ROUTLEDGE

Water Governance as Connective Capacity

EDITED BY
JURIAN EDELENBOS, NANNY BRESSERS AND
PETER SCHOLTEN

WATER GOVERNANCE AS CONNECTIVE CAPACITY

Water governance is becoming one of the most significant challenges of this century and our current technocratic and fragmented approaches are ill prepared to respond. This superbly organized book draws on a rich array of theory and applied research from Europe, North America and Australia. For anyone involved in the policy, management and governance of water, this book not only explains the most important challenges, but also provides valuable guidance on the effectiveness of water governance approaches.

Richard D. Margerum, University of Oregon, USA and author of *Beyond Consensus: Improving Collaborative Planning and Management*

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Chapter 1
Introduction: Conceptualizing Connective Capacity in Water Governance

Jurian Edelenbos, Nanny Bressers and Peter Scholten

Water Issues and the Need for Water Governance

Water is an important source for living. It is expected that due to interplay of climate change, population growth and industrialization, fresh water will become one of the scarcest resources for humans, societies, and ecosystems. In several areas of the world, for example, the state of California in the US and southern parts of Australia, this is already visible. Water shortage affects not only social human conditions, but also has an economic impact, for example in the agricultural domain. Water has social, economic, and environmental aspects. A country is said to experience 'water stress' when annual water supplies drop below 1,700 cubic meters per person. It is argued that a third of the world's population nowadays lives in water-stressed countries. By 2025, this is expected to rise to two-thirds (Edelenbos and Teisman 2011, IPCC-WGII 2007).

However, not only water shortage is a problem. In almost all delta areas in the world also the surplus of water causes problems. Three-quarters of the world population lives in deltas and runs the risk of severe flooding due to climate change. This will occur by, for example, heavy peak rainfalls and extreme weather conditions (IPCC-WGII 2007), such as in Louisiana (2005), Great Britain (2007), Romania in 2010, and recently the Queensland flood in Australia (2010-2011) and the floods in Thailand (2011). In numerous countries all over the world, defense strategies, such as constructing dams, dykes and levees, are employed. At the same time many countries develop adaptive approaches in trying to face water surplus by providing more room for the rivers. These room for the river programs are being developed to provide space for the rivers that are often been enclosed by urban areas (Warner et al. 2012). In practice a combination of resistance (defensive) and resilience (adaptive) strategies are employed in water governance processes.

At the same time countries all over the world, especially the developing countries, face problems of poor water quality, for example, due to water pollution by industries. But also in developed countries these issues remain high on the political agenda. The Water Framework Directive of the European Union

(Directive 2000/60/EC[1]), for instance, urges the countries of the European Union to come up with policies to (further) improve the quality of drinking water by explicitly providing guidelines on how to involve stakeholders in this process.

It is argued that governments should take drastic action to address the problems of water pollution, water shortage/supply and water surplus (for instance, Edelenbos and Teisman 2011). Numerous methods and technologies for solving water problems seem to be at hand, but at the same time the capacity (for example: skills, experience, financial resources, etc.) to implement these methods and technologies seems to be lacking. Some argue that the current 'water crisis' is not caused by a lack of water technology, but rather by a failure in water governance (UNESCO 2006). The explanation for this is that water issues cannot be solved by new water technologies in a top-down, hierarchical manner, but need to be addressed and approached through a bottom up, horizontal and multi-stakeholder way of working. This is what is meant by the shift from a government approach to a governance approach (Kooiman 1993, 2003). Water can be considered a complex and interconnected system, which touches upon other domains and fields like agriculture, economic development, social development, ecology, health, etc. Water is of interest to many stakeholders, industries, municipalities, farmers, recreational sector, environmental organizations and others, who all approach the problem and the possible solutions differently (Leach and Pelkey 2001, Kuks 2004). Consistent with the global rise of (formal and informal) networks (Castells 2000), water is a governance challenge, which requires certain capacities to solve water problems in an effective, efficient and legitimate way (Edelenbos et al. 2010).

