- 4 *Adaptive capacity of Dutch institutions*, by Bert Satijn, Managing Director of the research programme 'Living with Water'. Respondent: Willem Ligtoet, PBL Netherlands Environmental Assessment Agency.

Joop de Schutter, Deputy Director of UNESCO-IHE, presented his book 'Water in Central Asia: Past, Present, Future'.

The workshop was concluded by a round table, chaired by András Szöllösi-Nagy, Rector at UNESCO-IHE and included the participation of:

- Maarten Hofstra, Senior Advisor Policy Analysis and Water Governance, UNESCO-IHE;
- Jeroen Warner, Senior Researcher Water Governance and International Relations, Wageningen University and Twente University;
- Josee van Eijndhoven, Member of the Netherlands National Commission for UNESCO.

Some conclusions:

- Water issues must be tackled at various levels. Water governance therefore requires a 'dance between levels'.
- Water is a development issue at the border between social and technical systems. Good governance must be found in combinations of the above systems. Only then will there be innovation.
- Water governance has more to do with people than with water. Therefore, the emphasis should be on connecting people in order to combat compartmentalization.

- Water governance mainly focuses on the processes. Governance arrangements can only work if the processes associated with the underlying systems are understood.
- Water governance takes place in complex systems, making it difficult to find solutions that work in all circumstances. The question to be addressed is: how can water support other interests? Therefore it is important to increase the adaptability (the so-called 'adaptive capacity'). This is possible by enhancing and updating knowledge and skills, making better use of people and stimulating coordination.

This report presents four chapters of the respective papers of the keynote speakers, and a final chapter of synthesis and conclusions by Geert Teisman and Leon Hermans.

An essay on global water governance and research challenges

Joyeeta Gupta

Introduction

The water crises of the 21st century is in many ways a crisis of governance; a crisis of the failure of our institutions to manage our resources for the well-being of humans and ecosystems. Institutions refer to the informal and formal norms, principles, rules and structures that society shapes in order to address the problems that affect our society.

This essay focuses on identifying research questions that are of relevance to dealing with water governance in the 21st century. It discusses global water governance both as a supranational phenomenon as well as in terms of how water governance is changing nationally and worldwide. In doing so, it discusses trends in both areas and the issues that arise from these trends.

Global water governance

The need for global water governance

Is there need for global water governance? Different schools of thought have different answers to this question. From a holistic, supranational perspective, one can argue that there are four reasons for global governance. First, the Earth has one hydrological system. Second, climate change and loss of biodiversity and their underlying causes are global in nature. Third, local challenges can cumulatively lead to problematic global trends. Fourth, the direct and indirect impacts of water use may have global implications. Hence, there is need to structure global water science based on challenges emerging from global water governance. The govern-

ance challenges at global level include: competition between different ideologies and norms that have not been easy to resolve in the traditional consensus forums; increasing issue complexity; governance fragmentation at global level and pluralism at national level (especially in the developing world); the continuing relevance of sovereignty especially as governments are essentially accountable only to their own populations; and the limited or skewed opportunities for dispute resolution.

Is the question whether there is a need for global water governance therefore relevant? Is global water governance an inevitable step in the evolution of water law? Is it not already happening? Historically, we see a gradual evolution in water governance from the local to the global level and, in fact, there is increasing evidence at global level of attempts at global water governance.

More important than the question of the need for global water governance is which aspects of global water governance are being scaled up and which are not? This brings us to the politics of scale. The theory of the politics of scale argues that social actors have a diversity of reasons to scale up or down issues, and it is collective national politics that determines what is scaled up and what is not. There are four types of arguments for scaling up an issue: (a) to enhance understanding of a problem (and account for externalities, identify global impacts and thresholds/ tipping points of a problem, and understand the underlying ideologies driving decision-making); (b) to promote effective and inclusive governance (by including all countries and in an effort to achieve sustainable development); (c) to promote domestic interests (by creating a level policy playing field, postponing unilateral action, avoiding a race to the bottom and promoting better quality technology use globally); and (d) to promote extraterritorial interests (to gain influence, increase the decision-making space and access resources elsewhere). Similar arguments also exist to scale down a problem: (a) to enhance understanding of a problem through greater resolution and grain regarding critical local and contextual elements; (b) to promote effective governance through using existing institutions and mobilizing local people; (c) to promote domestic interests by

avoiding liability for externalized effects and protecting national interests; and (d) to promote extraterritorial interests through divide and control, inclusion and exclusion strategies, and to bypass specific bodies and procedures at global level that are seen as a hindrance to policy-making.

General trends

Let us then examine water governance in the context of general governance trends. At the global level there are major autonomous developments in the general governance process. First, global governance consists now of multiple actors and sites claiming legitimacy and rulemaking authority. Second, issue areas have exploded through the integration urge and everything appears to be connected to everything else. Third, there are three major shifts in governance: (a) from state consent to administrative law; (b) from public international to hybrid public-private; and (c) towards pluralism/fragmentation and multi-level governance systems. Fourth, these shifts do not result from explicit consensus, are often the result of the inability to get consensus at global level, and are autonomous, neoliberal and often paternalistic. These shifts in governance are a result of flexible, adaptive systems of governance but tend to lack accountability, legality and legitimacy. They are not always equitable and often reflect existing power structures, as they do not follow any formal rules of procedure and give room for forum shopping to specific countries.

Water governance trends

Against these general trends, let us examine four water governance trends. First, although there has been a trend in moving towards consensus in terms of norms and law making, there is evidence of more conflict than consensus. For example, the 1997 UN Watercourses Convention, that has been more than thirty years in the making, is yet to enter into force. The 1992 Rio Declaration on Environment and Development, which sums up the key sustain-

able development principles, is yet to acquire the status of customary international law. The adoption of the human right to water and sanitation by the UN General Assembly in July 2010 was only agreed to by 122 of the 194 countries. Second, in the water field alone, there are huge numbers of UN and non-UN agencies working and, unlike UN Environment with its secretariat in UNEP, there is no UN water agency. Third, water is so interconnected with life that there are any number of UN agencies with which water is linked. UN Water is attempting at coordinating these issues but has a limited mandate. Finally, the trends in water governance show that there are several shifts: (a) from consensus forums to non-consensus forums (e.g. World Water Forum); (b) from a centralized public law treatment of the social good nature of water towards a more private law treatment of the commodity of water (with privatization of water services; governance under the bilateral investment treaties and international arbitration); and (c) towards pluralistic and multilevel governance systems of water management.

Combined implications of these trends

The combined implications of these trends is the evaporation of legal, legitimate, accountable, transparent, consensus-based systems of water governance (governance systems marked by good governance), to a more fuzzy, Mobius web-like system that is less subject to control, less predictable, less in line with good governance principles, but perhaps more flexible, more reflective of power structures, more adaptive, more efficient and, at times, more effective.

If we compare this with the theories of architecture we find that there are ten options for governance. These include: (a) a hierarchical integrated body: A World Sustainable Development Organization; (b) a hierarchical single issue body: A World Sustainable Water Development Organization; (c) a high-level advisory body on water; (d) a non-hierarchical focal point; (e) a collaboration/ coordination body; (f) strengthening individual bodies; (g) promoting

coordination through law development; (h) regime clustering; (i) decentralized network organization; and (j) business-as-usual - Mobius web system. Of these, the most politically feasible and reasonable in terms of economic costs are the high-level advisory bodies or the coordination bodies.

The UN is at present experimenting with a number of coordination bodies. UN Water is one such body that tries to link up with the activities of all agencies and actors working on freshwater issues. However, its very feasibility – the fact that it does not step on the toes of existing UN agencies and that it is relatively cheap – is also its limitation. Its resources and authority cannot shape and steer policies, and it can only try and diplomatically seek some common ground and avoid duplication. It therefore seeks recourse in trying to set its own agenda and research work – and thereby becomes yet another actor in the process.

Globalization and its impacts on national water governance

General trends

Let us then briefly move to discuss trends in national water governance. We do this once more in the context of general trends in governance. These include the shift towards making central government leaner; from centralization to decentralization; the shift towards greater civil society participation in decision-making processes; and the shift towards engaging the private sector in public-private partnerships. Under some circumstances these shifts can make very good sense, but not under all circumstances. It has been argued that lean governments are not able to deal with growing environmental and resource management issues and are not able to govern production and consumption patterns. Where central governments are under-resourced, making them even leaner undermines the very conditions of getting the rule of law in place, a critical element of good governance. Where under-resourced central governments transfer responsibilities to further under-resourced lower governments, problems multiply. When under-

resourced central governments have to create governance systems that include large-scale public participation, this often results in symbolic participation. And when they have to make contractual deals with well-defined and rich private sector bodies, they often find themselves completely out of their depth – unable to deal with the complexities of private international law.

Water governance trends

Although geographical, historical, socio-cultural reasons imply that water governance should differ from place to place, through history there have been forces leading to converging water trends – for example, the spread of civilizations and religions, conquests and colonization. In the last century, water epistemic communities have increasingly led to converging state policies, marketing a series of ideas such as the hydraulic paradigm, integrated water resource management, the human right to water, decentralization, community participation in water, private sector participation in water management, etc. For example, through history water policies in Ghana have been influenced by external forces, but the results are not always appropriate for the country. I remember a case study in which Egypt was asking for drip irrigation technology, and the EU was offering good governance instead. Often the export of ideas results from a combination of ideological conviction, well-meaning idealism, scientific evidence of what works in the developed world, and a dose of paternalism. On the other hand, there are also limits to the demand-driven approach to development cooperation. Ultimately, for long-term sustainability, each country will have to manage its water resources within its own financial, technological and institutional capability and strategically use available international resources to meet its own needs. This calls for considerable ingenuity at state level to figure out what is the most appropriate way of doing business in a specific context. It also calls for considerable modesty on the part of outsiders providing panaceas to address water problems.

Conclusion

This brief overview of the theoretical challenges of the water governance problem leads us to a few critical research questions that need further examination:

- Given the vast number of issues that fall under water governance, where can global water governance make a difference? How can awareness of the politics of scale help to improve the framing of the issues for global water governance?
- Given the diversity of the governance framework, how can the system be made more accountable, legitimate, equitable and transparent, more responsive to correcting mistakes? Is a multiple actor/fora framework compatible with good governance principles? How can it be made more compatible with good governance principles?
- Is the very feasibility of the coordination mechanisms at UN level the problem? How long can we avoid facing up to a structural rehaul of the UN system in line with the problems and the knowledge of the 21st century?
- Should we have 'aquacentric' governance, or should water governance serve the goals and processes of sustainable development?
- Should we promote competition between different types of governance approaches instead of prescribing one way of universal water good governance?
- Given the resources available in the water sector what needs to be prioritized? This inevitably implies tradeoffs between different challenges, and ultimately national governments will have to make these trade-offs. Does this mean going back to sectoral approaches but within a different framing?

The (changing) role of national government in multi-level (water) governance

*Theo Toonen*¹

There is a difference between water management – even integrated water resource management – and water governance. Water management is about achieving goals, preferably in a functionally and socially responsive and efficient manner, with given means, and largely within given conditions and constraints. Water governance is about identifying, choosing or adhering to values and translating these values – water, safety, agriculture, urban space, natural beauty or artistic design – into goals, standards and institutional structures and processes. These are achieved in a context of public external accountability. Governance is about establishing the appropriate means and setting limits and constraints within which operational action in terms of water management can take place. And these are also achieved under conditions of public external accountability. Limits and constraints are not merely at the borderline of do's and don'ts. They also constitute the conditions for change and innovation. Without limits and rules – without scarcity and the need for choice – there is no innovation.

The quest for governance

If water management is about achieving goals and performance management, water governance is about joint decision-making. It is about consensus building and conflict resolution, and about external legitimization, which implies accountability. This, in turn, requires public discourse, rule of law, checks and balances. Both management and governance – and vice versa – are important.

¹ The author would like to thank Vincent van den Bergen for his useful comments as co-referent at the symposium.

One needs or presupposes the other. But the issues and underlying questions involved are often quite different. The choice among competing values and the translation of values into goals, constraints, and facilities can be envisaged as a separate act of conscious and deliberate or even centrally planned policy-making. More often this activity is embedded – and has to take place – in a process of piecemeal decision-making: step by step, by trial and error, and by learning by and learning from doing. This organic and evolutionary selection process is not seldom situated in the middle of a strong political struggle about underlying social interests and ethical values or embedded in the context of a battle for economic, bureaucratic or institutional power. In the debate on governance ‘Legitimation’ and ‘Power’ are the two sides of the same coin: no (public) power without responsibility, no responsibility without power.

Personally, I don’t think it has been much different in past times, but at least modern governance and policy-making – both nationally and internationally – are gradually and overtly being recognized and conceived of as fundamentally adaptive – may I say: incrementalist² – exercises. As a long time student in Public Administration I am keenly aware that this is a process of all times and all ages. Rather than deliberate – ‘rational’ – choices, governance is a process the outcomes resulting from anticipation, action and reacting and taking contextual positions and decisions – in gradualist processes and emergent situations, full of surprises and unexpected turns – ‘Events, my boy, events’ (McMillan). The political dimensions involved – be it in terms of conflicting values or of competing interests and power positions – raise questions of accountability, trust and confidence in those normatively or entrusted *de facto* with the position, and the power of binding decision-making for and on behalf of society. Political, corporate and bureaucratic leadership finds itself increasingly in situations of

² A. Wildavsky (1979) *Speaking Truth To Power: The Art and Craft of Policy Analysis*; Little and Brown, Surrey.

tackling public problems in ‘... a No-One in Charge, Shared-Power World’.³

The development of the notion and concept of multi-level governance (MLG) implies the recognition and acceptance of the fact that in a relatively short time-span of about 20 years, the most important (normative) locus of binding decision-making in and for society during the past 200 years – national government as the agent and embodiment of the idea of the modern Westphalian (sovereign) nation state⁴ – has undergone drastic change and transformation⁵. The changing position of the nation state in the process of governance since the late 1980s is perhaps most visible in the context of the European integration process, but has – in fact – occurred all over the world⁶. In the European context, the concept of multi-level governance (MLG) has been introduced in the course of the 1990s to be able to at least analytically deal with the impact of internationalization on the institutional position of governments, and the associated relocation of public power and governmental authority⁷. It has become necessary – not to say: inevitable – to address the changing role and position of national, regional and local government in the larger context of governance within the European region. Increasingly the concept is being introduced into the debate on Climate, Global or Earth System Governance. For this contribution, I have been asked to concentrate on the role

³ B.C. Crosby, J.M. Bryson (1992) *Leadership for the Common Good: Tackling Public Problems in a Shared-Power World*; Jossey Bass, San Francisco, 2005:8

⁴ C. Skelcher (2005) Jurisdictional Integrity, Polycentrism, and the Design of Democratic Governance; in: *Governance: an International Journal of Policy, Administration, and Institutions*, vol 18, no 1, pp 94–104.

⁵ T. Toonen (2010) Multi-Level Governance (MLG) and Intergovernmental Relations (IGR): Integrating the theoretical perspectives; in: E. Ongaro, A. Massey, M. Holzer and E. Wayenberg (eds) *Governance and Intergovernmental Relations in the European Union and the United States: Theoretical perspectives*; volume 1, pp 29–51, Routledge, New York/London.

⁶ J. Whitman (2009) *The Fundamentals of Global Governance*; Palgrave, London.

⁷ L. Hooghe and G. Marks (2003) Unravelling the Central State, but How?: Types of Multilevel Governance; in: *American Political Science Review*, vol 97, nr 2, pp 233–243.

of national government. I will do so, but in all modesty and due to the general lack of useful cross-national comparative research, I will have to limit myself to illustrations from the Dutch case.⁸

Multi-level governance (MLG)

Multi-level governance is not an easily defined term because it has different conceptual roots. It blends together two quite distinct meanings and disciplinary traditions. For some the concept of 'Governance' (as in the Governance (rather than management) of the Firm; Economic Governance; Governance of Financial Institutions, The Governance of IT systems, Corporate Governance or Government Governance) has an economic – or better: business – management if not (international) accountancy background. Throughout the course of the 1990s it became increasingly clear that 'corporate management' in an international or internationalizing local context needed to be complemented if not checked and balanced by governance, meaning: external accountability. To shareholders, but also to stakeholders, civil society, politics, and social causes, values and ethics, this is 'Governance' within the narrow – and therefore more useful – definition of 'external or public accountability'.

The second meaning has a policy and social science background, and originates in the late 1970s and mid 1980s.⁹ It implies the recognition of the 'discovery' that policy implementation is a matter of interdependency, rather than hierarchy or command-obey and that policy-making and execution implies thinking

⁸ The conceptual illustrations in this article refer to R.O. Keohane and J.S. Nye (1971) *Transnational Relations and World Politics: An Introduction*; in: *International Organization*, vol 25, pp 329–349, Cambridge University Press, Cambridge; and M. Keating (1997) *The New Regional Regionalism in Western Europe: Territorial Restructuring and Political Change*, Edward Elgar, Cheltenham.

⁹ T. Toonen (2010) Resilience in Public Administration: the Work of Elinor and Vincent Ostrom from a PA perspective; in: *Public Administration Review*, vol 70, no 2, pp 193–202. (Also republished in English and Chinese in: *Transnational Corporations Review* (TNCR), vol.2, no 2, pp 56–77, www.tnc-online.net.

in interdependency networks.¹⁰ These networks, in their effective operation were increasingly found to run across formal organizational borders and interorganizational boundaries. This also – if not especially – applied to the formal boundaries of governments as primary institutions of governance within the nation-state organization and the conception of modern democratic decision-making.

Rather than centrally unified and monocentric, the policy relations in the modern western welfare states were identified as interdependent and polycentric. With the globalization and internationalization – or should I say denationalization? – of policy-making in the modern state, this has only become more transparent and obvious. The polycentric nature of policy-making became more generally visible, not only for experts studying public policy and the inside of government and bureaucracy. Today, WikiLeaks provides free public lectures in Public Administration Classics on the functions of the executive, the work of the officeholder, the world of the bureau chiefs, the politics of bureaucracy, the reality of bureau politics, diplomacy, persuasion and the nitty-gritty of managing political administrative relationships. The most striking experience is that the publication of cables adds to the glamour and juiciness of these ‘dull administrative processes’, but reveals hardly ever anything new or things that we did not already know about. Does this mean that, so far and all in all, we may rely on the quality of democratic control mechanisms in international MLG?

By the last decade of the 20th century, the borders of the state became part of fundamental internationalization processes. These made increasingly clear that governance was not the sole monopoly of government. And the other way around, (national) governments gradually lost their historically established political role and position as the one and only undisputed locus for public decision-making in and on behalf of society. The internationalization process started a rather autonomous process of ‘defreezing’ traditional

¹⁰ P.A. Sabatier (1986) What can we Learn from Implementation Research?; in: F.X. Kaufmann, G. Majone and V. Ostrom (eds) *Guidance, Control, and Evaluation in the Public Sector – The Bielefeld Interdisciplinary Project*; Walter de Gruyter, Berlin/New York, pp 313–327.

authority structures – and along with them, their accompanying forms of legitimization and internal and external accountability. With internationalization, therefore, came the need to re-institutionalize the governance functions that had been assumed and routinely performed by the government apparatus for such a considerable length of time. This is basically the essence of the European integration project: renegotiate the institutional order within the region. European integration is part and parcel of a much broader process of globalization and internationalization. This also explains the broad current attention for ‘the quest for governance’ – both in the narrow and the broad sense of the word. Changing circumstances require attention for doing things different than before; that we do old things in new ways. This applies to public management, ‘old and new’¹¹, and it applies to governance – or public administration as it used to be called. In many respects, we are still in the middle of this reinvention process, particularly regarding the role and condition of national government in an internationalizing context of problem solving, policy-making and managing public affairs.

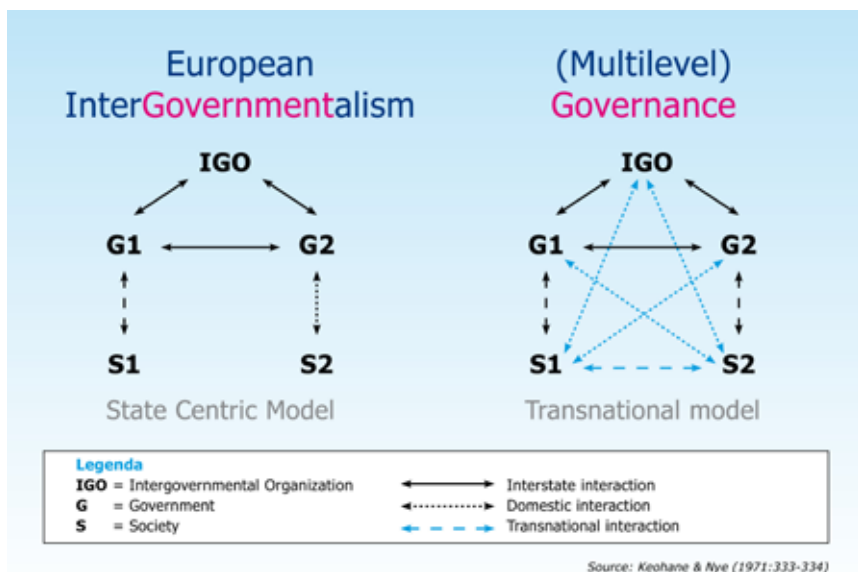
In polycentric international relations there are potentially many different water managers – locally and internationally – but despite the transformation that went on in government, only very few of them still have the institutional legitimization that national (Member) States have in the emerging world order, whether it is in the human rights or in the water management domain. To be sure: in many parts of the world, NGO’s, markets and international corporations have become important institutional contenders if not rivals to states, national regimes or autocratic – and sometimes outright corrupt – state bureaucracies. But it is important to recognize that national government in most instances is still the institutionally legitimized unit to represent national interests and territorial rights in international governance. I do not see this change easily in the foreseeable future, with or without the Internet, Social Media or WikiLeaks. These developments, however, do strongly affect the role, positioning and function of national governments

¹¹ L.E. Lynn jr (2006) *Public Management: Old and New*; Routledge, New York/London.

both within their domestic systems as well as in an international context.

Multi-level, multi-scaled, multi-layered

Let us, for the sake of analytical simplicity, limit ourselves to the experience in the European region. Although the national member state is still the undisputed corner stone of the European constitutional order, the reality of government in the European Union has dramatically changed over the past, say, 25 years. Sure, many domains of European integration have taken the shape and mandate of supranational governance. But as far as I am concerned, the overriding feature of the European integration project is that within a fundamentally still interstate – intergovernmental – judicial and political order, step by step a transnational policy practice and a routine of collaborative management and co-governance of EU policy has been emerging. This development, so far, has not so much eroded as it has *changed* the position of national government in the overall structure of governance. Social, economic and technological forces have urged us to start to think in terms of interdependencies and networks: hence the conceptual shift from *government* to



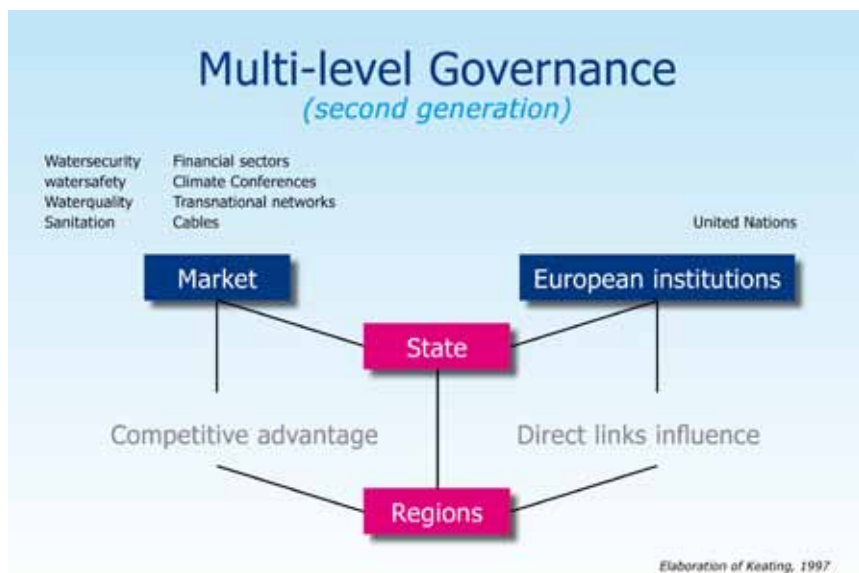
governance as the relevant unit of analysis and of policy in action. But this development has not eliminated the national (member state) government from the scene. In fact, we are dealing with the present day emergence of a very classical model in the study of international relations.