Due to the complex nature of water systems, a water governance approach is needed in which different values, interests and uses of water are interconnected so that water policy and measurements are developed and implemented with the support of different stakeholder groups. However, effective and legitimate water governance approaches are not easy to develop because of the wicked nature of the problem due to conflicting values and interests. This means that the solution can only be found beyond the boundaries of one layer and segment of government and even often beyond the boundaries of government as a whole. It requires delicate ways of governing multi-actor processes, which we call *water governance* in this book. As in the case with governance in general (Kickert et al. 1997) and also in the case of water governance, there has been a general shift from an emphasis on state provision to private provision based on market principles and more recently a multi-stakeholder approach in water governance. We will come back to this core concept in this introduction and the book itself.

Oftentimes the water governance capacity to solve water problems is insufficient due to the existing institutional fragmentation of responsibilities in this field. Water has many aspects, which are often handled by different organizations and institutions and these themselves are often bound by geographical and

1 See http://ec.europa.eu/environment/water/water-framework/index_en.html for more information and the document.

functional jurisdictions (Sabatier et al. 2005). In many cases there are different institutions with different and conflicting interests concerning water, like water safety, water quality or water shortage (Leach and Pelkey 2001, Lubell and Lippert 2011, Sabatier et al. 2005). But water also touches the issues of climate change, spatial planning and development. In this perspective spatial quality and integrated planning are often-mentioned goals and ambitions (Edelenbos 2010, Van Schie 2010). Achieving cooperation, joint responsibility and integration in such fragmented water governance systems is a core problem (Edelenbos and Teisman 2011). The water system is complex and interconnected of nature, but at the same time the governmental institutions and processes are fragmented and not capable of developing and implementing integrated and interconnected visions, plans, projects and programs. Therefore, dealing with water systems seems to become more and more a compounded problem. If a problem becomes more compounded, the interdependency with adjoining policy fields will grow, the amount of actors (uses and users) involved often tends to increase and the amount of frames, goals and ways of working easily multiplies. Within this kaleidoscopic environment the *capacity* to *connect* to other domains, levels, scales, organizations and actors becomes a very important aspect of water governance. The importance of connective capacity is also stressed in holistic approaches of water issues (Margerum 1999, Borin and Sonzogni 1995). In this holistic approach the interconnective dimension is emphasized, addressing interrelationship and linkages among multiple, cross-cutting, and often conflicting resource uses. This holistic approach is gaining popularity. However, it is not yet (fully) implemented in practice: "This is not surprising, since most water professionals consider, at least implicitly, water to be very important, if not the most important resource" (Biswas 2004: 253).

This interconnecitivity aspect of water governance, and its struggle with it, is the main topic of this book. Connective capacity revolves around connecting arrangements (such as institutions), actors (for instance individuals) and approaches (such as instruments). Water governance in this book will be approached as a way of *connecting* organizations, actors and institutions from different sectors and domains (agriculture, environment, economy, social welfare, nature, regional, landscape and spatial planning) to jointly face water problems and cooperate in developing effective, integrative and legitimate solutions for those water problems. This connecting aspect is often touched upon in water policy and management literature by literature on co-management and adaptive management (Pahl-Wostl 2007, Tortajada 2010), Integrated Water Resource Management (IWRM, for example, Margerum 1995) and Integrated Regional Water Management (IRWM, for example, Lubell and Lippert 2011), but has not yet been an exclusive point of view in literature on water policy and management. This book is devoted to this view. Therefore the following main research question is leading in this book: *which connective capacities in water governance are to be developed in order to face water problems in an integrative, effective and legitimate way*?

The water sector is a perfect field of research for the exploration of this question. Water systems are complex and compounded and often go beyond the boundaries of municipalities, regions and states. The issue of scarcity, pollution and flooding is furthermore complicated by the fact that they are heavily interrelated with other systems, like land-use and climate. In all there is much institutional and organizational complexity and fragmentation around water issues.

This book is primarily aimed at researchers working on (water) governance. However, due to our focus on concrete cases and tangible projects we believe this book is valuable for practitioners in the water field as well.