For a reflection on the emerging position of national government in multi-level water governance the history of the concept of MLG teaches us an important lesson. We have to make a difference between multi-layered governance and multi-level governance.^{1,2} Multi-layered government is still a rather traditional – government centric – concept, spelling out the relationships among various levels of government. These relationships are still important indeed, and too easily neglected in this age of ‘processes and networks’. But the current concept of MLG has to be much broader and put developments into a far more dynamic institutional perspective, way beyond formal state or government jurisdictions. Multi-layered government has become integral part of a much wider system of multi-level governance. MLG is about the identification and dynamic relationships among activities at multiple scales of governance. In this process governance issues and governance processes increasingly take place outside the bounda-



ries of (national) government, partly because at certain functional, territorial or temporal scales there are simply no established institutional vehicles for effective governance by government(s).

Second generation multi-level governance is as much about the institutionalization and institutional development of relationships for governance as it is about using existing institutions and relationships for emerging governance issues. It is ‘making governance’ as much as it is ‘doing governance’. Regions in ‘the knowledge based economy’ are no longer perceived as singular territorial entities, but as compound and complex ‘triple helixes’, i.e. networks shaped by governments, business and knowledge institutions and rooted in civil society institutions. Separate regions, but also separate sectors of governmental policy – water, agriculture, industry, environmental policy, water quality, water safety, preservation of nature, urban and regional policy, financial sectors – they all have under the current and highly dynamic institutional conditions, many different options for pursuing their values and interests in an international context. This includes with or without the state, by bilateral or by multi-lateral agreement, by international institutions like the European Union or the United Nations or by counting on competitive advantage in international and emerging



global markets, if needed with the help of international public private partnership or other strategic alliances with emerging global institutions of the civil society, like the Soros' or Gates' Foundations.

Sometimes, strategies of 'naming and shaming' suffice. The issue of trust and legitimacy, and therefore of reputation in governance, matters not only in an academic, but also in a very practical sense: most countries are really worried about their international reputation – a form of legitimization – and therefore in 'working the right way' according to internationally established 'green', 'safe', or 'socially responsible', if not 'sustainable' standards and 'good practices'.

None of these alternatives of international governance are a guarantee for success. Nor do they become so without cost. With the emergence and proliferation of more and more global and trans-regional platforms in the context of international environmental policy, climate governance, water management, water sanitation or water security issues – as we have witnesses in the last two decades – the institutional context and corresponding strategic options add up to the complexity of institutional trade-offs and dynamics. At the same time, however, due to the increasing transaction costs inherent in the effective exploitation of various options – both in an instrumental as in strategic sense – there is an increasing need for institutions which can seek alignment and re-alignment among various causes and institutions by building alliances and providing coordination and mediation among the various options and participants. This is preferably an institution which can still command and mobilize institutionalized legitimacy and accountability and generate some power, trust and confidence with respect to the institutional interests involved. Provided that it is capable of transformation, national government is still a marked candidate to this purpose.

If I apply this perspective to water governance and the governance of water management systems – as I was asked to do – what then is the role that national government should play in an emergent

system of multilevel water governance? Allow me to identify a few points of attention.

Non-executant role

First, legitimization is about choice and a proper organization of processes, systems and accountability structures. That is why the role of national government in MLG is changing towards a more and more 'non-executant' and more regulatory role, defining standards and constraints, often embedded in previously negotiated or enforced international agreements (Kyoto Protocol; EU-framework directives), internationalized standards for quality, safety, access or for 'good', 'healthy' water quality and 'robust' and 'sustainable' water safety strategies. National government is pushed into acting as a facilitator, rather than executive project manager and operating unit of large hydraulical installations or water safety infrastructures. In the Netherlands, this is illustrated by the development of the position of Rijkswaterstaat, from a national, functionally professionalized and rather hands on 'water bureaucracy' as an executive agency working under direct ministerial guidance and supervision, but very dominant in policy formulation, towards a more independent status as a body of professional knowledge and expertise, and a procurement agency, charged by the business-like maintenance and development of large-scale Dutch water management infrastructure, next to a professional and strategical management of procurement projects.

The former, sheerly untouchable and functionally professional bureaucracy and bullwork of civil engineers is now seeking 'design and construction arrangements' with 'market parties' rather than the hands-on execution of technological waterworks themselves. Partly this has to do with European market opportunities and regulations, partly with the need to adopt a more flexible, strategic and effective role in the modern 'network society'. It may also be illustrated by the inauguration of a Delta Commissioner – if he plays his role properly – in helping to overcome interface problems – sectorally and geographically – at local, regional and market levels of water governance in the context of the recently established

Delta Programme. This would anticipate and manage potential consequences of climate change for the overall Dutch water safety systems and freshwater provision.

Policy-making capacity

Second, from the viewpoint of effectively operating in a dynamic, constantly changing context of MLG, the expertise, competence and professionalism of national government should be aligned with strategic policy-making and political-administrative leadership, and less with the managerial and procedural concerns of executing policies, or guiding and maintaining large-scale executive organizations for (water)project management and implementation. An 'intelligent intelligence unit' with substance oriented, highly skilled, independent thinking, strategically operating, political-administrative professionals and internationally oriented policy-makers is favored, rather than a gathering of process and procedures oriented (new) public managers. In this respect the Dutch Government – not only the Ministry of Infrastructure and Environment, which includes water management – still has a considerable road ahead. The philosophy of the General Civil Service Department – Algemene Bestuursdienst (ABD) established in the mid 1990s to modernize Dutch central government human resource management – in the long run has probably done more harm than good by stressing the 'normalization' of civil service status and promoting generic 'managerial and procedural competences'. Combined with the deinstitutionalization of classic political governance principles and routines, and without being able to replace them with new safeguards, this has de facto geared large parts of the rank and file of national civil servants towards a 'can do' servitude. This is based on personal politicization rather than professional loyalty, political leadership, and shifts towards alignment with and compliance to higher echelons in the bureaucracy, rather than independent expertise, problem analysis and practical knowledge ('Dienstwissen'). Strategically it has led to a shorter orientation on the agenda of the minister in charge, rather than a long-term orientation on pressing (international and global) emerg-

ing problems and their consequences for the inhabitants of and quality of life in the Netherlands.

A crucial role for national government in the complex setting implied by MLG is the ability to formulate a clear, transparent and directive national policy, based on international standards, viewpoints and strategies, which serves as a foundation and constraint for regional, ecological, socio-economic, cultural and historical territorial agendas. Without such constraints, there is no innovation. But large parts of the national Dutch civil service seem to have moved towards a project and process inspired orientation and interpretation of the job. The results are evident in many domains of government policy, the least perhaps within water governance with its historical inherent local and decentralized institutional set-up. But this set-up in itself is being threatened by a clear lack of interest among many leading civil servants in value sensitive institutional design and in other institutional issues. 'Governance structure' has almost become a dirty word – the 'f-word' in the Dutch context – with the presupposition that only 'performance counts' and that 'structure follows strategy', even though the historical transformation and experience of the European integration project just blatantly points in the opposite direction, i.e. states have to drastically change their strategies because the international structure of governance – be it in financial markets or in water policy – is dramatically changing.

Comparative understanding

Third, and crucial to a more strategic operation in the context of MLG, is the development of a truly comparative cross-system and international understanding of how other systems work and operate, not only 'to sell' Dutch water policy internationally, but to properly understand national interest in a MLG context. Institutional settings and historical backgrounds related to water governance in other countries might be very different, which limits the 'portability' of experiences from one country to another. It is essential to fully understand the existing governance systems and their historical and cultural background. For certain questions, the rele-

vant issue for Dutch water governance is not how other countries have organized their water policies, but how they have institutionalized the protection of their 'vital national interests', the protection against critical societal vulnerabilities or the organization of the overall resilience of their systems. Different countries may take care of their water governance issues in quite different ways, based on the critical functions in society and the ways these have been arranged. Where in the Netherlands certain important organization principles have evolved around water, in other countries the focus may have been on other resources or sectors (such as mountains, deserts, the fisheries sector or the industrial sector). In these cases quite different routes may have to be taken to deal with water related issues, also in identifying allies in a transnational context.

Systems responsibility

Fourth, in a situation of MLG, national governments have to adopt system responsibility. Particularly at the national level more rather than less attention is required for the governance of systems – and even systems of systems – rather than its role in the governance within systems. This does not only apply to issues of regulation and control, proper procurement structures and strategies, and the attention for integrity and 'principles of good governance'. Water issues – whether national, local or international – are not going to be resolved by science and technology as such. Particularly in the current debate on climate change and global warming, many environmental scientists claim more than they can offer. Technology opens new options, solutions and sometimes the promise of radically alternative courses of action in solving social, political or economic problems. Science is an important source for identifying possible solutions and innovations in the context of pressing problems. But alternative technologies and scientific findings in themselves are sources of legitimization and rationalization in processes of governance. As such they will be the subject of permanent contestation in, for example, a battle among 'merchants of fear' against 'merchants of doubt' – or the other way around – as is taking place in the current climate change or nuclear power debates.

Of course, knowledge management, the mobilization of technical knowledge and expertise and the identification of known and unknown ‘knowns and unknowns’ are important responsibilities for national governments. But the identification of legitimate political and social interests is also to be admitted if not normatively included – even against their will – in the political debate on modern water management. The issue of governance, multilevel or not, implies that people – not water – should be central to the debate and organization of water governance. From a governance perspective water management is not about hydraulics, dykes or purification plants. It is about the hearts and the minds of the people and their vital interests. Solid knowledge management should be based on public problem analyses. Dealing with water governance requires the involvement of all relevant stakeholders. The multi-actor setting should not be considered as a problem, but as the necessary key to solutions. Mere operational stakeholder management risks the inclusion of vested interests only at the expense of more general public goods, water ethics, or the inevitable ‘new kids on the block’ that come to inhabit water management systems from time to time, given new technology, demographics or societal development.

The legitimization, for example, of the Dutch Water Board (Waterschappen) as governance institutions of international standing – and as such potentially strong allies to national government in a MLG policy game – has come under serious pressure. The origin lies within its governance structures, not its acknowledged functional expertise nor its performance – the two factors usually stressed in the current debate on the need for a separate position of water boards. The historical institution ‘Waterschap’ has become estranged from relevant interest configurations, crucial for contemporary water management, particularly in the western, urbanized part of the country. While involvement of relevant actors has traditionally been quite strong (farmers, land owners), the trend is that the interest and involvement of Dutch civilians is declining. Water boards are hardly rooted in the urbanized neighborhoods and metropolitan areas of the urbanized delta. As a consequence, present political discussions seem to ignore the importance of water boards – recognized and critically acclaimed by nearly every

national and international ‘water specialist’ in the field – in performing water governance tasks aimed at ensuring essential water-related functions (water safety and water supply), rooted in local networks and knowledge of the local situation.

However, provincial – and as such also national – government has failed to modernize the constitutional assignment to identify new interests which are emerging in the context of contemporary international water management, and therefore should be involved and incorporated in the existing governance structures. In the 1980s and 1990s environmental and natural preservation interests were identified and included in the overall governance structure. But the emerging interests in the Netherlands and all over the world are increasingly urban and neighborhood based. This involves a variety of potentially new vital interests to be institutionally mobilized and represented in the governance of the board of this crucial water governance institution. From a theoretical point of view, it is obvious that the emerging practice of dealing with these interests and ‘ordinary’ people behind it in the context of project management and the execution stage of policy, will not do the job. Within this strategy, people will negotiate but not associate with the Waterschap as a vital institution in Dutch water management.

Constituting self governance

A more permanent and deliberative involvement of these interests and the people behind them in the formulation of the general strategy and policy of respective water boards is needed, in addition to the operational involvement when carrying out the job. The current political debate is on the pros and cons of ‘water board democracy’, but the issues involved in the governance of and by water boards have little or nothing to do with ‘democracy’ in the generic meaning of the concept. At stake is the principle of self governance – even if this implies large-scale self governance. Also the governance of water boards has become a multi-level governance issue in which various spatial, temporal and functional scale requirements need to be accommodated by one overarching – ‘all in’ – govern-

ance institution. The historical institutional rationale of water boards in the Netherlands is that people affected in their daily economic, cultural or social household by the general policies and decisions of the water board should be involved and be a full partner in the governance of this institution.¹³ They pay the price – in cash and in kind (maintenance of property, forgone economic options and opportunities in the interest of the regional water management, setting priorities in the deployment of resources and personnel for urgent or required water management tasks, etc.) – for the overall policy decisions of the board. In exchange, their participation – their ‘voice’ or ‘say’, not their veto position – in the overall governance process should be secured.

The water board with its historical record and current reputation is easily identified as a crucial stewardship council for strategic asset management (quality care and maintenance) within the structure of Dutch water governance. With the erosion of its position, a powerful and authoritative ally for national government in MLG might easily disappear from the scene. Although water boards have the obligation to protect, maintain and modernize their own institutional structures and responsibilities – and they have not done a great job in this respect lately – it is only national government which is in the position to regulate and legislate proper governance structures for the system as a whole. Sometimes, idiosyncratic, traditional and endogenous institutions like water boards have to be protected against themselves, particularly in an internationalizing context. As an historical heritage they are often taken for granted, unless they are provided with a special seal. In this case there is no UNESCO World Heritage trademark available to do the job. They have to be represented, explained and justified as ‘institutions of vital domestic interest’ to an international forum full of pressures towards ‘standardization’, ‘level playing fields’ and ‘the clear separation of governments and markets’; concepts that make it difficult to survive as a mixed motive or ‘hybrid’ form of governance. In such a context, an idiosyncratic strategic domestic governance

¹³ T.A.J. Toonen, G.S.A. Dijkstra and Frits van der Meer (2006) Modernisation and Reform of Dutch Water Boards: Resilience or Change?; in: *Journal of Institutional Economics*, vol 2, no 2, Cambridge University Press, Cambridge, pp 181–201.

institution needs to be protected against the strong and often justified forces towards ‘structural isomorphism’ by national states themselves. The truth is that few, if any, of the national government departments outside the Directorate-General for Public Works and Water Management, have any consistent understanding, let alone forward-looking vision of the role of water boards in national or international multi-level water governance. They are generally understood as ‘old’ – dangerously close to ‘old fashioned’ – executive organizations for Dutch water policy. Partly this is caused by the fact that water boards themselves over the past few decades have been paying more attention to their functional duties in water management, than their capacity and potential in modern, multilevel water governance.

Political proficiency

In sum: modern water management in MLG is fundamentally bottom up, founded on a strong societal self-organization. Human and social capital are as important as money, and form the key to good water governance. This value can be seen in poorer countries with less material and economic resources than the Netherlands, and therefore more dependent on creativity and innovation. Decentralized systems can in fact be very structured, well-organized and effective. The interests of all relevant actors should be taken into account. Solutions to improve the system should be based on consensus building and negotiation. Many systems come from (or are still in) a transition process from the centralized tradition of the (‘unified/federal’) nation-state. The future of international water management lies with stewardship, smart water grids, stakeholder involvement, (‘federalized’) catchment area organizations, water- and user – boards, large infrastructure management (also by private firms), public-private partnerships, well-regulated markets and a strong involvement of financial institutions ranging from micro finance for small-scale social startups to large-scale strategic asset management for the maintenance of these large infrastructures.

Water safety and water quality are constantly under threat of ‘the tragedy of the commons’ as well the daily neglect of mainte-

nance by 'politics as usual'. It takes an effectively operating multi-level governance system to tackle public problems in the 'no-one-in-charge, shared-power world' that has emerged as the institutional stage of modern international water management. It takes a strong, solution driven, internationally oriented, professionally qualified, bureaucratically competent and politically proficient national government organization to deal with it.

The governance of large dams

A new research area

*Jill Slinger, Leon Hermans, Joyeeta Gupta, Pieter van der Zaag,
Rhodante Ahlers and Erik Mostert*

Our current familiarity with large infrastructures, the place they hold in the landscape and the roles they play in modern living combine to make us lose sight of their long-term, system-wide effects. In this paper, the action of the large infrastructures of dams in structuring both the biophysical and the societal environment in which they reside is elucidated. Thereafter, the particular nature of the governance of large water infrastructure is clarified by juxtaposing the governance of large dams between governance in general and infrastructure management in particular. Finally, the paper concludes by identifying the necessity for research on the governance of large dams.

1 Introduction

Infrastructures form an integral part of modern day societies and continue to play a role in shaping the landscape, harnessing environmental resources and influencing the interactions of people with the biophysical environment and each other. We have long been familiar with the network infrastructures of the roads and railways, as well as the water supply and sanitation systems, and are becoming accustomed to the increased connectivity associated with the social network infrastructures. The reflexive manner in which social actions are constrained, enabled and shaped by infrastructures, which are themselves shaped by society, forms the focus of scientific interest for structuration theorists (Giddens, 1986), complexity scientists (Vespignani, 2009) and the motivation for the exploratory analysis undertaken in this paper. Indeed, it is through the lens of water governance practice that the authors wish to explore how people, as they interact with an infrastructure and its associated technology in their ongoing practices, enact

structures which shape their emergent and situated use of that infrastructure and technology (see Orlikowski, 1992).

In undertaking such an exploration, we first briefly examine the meaning of water governance, then move on to describe the practice of infrastructure management. Next, we choose to focus on a large water infrastructure – dams – and to indicate how the governance of large dams differs from infrastructure management and governance per se on the basis of seven key characteristics. Finally, we identify the need for research on the governance of large dams and argue for a transdisciplinary approach to this new research area.

2 Water governance

There are many interpretations of the term governance. A common element in the various usages is the distinction from government as exemplified by Rhodes (1996) “governance signifies a change in the meaning of government, referring to a new process of governing”. Recently, Lautze et al. (2011) stressed three common features in governance definitions: governance is consistently viewed as a process, taking place through institutions (including mechanisms, systems and traditions), and involving multiple actors. Furthermore, they emphasized that governance is not about the outcomes of the process. Rather, the desirable outcomes will be different for different actors, and that “it is impossible to know that such outcomes are in fact ‘good’ without a participative and transparent process to define a good outcome” (Lautze et al., 2011). In our view:

- Governance is different from government per se (Stoker, 1998). Particularly, it includes non-government actors as well.
- Governance stresses the need to find new processes and mechanisms to deal with the multi-actor character (or the network character) of societies (Klijn, 2008).
- Governance is about the processes by which societies govern. These processes should lead to outcomes, but the outcomes are

not central; rather they are themselves to be decided upon among multiple actors in a governance process.

- Governance processes are typically shaped through a mix of three archetypical institutions of markets, hierarchies and networks.

The last point requires further explanation. Where markets operate, they operate in certain regulated spaces within society (Hermans et al., 2006). Regulation can come from hierarchies or networks, where the latter would include ‘self-regulation’ in line with a view of ‘self-organising networks’ (cf. Rhodes, 1996). The same applies to networks; they operate in certain spaces of society, but always within a larger context of, or featuring, certain hierarchical features. Hence the importance of command-and-control mechanisms in managing networks, and balancing between hierarchies and networks (De Bruijn and Herder 2009; Vespignani, 2009).

In particular, water governance refers to the manner in which power and authority are exercised and distributed in society, how decisions are made and to what extent citizens can participate in decision-making processes concerning water (WWDR, 2003). In essence, water governance deals with how a society governs the access to and control over water resources and their benefits.

3 Infrastructure management

The design and construction of large infrastructures has long been the domain of the engineer. Technical knowledge and its application in protecting society from natural disasters, e.g. floods, or in insulating society against natural variability by securing the supply of resources, e.g. irrigation systems, have laid the foundations for development. The management of the infrastructures has traditionally also been the domain of engineers and this has led to many highly specialized and advanced technologies for infrastructure operation. Examples include automatic operating systems for dams, national traffic monitoring and operational control systems, power grid load management, amongst many others. The infrastructure operation systems represent the pinnacle of a phased and structured approach to problem solving (De Bruijn and Herder,

2009) in line with the technological purpose of the infrastructure design. Such systems often cannot accommodate altered perceptions on the value of the infrastructure, its impact in society, changes in the manner of its use, nor adapt flexibly to altered circumstances such as an emergency situation. Similarly, such systems are seldom designed to accommodate requirements at the whole systems level; instead they are designed to work efficiently and well within the constraints of existing policy and decision-making structures. Indeed, such systems may even constrain actors in the scale at which they may attempt to adapt to altered circumstances and requirements (Vreugdenhil et al., 2010).

Just as with administrative governance, infrastructure management occurs throughout modern society and forms the daily task of many of its technically trained members. In the case of large water infrastructure, infrastructure management activities can focus on issues such as the management of an irrigation network, the treatment and delivery of safe drinking water, the construction and maintenance of dikes, and the construction and subsequent operation of large dams.

4 Governance of large dams

The governance of large-scale water infrastructure constitutes a special case of governance. Whereas general governance theories and frameworks stress the human and social character, focusing on governance as processes between actors, we choose to stress the particular nature of the governance of a large water infrastructure – dams- by juxtaposing it between governance in general and infrastructure management in particular.

The seven key characteristics of: (i) the environmental resource; (ii) the unit to be governed; (iii) institutions; (iv) scale; (v) knowledge; (vi) the actors; and (vii) the distribution of costs and benefits, which are used as the basis of the analysis, are described hereafter and a summary of the analysis is presented in table 1.

4.1 The environmental resource

Infrastructure represents human interventions in the biophysical environment to manage the risks associated with natural variability, and alter the access to and use of ecosystem goods and services. Currently, many countries deal with the effects on the environment of the construction of physical infrastructure through the policy instruments of environmental impact studies, mitigation and environmental management systems. However, the ongoing relationship between physical infrastructure and its environment throughout the lifetime of the infrastructure often goes unacknowledged. The cumulative or long-term effects of large infrastructures can only manifest over time and are not always understood at the outset. For instance, the effect of road and rail networks on the fragmentation of the habitat of many terrestrial species and the environmental impact of reduced freshwater flows on the aquatic environment of downstream rivers and estuaries were not foreseen by infrastructural engineers. Evidently, while the benefits of infrastructures are clear to those involved in their design and construction, the environmental and long-term societal costs (e.g. displaced communities, health risks) are not always clear (Brown et al., 2009). The need to acknowledge the deep connection between infrastructures and the environment within which they exist and to take the resource limits and requirements for the maintenance of ecosystem goods and services into account was emphasised by the World Commission on Dams in 2000 (WCD, 2000) and reiterated in the recent ten year review (Moore et al., 2010).

4.2 The unit to be governed

Unlike normal governance processes, governance of infrastructure is focused on physical infrastructure. The governance of large-scale infrastructures needs to acknowledge and centralise the connection between the social and physical (i.e. infrastructural) phenomena. In the field of technology development and innovation studies, the awareness of this connection has given rise to the development of a 'Large Technical Systems' approach for studying the development

of technical infrastructures (Coutard, 1999; Ravensteijn et al., 2002; De Bruijne, 2006). Similarly, this connection is a critical element in the study of the governance of large water infrastructure and the characteristics and limits of infrastructure, thus determining the scope of governance. Large-scale infrastructure has a number of characteristics, namely, the infrastructure controls an environmental resource, it has high upfront costs, there are sunk costs which make projects irreversible, and there is a high degree of path dependency. In addition, infrastructure projects are often high prestige projects resulting in infrastructures that can become symbolic and form part of social identity e.g. the Dutch dikes.

4.3 The institutions

Governance is about institutions. How do actors in society shape institutions and what institutions are suitable modes of governance in given circumstances? Thus, if governance is about the process, then the institutions, and institutional diversity, are one of the outcomes of the processes; which then in turn condition subsequent governance processes. This is the view that is visible, for instance, in the work by Ostrom on institutions (Ostrom, 2005). Likewise, large infrastructures can be considered both the outcome of, and exogenous context variables for, governance processes. Through these governance processes, large infrastructures are shaped by institutions and in turn shape institutions (see Giddens, 1986; Orlikowski, 1992). Initial norms, rules and procedures lead to critical decisions regarding the construction of large infrastructure. Once the infrastructure is created, it tends to re-shape the norms, actors, rules and procedures. Indeed, the practice of managing the infrastructure may not even cohere with the spirit of its design, i.e. the paradigm underlying its design and implementation (Franziska et al., 2010).