Fragmentation and Integration Regarding Water Issues

Society has become increasingly specialized and, as a consequence, fragmented. Specialization has for decades been the driving force for economic prosperity and wealth (Edelenbos and Teisman 2011). The division of labor and specialization was seen as an inevitable feature of modern society and modern organizations. Specialized organizations were able to do their specific task by internal coordination, often in hierarchical terms. The external coordination was assumed to be managed by the hidden hand of the market or formal rules. Organizations were perceived as a machine, composed of different parts that were managed and coordinated in a mechanical way (Morgan 1986: 27). Coordination is in itself a specialty and the coordinators will ensure that activities fit together in a coherent and beneficial way (Kanter 1983: 58-61).

Although this specialization brought increasing wealth, there are also negative side effects. Weber already discovered that bureaucracies undermined the capacity of spontaneous action (Kanter 1983: 60). Furthermore, increased emphasis on control and reduction of transaction costs by increasing specialization can lead to a simplification of reality and a limitation of connections with other actors and domains. “Organizations seek to transform confusing, interactive environments into less confusing, less interactive ones by decomposing domains and incline to treat their own subdomains as more or less autonomous. Organizations even tend to create buffers with surrounding subdomains” (March 1999: 197). Organizations often strive for autonomous space and maintaining, defending or enlarging that space. Each subunit of an organization strives for more autonomy and optimization of its self-interest. The unit does this by breaking down a complex problem into separate parts in which its own part is analyzed and solved separately without much attention for the combination or aggregate level of the subparts.

The problem of collective action is also present in water management (Sabatier et al. 2002). Fragmented and uncoordinated action guided by sub-goals and individual time frames and action schemes, may become rather dysfunctional on a larger system level leading for solving societal problems (March 1999). Functional specialization creates a structure that is supposed to be a system of cooperation but often turns out as a system of competition (Morgan 1986). Due to this, the

envisaged benefits of specialization may hamper progress and development of the public system. Regarding water, we see specialization on water safety, water quality, droughts, etc. that each has its quality, but hampers a more integrated view on water because each discipline has its own background, way of working and substantial focus.

The Need for Connective Capacity: From Water Management toward Water Governance

Water governance takes place in circumstances of high complexity. This complexity is characterized by the involvement of many organizations, institutions and actors in solving water issues. In literature on governance networks (see Koppenjan and Klijn 2004) and network society (see Castells 2000) the issues of interdependencies and interconnectivity are seen as the main cause of complexity. Responsibilities for water (such as water quality, water safety and water supply) are dispersed among different organizations and sectors, leading on the one hand to institutional fragmentation but on the other to interdependent relationships creating balanced and legitimate solutions (Lubell and Lippert 2011, Edelenbos and Teisman 2011).

The field of water management, in which different organizations and institutions take up water supply and water resource management, specifically constitutes a case of fragmentation. Although the stakes are high, in classic water management actors often maintain their working on specific subsystems instead of connecting to the broader picture (Lubell and Lippert 2011). Fragmentation is often not effectively countered by integration and synchronization efforts, because every pillar, turf and sector is defending its own interest and responsibility. This has resulted in smaller problem solving capacity, problem displacement and conflicts in decision-making (Lubell and Lippert 2011). Finding a solution in the one sector (for example: intrusion of salt water for nature development), could lead to negative consequences in the other sector (for example: fresh water use for agricultural purposes). This multi-issue character of water makes the problem situation highly complex. As a way to deal with this fragmentation, the concept of water governance has developed. In contrast to traditional water management, this approach strongly underlines the need for coordination, integration and synchronization of values, interests, responsibilities and tasks within water management (Teisman and Edelenbos 2011).

Water governance is an upcoming theme in public administration (Edelenbos and Teisman 2011, Teisman and Edelenbos 2011, Pahl-Wostl 2007, Huitema et al. 2009, Kuks 2004). Some explicitly speak of *adaptive* water governance in order to stress the need for using adaptive management approaches to deal with complex water issues. These approaches can be characterized as flexible, inclusive, participative, bottom-up, learning and reflexive and are needed to taking into account the true complexity of water systems (Folke et al. 2007, Pahl-Wostl 2007, Brunner and Steelman 2005). Our use of the concept water governance in this

book touches upon the adaptive nature of water governance by explicitly stressing the inclusive nature of it. Water governance encompasses more than preventing the people from being struck by floods. Water governance has become an integral part of spatial planning and regional development. Water governance requires the combination of different functions and values (nature, recreation, agriculture, housing, economy and infrastructure) with measures to increase water retention capacity and safety against floods, to restore estuarine dynamics and to anticipate droughts. Aside from measures for water quantity issues, it also addresses issues of quality, supply and distribution of water.