4.4 *The scale*

Three scale dimensions can be distinguished with regard to large infrastructure. First, most large infrastructures are designed to last a long time and in practice have longer lifetimes than envisaged in the design phase (Wieland, 2010). Second, large infrastructures extend over large spatial scales or have an influence that extends over large spatial scales. For instance, dams enable harvesting of a resource that has a fluvial scale and environmental effects extending downstream. Third, administration of an infrastructure may take place either at the scale of the infrastructure e.g. local dam operator, or completely elsewhere such as in the capital city.

Both the temporal and the spatial scales do not match well with government or governance scales. Governments are in power for short periods of time and the different levels of governance may not match the scales of the infrastructure.

4.5 *The knowledge*

Large technical infrastructures raise a number of knowledge related issues. The technological dimension involved easily leads to the emphasis of technological knowledge over other forms of knowledge, with engineers rather than social scientists holding a central role. The only exceptions are economists, because of the huge investments needed (Coutard, 1999).

The special role played by technical knowledge, however, easily leads to the assumption that there is such a thing as 'right' knowledge, and that 'sound science' can (help) settle disputes over infrastructures. However, despite the cleverness of engineers, hydrologists, ecologists and other scientists, a high degree of uncertainty is still associated with their knowledge, which is also generic rather than situation-based. This is reflected, for instance, in the calls for 'adaptive management' and transdisciplinary studies (Dronkers and De Vries, 1999). Therefore, although a recurring conception is that 'hard' science can settle disputes over infrastructures, often it

cannot. As is known from the literature on ‘intractable controversies’, ‘wicked problems’ and policy change and learning, knowledge cannot always settle these controversies. Knowledge can be contested, with different ‘coalitions’ favouring different types of knowledge. In fact, a significant part of the literature on such disputes concerns disputes related to water and water infrastructures (see Sabatier and Weible, 2007). In works on governance, the ‘subjectivity’ of knowledge and the importance of perceptions and mental models are generally acknowledged.

4.6 The actors

Governance is about institutions, and governance is about actors. Large infrastructure governance is generally characterised by a large number of actors at multiple levels of governance. This is even true in a hierarchical and centralised system; governance of large infrastructure is always multi-level governance. Also, given the large temporal time scales involved, the importance of different actors changes over time. In the beginning actors who take political decisions, finance, design and build the dams are important – as are local stakeholders – and over time the dam operators become more important. Furthermore, there is substantial variation in the power of actors; some actors have both high power and high interest (ministers, investors, etc.); some actors have low power and high interest (local stakeholders). Finally, actors who have specific knowledge or expertise play a role, as explained in the discussion on knowledge. In addition, actors who are close to the operation of infrastructures play a special role. Line operators in the control room play a critical role, and one that has grown in importance in recent years (Van Eeten et al., 2002). They have tacit or implicit knowledge about what is going on and what operational responses are appropriate.

4.7 The distribution of costs and benefits

At the time of its construction, infrastructure embodies the physical manifestation of societal convictions regarding the control, access to and use of environmental resources. For example, the location of a dam and the associated water delivery system determines who is upstream and who is downstream; who is a victim and who benefits. The building of a dam leads to reallocation of existing (often implicit) rights of access to water. With recent innovations in the contracting forms used for the commission of dams, the creation of a dam also introduces and assigns new positions and pay-off rules: owner versus outsider, who bears costs and who is entitled to what benefits? Over the lifetime of the infrastructure, societal values can alter and this can lead to changes in the operation of the infrastructure. The extent to which the infrastructure shapes the new rules regarding the distribution of costs and benefits depends on the type of governance system in place.

5 The need for research on the governance of large dams

In this paper we have indicated that the governance of large dams differs from governance per se and from infrastructure management. It is also evident that despite the recognition and attention for the problems associated with large dams by the World Commission on Dams in 2000 and beyond, many issues persist and new challenges have arisen in the last ten years (Moore et al., 2010).

It is our contention that by viewing the governance of large dams as a special case of governance, research into the governance of infrastructure can build on existing theories. In particular, research can build on existing theories of governance and institutions. However, as a special case, it needs to complement, extend and modify these more general governance theories and questions, so that they accommodate the specific nature of infrastructures, as human constructs at the interface of societies and their biophysical environments. Clearly, multidisciplinary perspectives are needed in

tackling such complex research, but situated knowledge at the local and the systemic level is also necessary. Accordingly, we argue for a transdisciplinary approach in studying how governance processes shape the large-scale infrastructure of dams and how large dams in turn shape governance processes.

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Table 1: The governance of large dams compared with infrastructure management and governance per se.

	Governance	Governance of large water dams	Infrastructure management
1	Environmental resource to be governed	No direct link	Infrastructure embodies the human intervention to manage the risks of: alter access to and reallocate the resources of the environment
2	Unit to be governed	Not clarified upfront: may be social, physical or both	The infrastructure network, e.g. the road network or train lines. In the case of a dam, barrage or bridge, the management focus is the structure and associated engineering work (such as canals, sluices) itself.
3	Institutions	Shapes and is shaped by governance processes	Shaped by infrastructure. Initially focused at local administration, e.g. dam operator. Later system-wide effects induce upscaling of institutions, e.g. river basin organisations or provincial national road networks. Technical demands of infrastructure still structure management
4	Scale	Any	Large: – Spatial – Difficulty with extreme conditions such as traffic jams for roads or floods and droughts for dams – Often: localised administration
5	Knowledge	Contained in 'mental models' of actors	Primarily technical knowledge possessed by engineers. Local operators may manage the system differently from the original technical design for management
6	The actors	Diverse, with divergent interests, power, access to resources and knowledge	Primarily public actors such as Ministry of Public Works, or public-private partnerships. Can also be private companies such as rail service companies. Displaced communities.
7	Distribution of costs and benefits	Dependent on the equity of the governance system whether elites benefit or the populace – in democratic societies the distribution of costs and benefits provides a rationale for governance	Often inequitable distribution of costs and benefits. Infrastructure management aims at use of infrastructure within constraints of existing policy and decision-making structures.

Governance capacities for adaptive water management

Bert Satijn and Wilfried ten Brinke

Adaptive water management for an uncertain future

Uncertainties are a fact of life. We do not know how socio-economic developments and the consequences of climate change will affect our society in the next decades, yet we already have to design adaptation strategies to be prepared for this uncertain future. We also live in a complex world in which everything is interrelated and measures that serve one interest should preferably serve several other interests as well. More and more, people have a say about the spatial planning of their surroundings, and politicians and administrators are increasingly called to account. Especially in deltas such as the Netherlands these uncertainties and complexities come together: a high population density; multiple interests that have to be assembled on the same small piece of land; sea-level rise; land subsidence; and a future outlook of an increase of droughts, heavy rainfall and river peak discharges.

It is both unwise and unnecessary to take measures that anticipate changes in, for instance, river peak discharge that might unfold at the end of this century. Rather, a stepwise approach should be followed in which the steps are sufficiently large to be sufficiently prepared for changes in the near future. We need to take care, however, that these steps do not block but facilitate additional measures to be taken in the long run. The small steps need to be part of a long-term strategy and also serve the short-term needs.

Water professionals need to be able to follow a stepwise approach within a long-term strategy, facing an uncertain future in a highly complex world. In addition to knowledge on water issues, they need capacities on water governance. What these capacities look like and how they can be strengthened is the subject of this paper.

An uncertain future

Throughout the course of this century yearly averaged temperature in Europe will rise by 2–6.3 °C in 2100 compared with 1990 (EEA, JRC and WHO, 2008). Also the patterns and intensities of precipitation will change. Generally, for Europe wetter winters and dryer summers are anticipated. Heavy downpour will be more common, especially in the summer. Most uncertain are changes in the frequency and intensity of storms. Possibly the zone with storm depressions will shift to the North, causing storms to become more frequent in the Baltic States and Scandinavia, and less so in the South (Pinto et al., 2007).

The degree to which climate will change can only be quantified as a wide range, but it is clear that climate extremes will increase. The consequences of this change are even (far) more uncertain. Most recent results on projected changes in Rhine discharge near the Dutch–German border indicate that peak discharge with a probability of 0.1%/year may both increase by up to 30%, or decrease



Figure 1: Around the globe the impact of climate change on water issues varies from one place to another. Generally, the risks of floods and droughts increase. Pressure on water quality will also increase.

by up to 5% (Görge et al., 2010). Most recent results on projected (absolute) sea-level rise are far more dramatic than the latest IPCC results: 0,90–1,60 m in 2100 with respect to 1990, compared with 0,25–0,76 m according to the IPCC (Arctic Monitoring and Assessment Programme, 2011).

A complicated world

The Netherlands has to fit all of its housing, agriculture, employment and transport onto a relatively small land surface area while maintaining the quality of the living environment and the landscape. The way to use the available space as effectively as possible is to view these functions and features as an integral complex system, including the additional demands made on water management, caused by the effects of climate change. In their Second Sustainability Outlook (Netherlands Environmental Assessment Agency, 2010), the Netherlands Environmental Assessment Agency (PBL) showed how optimizing the spatial allocation of activities can maximize the sustainability of the Netherlands. Their study was based on a projection of modest economic growth (1.7%) and population growth (to just over 17 million in 2040), and a projection of high development pressure with an economic growth of 2.1% and a population of almost 20 million by 2040.

The Netherlands Environmental Assessment Agency concluded that in the present system, political and administrative decisions on the various social issues are almost invariably taken from a sectoral, and thus partial, viewpoint, leading to partial solutions and compartmentalization. To accommodate the current demand for land, while ensuring that future generations inherit a high-quality living environment, we need a more coherent, long-term vision.

Short-term steps and long-term strategy

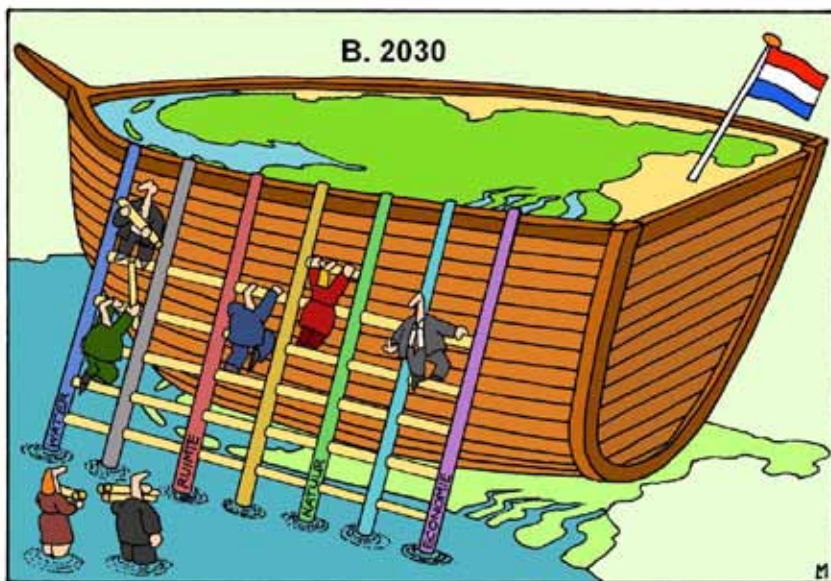
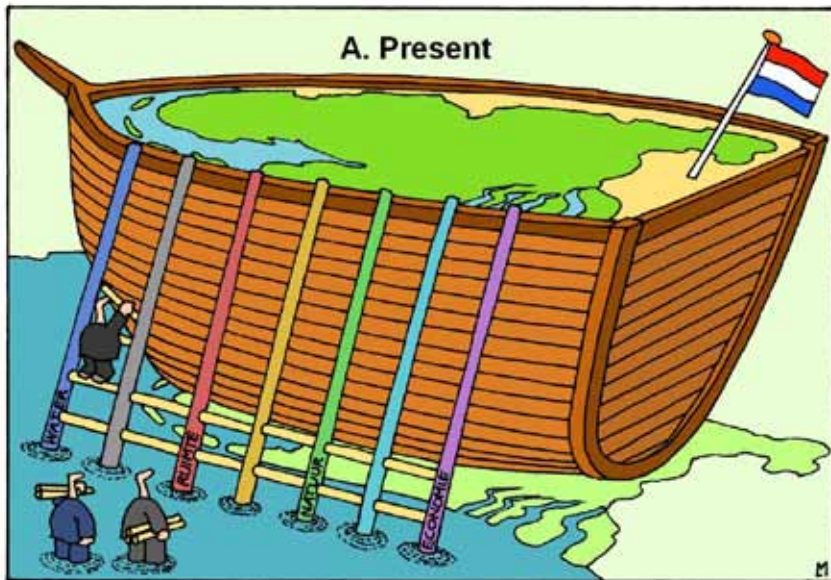
A more resilient society with respect to water allows us to adapt more easily to socio-economic developments and the consequences

of climate change. By following a short-term, stepwise approach, we can adjust our measures or take additional ones if socio-economic factors or the consequences of climate change turn out different than anticipated. These measures have to fit in a long-term strategy, however. Every step we take has to connect to the previous one and facilitate the ones ahead so that, in combination, they are a pathway towards a climate-proof and sustainable future in which the availability of sufficiently fresh and clean water and a high level of flood protection are secured.

Making the right connections from one step to another is of vital importance. This means that when taking a step, and implementing a measure or strategy, we need to think ahead of how this step leads the way to additional steps in the future. Every step must contribute to the resilience of a flexible system. By no means should steps be taken that block essential measures in the future.

This approach is illustrated in figure 2. All water professionals have to get aboard in finding adaptation strategies that address all the interests involved. In order to really assemble these interests, they need to look further than their own discipline. They have to climb ladders whose rungs are integral plans and measures that connect different disciplines. Each rung is a step, and the ladder represents the long-term adaptation strategy. Professionals have to invest in their governance capacities to be able to climb the ladder.

In the Netherlands, the Delta Programme has been initiated in which strategies are explored for future flood risk management, freshwater supply, and new urban development and restructuring (Ministry of Transport, Public Works and Water Management et al., 2010). The concept of short-term steps that fit in a long-term strategy makes a good approach for the Delta Programme. In fact, it has already been adopted by this programme through the concept of adaptation tipping points, a method that links short-term measures to a long-term strategy.



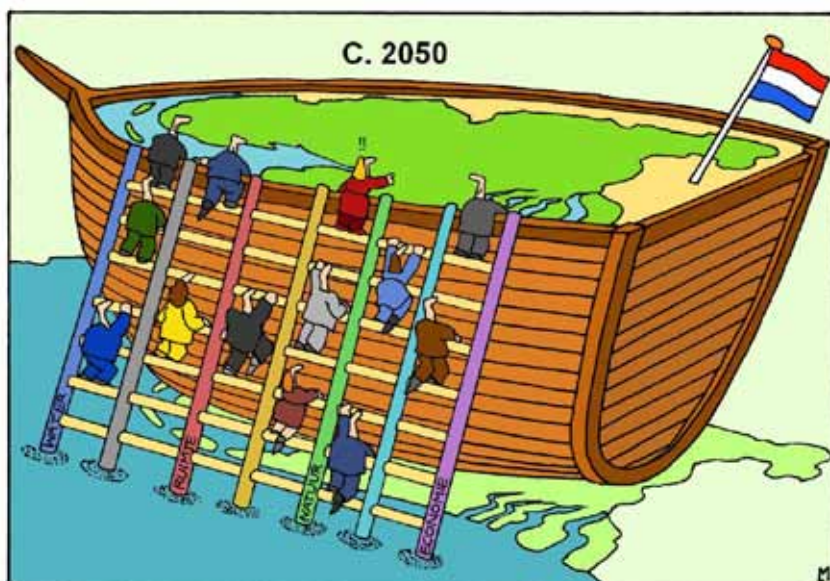


Figure 2: All water professionals have to get aboard in finding adaptation strategies that address all the interests involved. The ladders represent the long-term adaptation strategy, and their rungs are integral plans and measures that connect different disciplines.

Adaptation tipping points are defined as points where the magnitude of socio-economic developments or the consequences of climate change is such that the current policy strategy will no longer be able to meet policy objectives and alternative strategies are needed (Kwadijk et al., 2010). Each new strategy has its own future tipping point that, again, requires a switch to be made. In the long run water management is a succession of strategies. Adaptation thus follows pathways of strategies that are influenced by current and future climate, socio-economic developments and societal perspectives. A strategy is sustainable when it can cope with various possible futures while being flexible enough to be adapted in case the future unfolds differently than anticipated (Deltares, 2010).

An example of a sustainable strategy (or resilient approach) is the strategy of sand nourishments for coastal flood protection. These nourishments do not block alternative measures or strategies in the future, and serve several interests at the same time. Strength-

ening flood protection by building seawalls along the coast or raising dikes along the rivers is far less sustainable; if we need to switch to alternative strategies, they may be in the way.

Capacities for water governance

Flexibility is key to adaptive water management. Water professionals need to invest in a number of governance capacities that will enable them to integrate the legal, managerial, financial, institutional, and social elements.

By doing so they will be able to look further than their own discipline and assemble several interests into one solution. This solution will probably not be the best solution for all interests at stake; interests have to give way in order to give other interests elbow-room as well. There will not be a win-win situation for all the interests involved. More importantly, the society as a whole will be the beneficiary.

Organizational/managerial capacities. Being able to look further than your own discipline means being able to understand the point of view of other stakeholders and assemble interests into one solution. An example is integrating a car park inside a flood defence. If a water board and a municipality think along the same lines, they are able to assemble their interests and come to a joined solution. It also means realizing firm legal and financial arrangements. Working separately blocks this solution. After all: a water board does not build car parks.

Those involved in water issues need to have an open mind for other interests. In fact, they need to be able to manage their strategies across different organisations and disciplines. Balancing and assembling all the interests means applying a choreography that gives all stakeholders a role in a play that is more than the sum of the parts.

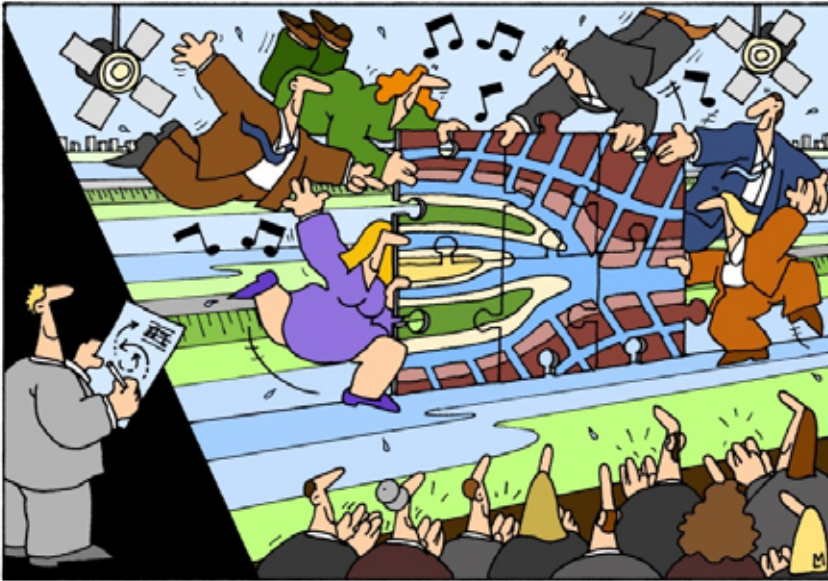


Figure 3: Balancing all the interests means applying a choreography that gives all stakeholders a role in a play that is more than the sum of the parts.

Financial capacities. Stakeholders are willing to finance only those measures that serve their interests. It may be highly efficient to invest slightly more and serve other interests as well, within the same solution. Crossing borders of different domains in financial decisions appears to be complicated in practice. Recently, an assessment of impediments to the realization of innovative solutions to water issues in the Netherlands has been carried out (Netherlands Water Partnership, 2009). It was concluded that compartmentalization of authorities, including the division of financial means along the lines of departments, is the main impediment to innovative solutions.

Besides, stakeholders need to be able to deal with costs and benefits in both the short- and long-term – too often the costs of maintenance in the long-term are not adequately taken into account. Also, investment decisions may seem to be wise from a cost-benefit approach on the short-term, but may appear to be short-sighted when they block adaptation strategies in the future.



Figure 4: The division of financial means along the lines of departments is the main impediment to innovative solutions. Man to woman: 'you're not allowed to sunbathe over here, this beach has been paid for by the Department of Safety'.

Legal capacities. The interpretation of the different legal frameworks may result in a conflict of interests where one interest blocks another. The Water Framework Directive, for example, is sometimes in conflict with Natura 2000. In most cases, however, this conflict can be avoided because there is ample room for assembling different frameworks in a certain case. In the river area, for instance, legal flood safety standards need to be upheld whereas for the same area (European) nature policy objectives have been set. The execution of the Room for the River Programme shows that measures can be implemented that both increase flood safety and improve the overall environmental quality of the river region, respecting the different legal frameworks.

Institutional capacities. We need new institutional arrangements in which different authorities, different departments, the business community and research institutes work together on common goals. These arrangements should be designed by politicians and administrators. A different attitude is needed in which profession-

als swap interests, are willing to invest in measures that help the ambition of others, and get something in return.

Key aspects of these arrangements are clearing the way for investments across the borders of different domains, and creating more space for the business community and research institutes to innovate within large-scale projects. The establishment of the Delta Programme, for example, has a special law that combines budgets from different domains.

Social (communication and participation) capacities. Governmental decisions are not taken for granted by the general public. Stakeholders, including citizens, need to be taken seriously. Communication, therefore, is a discipline of its own. It is a challenge and a necessity to turn opposing forces into partners. Examples in the Netherlands show that adequate government communication creates public support for innovative solutions such as urban development outside the dikes and concentrated large-scale coastal nourishments (Zandmotor).

Making the most of opportunities

It is not easy to get things done from one perspective in a society where many interests are at stake in the same area at the same time. Sometimes, however, windows of opportunities arise to fit short-term measures in a long-term strategy, and thus practice adaptive water management. It is essential to be able to make the most of these opportunities. Water professionals need to have the right governance capacities to make this happen. When, for instance, urban areas are restructured, this is the right time to design extra space for water storage, given the limited options and high costs of later modification.

Making the most of these opportunities asks for knowledge of spatial planning and future developments. Generally, however, water professionals lack the capacities to narrow the gaps between water management and other domains. Increasingly, a 'choreography' is

needed in which water professionals act in close interaction with professionals from other disciplines to find answers to societal issues. In practice, however, many water professionals keep on playing their own water ballet in isolation from their surroundings.

There are examples of successful choreography across different domains, and the number increases. Strong vegetation in front of a dike to break incoming waves, for instance, is being implemented within the Room for the River Programme. This so-called ‘green adaptation measure’ compensates for a higher dike and thus reduces construction costs while increasing the natural value of the area.

Recently, the Water Governance Centre has been established, a network organisation aimed at strengthening the role of water governance in water issues, both in the Netherlands and abroad. The Centre connects professionals working on water issues from different disciplines, domains and organizations. By connecting them, the professionals get to know each other’s discipline and competence, and strengthen water governance together.

The biggest window of opportunity is the Delta Programme, a fine example of a new, forward-looking approach, in which different interests are assembled and strategies are defined that cross the borders of several domains. This Programme should boost the strengthening of the governance capacities that are highlighted in this paper, not only by focusing on the water professionals of today, but also by focusing on education and research, and thus on the water professionals of the future. After all, adaptive water management is about thinking ahead, in terms of the strategies we need and the skills of those who can make that happen.

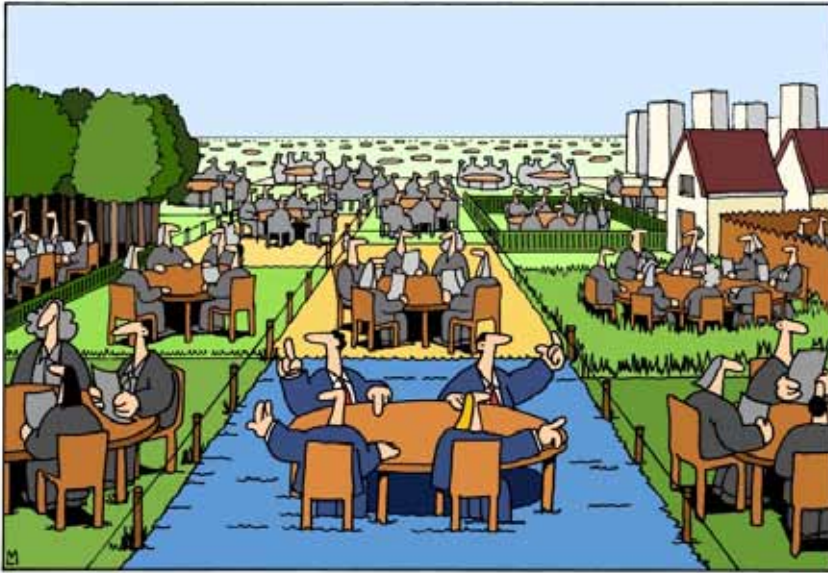


Figure 5: Water professionals need to act in close interaction with professionals from other disciplines to find answers to societal issues in a complicated world with an uncertain future.