Modes of Government and Governance

From prior research (Kickert et al. 1997, Koppenjan and Klijn 2004, Van Buuren et al. 2010) we know that monocentric government models and approaches are incapable of handling persistent uncertain and complex situations. Multi or polycentric governance models are better equipped for this, because these modes give more room for a variety of actors, ideas and frames. These governance modes are more capable of handling fundamental environmental uncertainties (Folke et al. 2007). Climate change and adaptation, after all, do not occur in a vacuum (Edelenbos 2010). It will lead, for example, to water problems on quality (fresh water) and quantity (drought, flooding, water retention). However, the contents of those water policies are subject to intense discussion and negotiation. The conflict between values is played out here, especially between safety, spatial development, environmental and ecological qualities. The issue of water safety touches the possibilities for the development of agriculture, nature, urban areas, infrastructure, and recreation areas.

A system-wide governance perspective is thus required, especially in the case of water issues (Edelenbos 2010). This system-wide approach should provide space for all the values actors may attribute to water. Water, after all, fulfills various functions for very different audiences and interest groups. Sometimes it is a difficult condition for housing and economic development. It can also be a desired quality for recreation and nature. Sometimes it is a threat that should be banned. Then again, it is vital for agriculture and horticulture. In other words, water is valued differently by various groups of stakeholders. These stakeholders and their values and ideas have to be integrated into the decision-making processes about water. The resulting shift in governing has been generally called the shift from government to governance (Loorbach 2007, Kickert et al. 1997, Kooiman 1993). This shift involves the recognition that modes of governing are multiple and include processes and institutions that transverse scales as well as networks of actors which cannot easily be characterized by the state/non-state dichotomy (Betsill and Bulkeley 2006). Water governance is then about the ability to connect different frames, values and ambitions. It is for example about finding balanced solutions in which (conflicting) interests are combined and integrated. The connective capacity also relates to the ability to connect the local (city) with

the regional, the metropolitan area. Moreover, it is about the capacity to connect different processes from society, market and government (Van Buuren, Edelenbos and Klijn 2010).

The water governance approach emphasizes horizontality and reciprocity. Water governance is the set of interplay of processes of coordination and cooperation and the set of interfaces between various actors (Edelenbos 2010). It is multi-level, multi-scale, multi-process and multi-actor. "... the speed of interactions and the multiplication of linkages among elements in the biophysical, technical, and human systems at a number of spatial scales seems to be increasing, creating a global "time-space compression" (Duit and Galaz 2008: 311). Crossovers between frames, scales and levels do not add up in a linear, predictable manner. Negative and positive feedback loops between (temporal and spatial) levels and scales result in unexpected consequences that need adaptive and above all connective capacity (Edelenbos 2010, Teisman and Edelenbos 2011).

Connective Capacity in Water Governance

This book focuses on how to deal with the various sources of fragmentation in water governance by organizing meaningful connections and developing 'connective capacity'. What 'ticks connective capacity'? What are its determinants, how is it manifested in practice and how can we mobilize, use, and consolidate the capacity to connect different scales, domains, levels, actors, agendas, processes and more? Connective capacity does have many components: personal, relational, organizational, and institutional (Innes and Booher 2002, Sabatier et al. 2005, Foster-Fishman et al. 2001, Leach and Pelkey 2001, Weber et al. 2007, Williams 2002). In this book we define connective capacity as the capabilities of individuals, instruments and institutions to counter fragmentation in water governance processes by crossing boundaries (structure, organization, language and so on) and establishing linkages between different actors (on different levels, at various scales and in numerous domains) in the light of solving water issues.

Following these definitions, we approach and investigate connective capacity in a two-fold way, by looking at (1) carriers of connective capacity and (2) focal points of connective capacity. Carriers of connectedness can be distinguished as an attribute or capacity of (a) individuals or groups, (b) instruments or approaches, and (c) institutions or (governmental) arrangements. This connectedness can be applied on different focal points (the objects of fragmentation and integration). We distinguish five different focal points:

1. government layers and levels.
2. sectors and domains.
3. time orientation of the long and the short term.
4. perceptions and actor frames.
5. public and private spheres.