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Perspectives on water governance

Synthesis and conclusions

Geert Teisman and Leon Hermans

Introduction

The papers in this volume address water governance issues and phenomena from different perspectives and at different levels, yet collectively set out to address similar questions. The first is: How is water governance evolving at different levels of government? In this question government refers to public (democratic) organisations in which politics, guidance and administration are combined in a formal set of rules, positions and procedures. Governance refers to the variety of organisations active with respect to a certain collective topic – in this case water – and to the vitality of the interactions (exchange, coordination, cooperation, control, intervention, conflict) between the variety of active organizations. The need for protection against flooding, drought and pollution can only be fulfilled if a variety of public and private organisations dealing with public services and investments and non-governmental organisations are able to jointly generate governance capacity.

The second question, well-known in the international debate on good governance, is: What are the implications of existing water governance constellations in different parts of the world for principles of good governance such as equity, legitimacy, efficiency, transparency and accountability? It is already difficult to identify these principles for one organisation and improve them if they are insufficient, and even more challenging for a constellation of organisations in charge of a variety of areas of the water domain. The protection against flooding is often a combined responsibility of national and regional governments as well as specific agencies like water boards. Each of the bodies can be held accountable for parts of the protection, but who is accountable for the whole? Or accord-

ing to Crosby and Bryson (2005) “Who is and what is accountability in a society where nobody is in charge?”.

These two intriguing questions are at the core of the debate about – and the improvement of – water governance capacity. They were addressed at global, international and national level from the perspectives of researchers, practitioners and policy-makers. In the concluding contribution to this volume, we attempt to take stock: What do these collective papers tell us about the key questions that they set out to address?

Regardless of the perspective through which water governance is encountered, or the specific governance arrangement that is discussed, one continuum across all papers is that water governance is characterized by a multitude of components and relations. This multiplicity is looked at in the laws and rules in global water governance (Gupta), the actors involved, their roles and at multiple levels at which they operate (Toonen), the multiple ‘silos’ through which governments tend to work (Van den Bergen), the multiple scientific disciplines needed to study and understand water governance arrangements at multiple levels of scale (Slinger), the multiple interests that affect the evolution of water governance systems over longer historic periods in a particular region (De Schutter), or the multiple capacities needed to organise adaptive governance processes among stakeholders (Satijn). Interactions can be competitive, cooperative, conflicting and coordinative in orientation and outcome. Conflict at one level of the system can lead to cooperation at other levels and the other way around. Studies on water governance focus on this multitude of interactions in trying to answer the question: “Does the combined set of interactions lead to sufficient governance capacity to prevent a region or country from flooding, water shortage and pollution of the common water pools (surface and sub-soil)?”.

Where government is more about actions (decisions) of a single organisation in charge of a part of the water challenge, governance is about the interactions between a variety of actions and whether these interactions lead to future-proof water protections. This ‘mul-

titude of everything' illustrates that complexity is a key notion when it comes to water governance. Where government is often about creating *one* policy, *one* organisational structure (often a bureaucratic one) and *one* order, governance is more about understanding the complex interactions between a variety of governments and other organisations active in a joint domain. Governance is about *more*: a combined and intertwined set of ambitions, goals and future challenges, a joint mutual dependent set of organisations beyond the public private boundaries, and a set of sub processes creating a more or less unmanageable water governance process system (Teisman et al., 2009; Flood, 1999).

Arguably, the interest in water governance is growing and will grow further precisely as a result of the complex action field in which water systems need to be managed and governed and the knowledge that the complexity will only increase in a society of rising expectation and demands. Due to rising expectations the quality of the water management has to go up and will also be forced to take demands from other domains into account. Water management is increasing intermingled with urban and regional development.

This increasing complexity means that straightforward solutions for water management, based on linear relations between cause and effect within the water domain, are not sufficient for governance capacity and practicability (cf. Warner, panel discussion). Likewise, hierarchical public management arrangements focussing on the solution of one single part of the water challenge often will fall short, as do pure market arrangements. It is intriguing to see that in many regions all over the world we end up with some kind of hybrid complex arrangement beyond the boundaries of public and private domain, while the dislike for these hybrid and difficult to understand networks will not disappear at all. This will lead to a fascinating paradoxical challenge for public leaders in the next decade. On the one hand new modes of governing are required, which include hybrid forms, in which not only hierarchies and markets are blended with network arrangements typically associated with governance in multi-actor settings and pluricentric socie-

ties (e.g. Rhodes, 1996; Klijn, 2008; Teisman et al., 2009), but also maintain the desire for simplicity, autonomy and someone in charge. Stronger government is desired, effective governance is needed, so it seems.

A consequence of complexity as a key feature in water governance is that it is hard to see the forest for the trees. In this final chapter, we will give our interpretation of the trees and the forest as they emerge from the various contributions in this volume. We shortly revisit the main trees, as they have been presented in the previous papers, to then assess what this tells us about a possible forest. How are different aspects of governance evolving, as perceived through different lenses? And what does this tell us about the evolution of water governance as a whole?

Water governance trees

Processes among actors, governed by rules and laws

Rules, and rule-making authority, are an important feature of certain governments in the water governance networks. It is only up to certain authorities to make and enforce rules. This special privilege does give these authorities a special role in governance networks. Governments can contribute to level playing fields - to legal certainty. They can create incentive structures for sound behaviour. They can prevent organisations at a lower level of a hierarchical structure easily succumbing to tragedies of the commons. But who has this authority and who can claim successful enforcement?

If we focus on the international level, there are already multiple actors and assemblies claiming legitimacy and decision-making authority (Gupta). Gupta argues that, as a result of the inability to get consensus in these debates, three major shifts can be observed in the rules and laws that provide the institutional background for water governance processes: (a) from state consent to administrative law; (b) from public international to hybrid public-private; and

(c) towards pluralism/ fragmentation and multi-level governance systems.

Against this background, multiple competing and overlapping governance arrangements and platforms co-exist. This co-existence of competing actors, platforms and arrangements, and our understanding that the development of societies goes hand in hand with growing multiplicity seems to challenge the well-known international principles of good governance such as accountability and transparency. Some will dislike and even condemn networks of hybrid governance relations, compared to the traditional government structures, which seemed to be more transparent. At the same time, Gupta and others stumble, a little astonished and confused, into the preliminary conclusion that these hybrid arrangements, arising all over the world, are perhaps more flexible, more adaptive and more reflective to recent challenges than the traditional power structures.

Similar issues are raised by Toonen when he focuses on the national – regional interaction in water governance networks. He also discusses the challenges that the involvement of multiple actors at multiple levels poses for principles such as accountability and legitimacy. What is accountability in networks when it becomes clear and indisputable that nobody is in charge, or to state it the other way around, when many are in charge for parts of the challenge, but nobody for the whole? It seems vital to develop new concepts and principles of good governance that are able to deal with the characteristics of governance networks.

Another tree in the forest important for understanding governance and our aim to increase water governance capacity is the crucial insight that governance is about interaction. The logical consequence is that our focus should shift to processes. Governance systems do have structure in terms of networks, but these structures are only for a small part designed and open for redesign. Networks are largely self-organising in the sense that many of the constituting nodes (actors or organisations) in the network can decide to change their participation and course of action. By doing so they

contribute to the restructuring of the network, without knowing in advance how the network will change, due to the fact that this depends on the action and reactions of many other nodes in the network. This is not a new lesson. We share it with previous authors on governance and water governance (Kickert et al., 1997; Rogers, 2003; Pahl-Wostl et al., 2008).

A dynamic balancing act

A next branch in the forest has to do with improvement and effectiveness. In a government approach it is assumed that effectiveness is created by solid policies, clear decisions and enforcement. In a governance approach there is much more attention given to the interactions between the variety of policies, decisions and enforcement attempts. It is much more about high quality interaction. Governance capacity is generated by effective interaction creating mutual added values to each others' content, actions and sub-processes. This is one of the reasons why adaptive capacities are gaining popularity in theory and practice. Governance is not only about action, but also, and for an important part, about the ability to develop rows of actions that are committed to one's own ambitions on the one hand and are well embedded and enforced in the network on the other. In that sense water governance requires a dynamic balancing act. Multi-level governance capacities increase when actions across levels and across domains of content and responsibility are sufficiently aligned (Gupta) or synchronized (Teisman, Jaworski, 1998).

A crucial subject for further research and revision is the question of how alignment or synchronicity can be achieved. In governance terms it can be ensured through hierarchical structures. The effectiveness of this approach however is not undisputed. Alignment or synchronicity can also be achieved, and increasingly is, through the facilitation of bottom-up processes of consensus-building and negotiation (Toonen) and integration into broader programmes of collective action (Van Buuren, Buijs, Teisman 2010). Balancing is not only required between levels and public and private domains,

but also between interests and values. Care for our waters is not the only interest in a society – and often not the most important one. Water governance therefore is not only a balancing act between water issues; it also requires balancing interests in a broader domain of socio-economic development. This raises attention to the question: to what extent are water governance actions in the regions of our world perhaps to ‘aquacentric’ and for that reason undermine their own effectiveness? (Gupta, Toonen, Teisman).

A balancing act in a dynamic process system that evolves over time demands the ability of governments and other organisations to align and synchronize their own behaviour with changing circumstances, while the classic government approach often has the ambition to adjust the circumstances to their own policy. This generates an intriguing dilemma. On the one hand clear, understandable and rational policies and decisions are desired and on the other hand the effectiveness of decisions heavily depends on the way they are encountered in the networks. Rational decisions (rational from a single perspective) can surprisingly turn into an ineffective intervention in broader networks. Rational in one domain and irrational, illegitimate and differently understood in a broader domain can go hand in hand. The concept of adaptive governance does help to gain sufficient attention for the importance of the evolution of external interests and actions and the effectiveness of responsiveness in terms of reactions and governance arrangements. Governance capacities will increase when a governance network does not only cater to the vested interests that have historically shaped existing governance structures, but also admit entrance of new interests into the water-related policies and management (Toonen). Innovations are needed and will often be found on the edges with other domains (Teisman, 2005; Schumpeter, 2003)

The interconnection between social governance processes and physical water systems

Even though water governance has to increase its awareness that it is embedded in a broader world where water is not always the cen-

tral issue, it still is and will be the case that water governance is about water. There can be debate whether or not water is, or should be, the central issue for societies per se, but definitely, water is central in water governance. The added value of water governance is its knowledge of and care for vital water systems and water chains. Water systems are, for a large part, physical phenomena and a part of good governance is related to the realisation and management of water infrastructures. Governance of infrastructures, especially if they are large, poses specific challenges (Slinger). This gives a specific role to the people and organisations that possess specific knowledge of these technical infrastructures and their operation on a daily basis. Also, it means that, as these physical and technical phenomena themselves are complex, different types of knowledge and disciplines need to be involved. Here, communicating across boundaries is as essential, and as difficult, as in other domains of water governance. Also here, issues of scale play a confounding role (Slinger). River basin planners typically look at water-related phenomena at levels that are different from those used by conservationists interested in a specific local habitat.

Governance and societal interest in water

Water governance is about the processes through which we manage and govern our water resources. It thus derives meaning from the interests that societies have in these water resources. If water governance is about power and power sharing (Van den Bergen), then it can only be so because various parties have an interest in the benefits and services associated with sound water management, whether they be the availability of sufficient freshwater or the protection against floods or diseases. Through this connection to societal services provided by a physical water system, water is related to development.

The importance that these water-related goods and services have in a society, and hence the importance associated with power over water governance, tends to be reflected in the existing water governance arrangements. Water governance arrangements are part of

a larger governance and government system, which reflects how countries have organized the protection of interests critical for their societies to thrive and survive (Toonen). If water management and flood defence is critical to societal survival, water management agencies will get a more prominent role, as illustrated by the institutional position of water boards in the Netherlands. In other countries, this may not (yet) be the case.

Governance arrangements, as they have evolved in particular countries, regions or localities, need to be understood fully before conclusions can be drawn regarding their transferability to other countries or regions. The corollary is that the specific needs, resources and problems of a recipient country also need to be well understood when considering a transfer of governance arrangements from one place to another (cf. Gupta in this volume, and Hermans, 2010). This not only applies to formal governance arrangements in developed countries, but also to the water governance arrangements used by indigenous people (Van Eijndhoven).

It is likely that water becomes of more critical interest in a growing number of countries and regions for different reasons. Climate changes and more extreme weather conditions are expected to result in growing water scarcity and flood risks. If water becomes more important, societies will demand more of their water governance arrangements in terms of their transparency, and the extent to which they are a legitimate reflection of contemporary concerns and need of societies (panel discussion).

Uncertainties and three responses

Water governance takes place in, and at the same time generates, a complex system of interrelations and interactions, in the physical as well as in the social system. This means we have to take this complexity serious, accepting that uncertainty is a key element in water governance. Three responses were highlighted in the papers and the workshop discussions. First, it means governance capacities that help build resilience, robustness and flexibility gain

prominence. This puts demands on competences of people, on processes and process arrangements – and less on definitive specific solutions (Satijn, Ligtoet). We have to look for ways to deal with complexity and uncertainty in a sensible way, rather than through the promotion of linear solutions and stopgaps (Warner, panel discussion). Second, taking complexity and uncertainty serious, means that research is needed. And as part of this research, we need to expand the toolkit on uncertainty analysis (Szöllösi-Nagy, panel). Promising avenues here include exploratory modeling and analysis (EMA, Agusdinata, 2008) and similar developments. Third, we have to accept that surprise will always be there. Therefore, we need to learn from experience, through learning by doing and monitoring (Slinger, Van den Bergen, panel).

Contours of water governance forests?

What is the bigger picture that emerges from the summary of various elements that were discussed in the contributions to this volume, and during the workshop? Can we discern the contours of a forest? Can we identify some shared features and draw some boundaries?

First and foremost, the water governance forest is about dedication to vital water systems and chains, as well as social interaction between people, both in their role as citizens and their formal role as official and agent of a specific organisation and interest. Neither of the two worlds is subordinated to the other. It is not the case that the needs of the water system will lead to policies that will be embraced by the social system passively, and neither is it the case that societies can exploit the water systems without any response from the system. Both have a life of their own. Water governance is about the question of how the two dynamic and changing systems meet and how they can develop jointly in a vital way, safeguarding existing qualities and developing new qualities. The quality of the interaction is the centre of our attention. The term water governance is well chosen in that respect. It is not only about one organi-

sation managing a water system. It is about the ability of a mutual development adding value.

Water governance is primarily focussing on the demands and desires of the water system and on the man-made infrastructures that have been engineered over centuries. At the same time it is willing to analyse and understand the demands and desires of people for protection, consumption and development in relation to water and the consequences for water system development, as well as changes in infrastructure solutions and the maintenance of these infrastructures.

Taking care of the demands of water systems and infrastructures is more than investment and maintenance alone. Water investments and maintenance do not evolve in isolation to other systems and developments. In order to take care of a vital water system it will become more and more important to improve the embeddedness of the water system development and maintenance in other streams of policy issues. Water governors have to make sure that important water issues are taken on board by other issue communities, often as part of another overriding concern. Internationally, these may be climate change negotiations and discussions. Nationally and locally, these may be other concerns, such as spatial planning in urban areas. The extent, to which water is seen as impacting on critical interests for societies, will be a key aspect that is sometimes too easily overlooked by experts coming from the water domain. Imaging and framing the water issues in such a way that it can be more easily synchronized with or embedded in other issue communities is and will be an increasingly important part of water governance capacities.

Water governance means that addressing water issues is about people and processes. In that sense it adds to well-developed issues of water management, where the focus is more on knowledge of the water systems and its infrastructures as such. This is a key difference between water governance and integrated water resources management, or IWRM (see Lautze et al., 2011). Designing new governance arrangements and management strategies can be done

more effectively if the designers understand the possibilities and desires of the water system and at the same time the dynamics, desires and logics of behaviour in the social process system in which the care for water is embedded in. These processes are changing and increasingly take place in a pluricentric and multi-actor society. In such a changed context, boundary work and managing interface problems are needed to improve governance capacities. This requires dancing across the boundaries between different levels of government and across boundaries between the public and private domain as well as connecting the silos that exist in most government administrations between the water domain and neighbouring domains. Water governance capacity is about the ability to generate clearly different roles for all in such a way that the actions lead to interaction patterns with maximum outcomes against affordable efforts. Water governance research will help to find innovations on the edges of domains and to increase efficiencies by way of system integrations beyond the boundaries of existing systems.

Water governance combines two main features, a physical and technically-oriented water systems approach and a multiple governance processes orientation. It balances on the edge of social and technical systems, and emphasizes the elaboration of new combinations that can be found on the edges. Boundary crossing as activity will stimulate innovation as well as the ability of synchronicity.

In order to become competent boundary crossers, the complexity of the system has to be understood, embraced and used. We need to think how domains divided in the past can be confronted in a creative manner leading to more efficiency, innovation and effectiveness. Transparency and accountability can probably not be created in advance, due to the fact that networks are self-organizing and dynamic. Governments however can take the role of selector in variation in the sense that joint actions or proposals of alliances able to meet a variety of desires and able to generate support could be facilitated and empowered.

A process of evolutionary selection would create adaptive capacity in a network, even if governments themselves have a limited adaptive capacity themselves. The evolution into new combinations can create the needed adaptiveness. In this system people are allowed to do things wrong – which is not allowed in many government settings. And we can increase governance capacity by addressing people's skills, by ensuring that these are embedded in appropriate arrangements, and build on solid knowledge and sound monitoring systems. But, in the end, although we can increase governance capacity, new problems and challenges will always arise in these complex systems. This is not due to a lack of capacity but to the evolution of rising expectations. That is what we call progress.

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Biographies

Joyeeta Gupta is Professor of Climate Change Law and Policy at the Vrije Universiteit Amsterdam and of Water Law and Policy at the UNESCO-IHE Institute for Water Education in Delft. She is Editor-in-chief of the journal, *International Environmental Agreements: Politics, Law and Economics*, and is on the editorial board of the journals, *Carbon and Law Review*, *International Journal on Sustainable Development*, *Environmental Science and Policy*, and *International Community Law Review*. She was and continues to be - lead author in the Intergovernmental Panel on Climate Change, which recently shared the 2007 Nobel Peace Prize with Al Gore and of the Millennium Ecosystem Assessment which won the Zayed Second Prize. She has published extensively on climate change, and is on the scientific steering committees of many different international programmes including the Global Water Systems Project.

Theo Toonen is Dean of the Faculty of Technology, Policy and Management, and Professor of Public Administration at Delft University of Technology. Since 1989 he has been Professor of Public Administration and, in 2003, was appointed Dean of the Faculty of Social and Behavioural Sciences at Leiden University. Professor Toonen's research focuses on themes ranging from water management and governance, multi-level governance, (international) comparative public administration, European knowledge economy, and public sector and administrative reform to international urban and regional government. He is a member of the Independent Dutch National Advisory Committee Water (AcW), the Council for Transport, Public Works and Water Management (RVW) and the board of the StimulanSZ Foundation, The Netherlands.

Jill Slinger is Assistant Professor at the Policy Analysis Unit, Policy and Management, Faculty of Technology at Delft University of Technology, a position she has held since 2002. Dr Slinger has extensive international experience in water and coastal research

and modelling, including the coordination of collaborative, multi-disciplinary research programmes, and developing policy for the allocation of freshwater to South African estuaries. She served on the Scenario Development Panel for the World Water Vision and held a function as a senior advisor for water and coastal management at Resource Analysis in Delft. At Delft University of Technology, she is involved in the (inter)national policy development arena undertaking research on the Incomati River Basin, the Scheldt Estuary, the Rhine River and the North Sea coasts of the Netherlands, England, Scotland, Belgium, Germany and Denmark. In 2003, she was invited to serve as part of the Dutch expertise network for coastal flooding safety (Expertise Netwerk Waterkering – Kust) and is currently an invited delegate on the Dutch special committee on setting safety standards for flooding in the 21st century (ENW-Normering). Her current research activities focus on the role of model-based knowledge in supporting the interactions between people, science and policy in the governance of social-ecological systems.

Leon Hermans works as an Assistant Professor in Policy Analysis at TU Delft since September 2006. From December 2003 until August 2006, he worked for the Water Service of the Food and Agriculture Organization of the United Nations. He obtained both his MSc and PhD degrees from the Faculty of Technology, Policy and Management at TU Delft. Leon specializes in water resources management and has worked on water problems in various countries. Specific research interests include policy evaluation, actor analysis, the value of water and integrated water resources management.

Pieter van der Zaag is a Professor of Integrated Water Resources Management at the UNESCO-IHE Institute for Water Education. Pieter has worked long-term in developing countries from 1982 to 2003. He has conducted research in the field of water resources, focusing on the dynamic relationship between biophysical and social processes. He has special interests in agricultural water management, water allocation issues in catchment areas and in the management of transboundary river basins, topics on which he has

published widely. He is also an expert in curriculum development for water resources management.

Rhodante Ahlers is a Senior Lecturer in Water Resources Management at the UNESCO-IHE Institute for Water Education. She has built a solid track record in education, gender consultancy, and in designing, conducting and managing interdisciplinary research projects, addressing engineering, environmental, institutional, and education related topics in land and water resources management. In her work, she focuses on interactive and participatory methodology with strong emphasis on knowledge sharing, with explicit attention to local-global interaction. Her specialization lies in gender and policy analysis of the political economy of water management.

Erik Mostert is lecturer within the Water Resources Management group at Delft University of Technology. His research focuses on water policy and law, collaboration processes in water management, the role of expertise, and the role of concepts. Erik Mostert has conducted much comparative research on these topics, especially in Europe. Specific management issues that he has studied include the implementation of the European Water Framework Directive (2000/60/EC) and the Flood Risk Directive (2007/60/EC) and the organization of public participation. Moreover, he has advised on institutions for transboundary river basin management and on the role of international donors in this.

Bert Satijn is currently coordinating the preparation of the Water Governance Centre. With qualifications in civil engineering, and remote sensing and hydrogeology, he has worked in West and East Africa in rural water supply and resources, and several projects in the Netherlands and abroad in water supply, water resource management and soil contamination. From 1984 to 1998 he was Managing Director of a regional office of the consultancy firm Iwaco in Rotterdam. In 1998 he starting his own independent consultancy, and principally managed programmes on soil contamination from 1998 to 2004. In 2004 Bert was appointed Managing Director of the research programme Living with Water,

a 56 million euro programme encompassing about 120 projects and 200 consortium members. Water Governance was one of the key items of this programme until the programme finished in April 2011.

Wilfried ten Brinke is an independent consultant and writer on water issues at BlueLand, his own consultancy. He has 25 years of experience as a researcher, advisor and manager in the field of water management. Over the last years he specialized in flood risk management. He conducted the first national flood risk policy evaluation for the Dutch government. At present he is involved in the new journal Water Governance. He also focuses on the consequences of climate change for Europe. He has initiated the website climateadaptation.eu on the vulnerabilities of European countries for the consequences of climate change and possible adaptation strategies to deal with these consequences.

Geert R. Teisman is Co-director of NederLandBovenWater, Chair at Research Group Governance of Complex Systems (GOCS) and Professor of Public Administration at Erasmus University Rotterdam. He achieved degrees in transport and sociology. His PhD thesis on the phenomena of complex decision-making in the field of urban development, transport and environmental affairs was published in 1992, followed by a second edition in 1995 and a third edition in 1998. Since 2000 he has been Professor in Complex Decision-Making and Process Management at Erasmus University Rotterdam. He is member of the board of Habiforum, a joint venture between science, private sector and public authorities, exploring possibilities of multiple land uses, and is Scientific Director of the foundation Living with Water, governing a variety of projects in which water system improvement is one of the principal aims. He is member of the executive board of Netlipse, a European knowledge exchange network in the field of infrastructure project management. On a regular basis he gives advice to governments and private organisations on topics such as complex decision-making, strategic planning, public-private partnerships, process management, intergovernmental cooperation in metropolitan areas and policy evaluation.



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