Carriers of Connective Capacity

The concept "connective capacity" is an attribute of someone or something. It is empty without a subject owning a certain extent of connective capacity. Therefore, in this study we distinguish different carriers (or owners) of connective capacity. First, this capacity can be carried by *individuals*, by certain specific persons like water managers, but also by other stakeholders involved in the water governance process. Second, connective capacity can be considered an aspect of *instruments* used in the water governance process. For example, a modeling instrument in which flooding is forecasted. Third, *institutions* can be 'owners' of connective capacity. In this respect, scholars speak of institutional capacity building (Healy 1997), by developing rules and structures which have the capacity to bind and interrelate fragmented action and behavior. These three carriers will be explored below.

Individuals

Personal aspects are considered crucial in developing governance capacity (Foster-Fishman 2001). Human conditions in governance processes are of importance because they deliver important resources, that is, knowledge, skills, capabilities, motivation, attitude, and etcetera, which feed collaboration in watershed partnerships (Leach and Pelkey 2001). In the field of water management we can see a development from a technocratic approach in which water experts dominate, to a more democratic approach in which there is space and opportunity for stakeholders to bring in and develop their knowledge, interests and demands together with the regular experts. As of yet, there have been few encounters with this latter form, and many experiences so far have been disappointing because the process requires for each participant to leave his own turf and boundaries and dare to engage in interconnections (Edelenbos et al. 2010). Looking at things from a new perspective and stepping out of your comfort zone of the home organization into informal spheres and onto crossroads of different organizations requires new skills like, for example, relational capacities (Foster-Fishman et al. 2001) that are not easily developed or learned.

These activities of constantly connecting scales, organizations, levels, and actors are called boundary-spanning activities (Leifer and Delbecq 1978, Williams 2002). Boundary persons are always acting in an in-between space. Innovation literature (cf. Bekkers et al. 2011, Loorbach 2007) has shown that innovative solutions are developed in these border areas, so-called niches, in-between areas, and gray zones (Bekkers et al. 2011). These areas embody the organizational crossroads on which innovative solutions and daily practice can be brought together. Looking beyond organizational boundaries is an effort that specifically requires individuals. The literature on boundary spanning is focused on organizational members who are able to link organizations with their environment (Leifer and Delbecq 1978, Williams 2002). "Boundary spanners are characterized by their

ability to engage with others and deploy effective relational and interpersonal competencies. This is motivated by a need to acquire an understanding of people and organizations outside their own circles …" (Williams 2002: 110). Boundary spanners are able to deploy effective relational competencies and are important for building trust within partnerships and coordinating activities and policy making in separate organizations (Williams 2002).

In this volume we will focus on activities that connect new ways of working with established ways of working. Williams (2002: 115) mentions different key factors which influence collaborative working: the use of particular skills, abilities, experience and personal characteristics. We argue that individuals play an important role in this connective capacity and that these collaborative activities are important within processes of adaptation with regard to the interaction between emerging governance arrangements and established institutions of representative democracy.

Instruments

In water resource management all kinds of instruments are used in order to analyze water issues and to develop and implement water solutions and scenarios such as risk analyses, hydraulic modeling, scenario techniques, etc. (Lintsen 2002). These techniques, approaches, and instruments are often technocratic of nature and based on scientific knowledge (Van Buuren and Edelenbos 2004). The validity of this type of knowledge is based on scientific models and methods and on the rigorous quality checks of peer review (Van der Brugge et al. 2009). This scientific approach and use of instruments makes water management in many countries all over the world very technocratic of nature.

However, we see a general transition from technocratic towards open and more inclusive approaches in which new instruments and approaches are developed, such as water gaming, scenario building, strategies, techniques and joined up approaches, which aim for connecting actors, frames, ambitions, time horizon, spatial scales, and etcetera (Van der Brugge et al. 2009). For example, in the Netherlands in the Room for the River program, a special tool, the building box, was developed. This instrument was designed for interactive use by all interested parties in developing and measuring the effects of solutions confronting the problem of high river discharge of the main rivers in the Netherlands (Van Buuren et al. 2010).

In general, we see approaches and instruments develop which are oriented on improving collaboration between professionals from multiple domains (climate change, spatial planning, water management), but also between water professionals on the one hand and stakeholders (for instance citizens, farmers, NGOs) on the other hand (Van der Brugge et al. 2009, Kuks 2004). All kinds of new techniques are developed, such as water gaming. Water gaming can be described as computer assisted collaboration between all kinds of actors in the water governance network. These gaming techniques aim at visualization of problems and possible solutions

in order to stimulate coordination and cooperation between different organizations and sectors. One can argue that these instruments and approaches deliberately try to enhance connections in a fragmented water governance process (Edelenbos 2010). Instruments therefore include all possible approaches that might be employed to influence connective capacity in water governance, ranging from techniques to strategies, to models, to games, to scenarios and many more. The effect on connective capacity of this influence through instruments is undefined: it can lead to enhanced connective capacity but equally to decreasing or stabilizing connective capacity.

Institutions

Many scholars stress the importance of institutional capacity in realizing connections across organizations, sectors and domains (Healy 1997, Putnam 1993, Amin and Thrift 1996). Institutions as a concept are much discussed but at the same time interpreted in various ways. In studying the functioning of public administration over the last years, the institutional approach received a lot of attention (Goodin 1996). The institutional theory has a versatile 'body of knowledge'. This theory involves roughly three streams: an economic, a political and a sociological stream. Some interpret institutions as organizations or organizational structures (see Lubell and Lippert 2011), others approach it as rules in use or roles actors play in policy processes (Goodin 1996). Healy (1997) argues that governance capacity of institutions lies in the quality of local policy cultures and practices. Some are well integrated, well connected and well informed to capture opportunities. Others are fragmented, and lack the connections to sources of power and knowledge.

When relating water governance with institutional perspectives, the discussion on river basin management and organization is interesting (see Huitema et al. 2009). For some, the river basin is the ideal scale to approach river and watershed management. It is about a regional scale in which various local issues and challenges can come together and can be integrated or coordinated. At the same time we see the river basin organization develop as a single centralized organization structure functioning as one team and integration of that one single organization into a broader community or network of organizations (Edelenbos and Teisman 2011). Some question the reality of grasping all dispersed layers of water management into one single organization structure (Huitema et al. 2009). There are endless local initiatives, more or less embedded in several regional and provincial plans and actions schemes, more or less embedded in a variety of national economic, spatial, infrastructural and water plans and programs. Nobody is in charge of the whole but rather many of a part of a collective (Edelenbos and Teisman 2011).

In this view institutional capacity is not built through robust structures but through resilient, lively and rich social networks as research of institutional capital through which coordination and integration can be organized rapidly and legitimately (Healy 1997). It is then about building relational resources (Williams 2002), about developing a context within which is sufficient mutual trust and

discourse. A communication arena is developed in which a discourse is developed by which stakeholders can understand each other and take joint action (Healy 1997). The quality of this arena is reflected by the range and density of informal network relations between stakeholders and the degree of trust (Edelenbos and Klijn 2007) and translatability identified as 'social capital' (Putnam 1993) or institutional capacity (Amin and Thrift 1996). Institutions, in this sense, therefore also include informal networks and other temporary arrangements. Institutions are all structures, whether formal or informal, whether permanent or temporary, which influence connective capacity in water governance.

Focal Points of Connective Capacity

Water problems transcend jurisdictional, organizational, regional, and even country boundaries. In this volume we address the three above described carriers of connective capacity with regard to five focal points for connective capacity:

1. government layers and levels.
2. sectors and domains.
3. time orientation of the long and the short term.
4. perceptions and actor frames.
5. public and private spheres.

We will discuss each focal point with some conceptualization and examples in the following sections.

Water Governance Crosses Governmental Layers and Levels

Water management is closely related to processes of climate change and climate adaptation. These matters are multi-level issues. They cross local, regional and national borders and jurisdictions. Rivers do not restrict themselves to borders, and effects of climate change may be induced from developments elsewhere in the world. To address these multi-level issues, the various layers of government within and between states need to be coordinated. This is called multi-level governance (Hooghe and Marks 2003). Networks resulting from this multi-level governance are simultaneously global and local, state and non-state. Multilevel governance, which emphasizes the connections between vertical tiers of government on the one hand and horizontally organized forms of interactions on the other hand, helps us to understand water and climate governance within and across scales (Betsill and Bulkeley 2006: 149). Processes, programs and institutions are developed between levels and create new spheres of authority, which require new analytical perspectives on governing. Many authors stress the importance of cross-scale and multi-level interactions (Adger, Brown, and Tompkins 2005). Interconnectivity

between levels and scales focuses on how to interrelate actions, events and processes in surrounding subsystems.

We can illustrate the challenges of multi-level governance and the role of individual interactions in water and climate issues with two cases. The first case concerns an urban development project (Stadshavens) in the floodplain area of the city of Rotterdam. Specific questions concerning adaptation issues of this development on the local scale coincided with questions about developments on regional and national level, such as the regional decision about a main waterway close to the city (Nieuwe Waterweg). If this waterway would be closed, effects on sea level rise would be different than if the waterway remained open and thus would have different consequences on the local project scale. On the national level a program was developed to counter long-term changes in water and climate change: the Delta Program. One of its nine subprograms concerned the region in which Rotterdam can be found. This subprogram was especially developed to address the boundless issue of climate change and regional development. All these developments on the local, regional and national level had to be taken into account to decide on the plans for the Stadshavens project.

Second is the case on the Fraser Basin Council (FBC), in British Columbia, Canada (see Watson 2004). The Basin is highly important for the provincial area, both in terms of drainage as in terms of Gross Provincial Product. In the last 200 years, activities such as mining, timber production, fishing, agricultural settlement, port development and urban expansion have produced a complex mix of land and water-related problems together with climate challenges (Watson 2004). To address these problems the Fraser Basin Management Program was established. The program was based on a five-year agreement to pursue sustainability signed by representatives from the federal, provincial, and local tiers of government. It was developed through a multi-stakeholder board, which included representatives for the four levels of government – federal, provincial, municipal, and First Nations – and economic, social and environmental interests from different parts of the Fraser Basin. Watson concludes that the success of this program was not the installation of a new institutional structure but the people who worked in the program: '... it is people and not institutional structures ... that determine the outcomes of collaboration. There are no substitutes for mutual respect, patience, dedication, trust, negotiation, skills, and endurance' (Watson 2004: 251). This case demonstrates that multi-level governance is an important step in handling water and climate challenges.

Water Governance Transcends Sectors and Domains

Water governance is multi-issue. The interconnected nature of many water and climate issues means that a sector-transcending, or holistic, approach is needed in dealing with cross-sector challenges. Examples of these holistic approaches are the Integrated Regional Water Management (IRWM) or Integrated Water Resources Management (IWRM) approaches. An example of this cross-sector

water and climate governance can be found in the relation between climate change and urban area development. Global warming and related climate changes are likely to significantly increase the weather-related risks facing human settlements, including floods, water and power supply failures and associated economic collapse. This means that both urban area development and climate and water adaptation have to take the interests and prospects of the other sectors like water, agriculture, nature, environment, building, infrastructure, and etcetera into account (Edelenbos and Teisman: 2011).

Domains are interdependent and need constant coordination and fine-tuning. Water policy needs to be embedded in other policy fields as water, infrastructure, urban development and agriculture. A study from Van Buuren, Edelenbos and Klijn (2010), which researched eight Dutch water related regional development projects, indicates that regional development is a multi-functions issue. All the researched cases show to a certain extent the interconnected nature of regional governance.

To provide an example, we briefly discuss the case of the Bay Area Integrated Regional Water Management program (Bay Area IRWM) in California USA to illustrate the challenge of meeting climate change and domain and function integration. Several studies have indicated that California's climate is variable over history and in the present is experiencing sea level rise and may experience significant effects of climate warming (cf. Lubell and Lippert 2011). For the Bay Area IRWM we see fragmentation and interrelation on the following functional areas: water quality, water supply, waste water, urban development, flood protection, storm water management, and habitat protection/restoration (Lubell and Lippert 2011). In the Bay Area the IRWM approach is started especially to try to integrate the different abovementioned function areas, functions or domains.

Lubell and Lippert (2011) found that IRWM approaches in California largely fail to integrate different functional domains/functions. Participants considered the IRWM administration as confusing and inflexible, the process too complex, time consuming and unfair. However, participation in IRWM was associated with a higher level of collaboration on implementation activities. The integrated approach had a small but positive influence on levels of collaboration and probably increased the breadth and density of policy networks in the Bay Area. However, this increased collaboration did not yet result in the integration of functional areas and different interests stakeholders want to realize in developing the region in order to face climate change. This means more research about effective cross-sector cooperation is required to improve its application.

Water Governance Transcends Time Orientations

Time orientations make water governance even more challenging. Connecting the present to possible futures is necessary before good choices can be made (Loorbach 2007, Rotmans 2006, Peterson et al. 1997). Climate change brings new challenges, concerning for instance the rate (and magnitude) of change of climate,

the potential for non-linear changes and the long time horizons. All these issues are plagued with substantial uncertainties, which make implementing adaptation strategies difficult.

Burton et al. (2002: 154) argue that 'the essential starting point is the present'. However, the future is uncertain. Overall, it is argued that realizing system change and system innovation requires generations. It is, in other words, a long term process (Rogers 2003, Rotmans 2006). The effects of actions will take a long time to become visible.

Another cross-time problem in complex governance processes is that different actors hold different time frames and agendas (Bressers, Avelino and Geerlings 2012, Rotmans 2006: 56). Attempts to clarify these agendas might be flawed when actors still discuss their objectives in terms of long term or short term. What one considers to fall under which category differs per actor (Bressers, Avelino and Geerlings 2012). Private actors, such as investors in real estate (for example, developing business areas), hold time frames of 15 years or longer, whereas politicians and governments hold time frames of four years ('election cycles'). "Time horizons of a century, and over continental scales, are not compelling to most policymakers" (Someshwar 2008). Primary temporal planning and policy horizons are from one season to at the most a decade ahead. This makes it difficult to set goals and develop and implement strategies for the long run. Adaptation policies and programs need to be contextualized in place and time. Governments find it difficult to bring this place and time contextualization into practice because it is not common practice.

For example, we see in The Netherlands that different municipalities, such as Dordrecht and Rotterdam, are developing outer dyke urban development and taking safety measures. But these processes of local self-governance are being frustrated by the fact that national government has not yet set the norms for water safety for the future. This will probably not be realized before 2017. In The Netherlands it is important that national government facilitates the local and regional initiatives that counter climate challenges and water management issues. If national governments don't make steps in making policy for the long run, for example, policy with the necessary safety criteria and norms, local initiatives come to a standstill. It is important that proactive and adaptive local policymaking and implementation is stimulated in time. Challenges in water and climate governance across time are therefore the third focal point of this book.

Water Governance Crosses Actor Frames

Water governance processes can be approached as complex actor networks (Edelenbos et al. 2010, Dewulf et al. 2011). Competing claims of actors from different organizations, domains and sectors make it inherently difficult to manage the divergent claims on water (Edelenbos 2010). All sorts of actors ask for attention in water governance processes: farmers, industry, inhabitants of higher and lower areas, water power plants, municipal, regional and national governments. The

involved actors are using different frames to make sense of the issues that they face. Integration cannot be imposed or defined beforehand but will depend on connecting the fragmented frames and actors that populate a specific problem domain (Dewulf et al. 2011). Every actor brings his or her own scripts and routines to the multi-actor setting and these can diverge substantially, especially when actors from different sectors are involved.

Water governance can be characterized as a multi-actor setting in which various stakeholders often voice divergent opinions about what the issue is exactly or what the whole situation is about (Adger et al. 2005). From their different backgrounds they pay attention to different aspects of the situation and tell a different story about what the problem is and what should be done to solve this problem. Confusion, misunderstanding, disagreement or even intractable controversy are likely when participants frame the issues in divergent ways (Koppenjan and Klijn 2004). Framing is a three-fold process of selection, focusing and embedding (Dewulf et al. 2011). People frame issues by bringing certain aspects of a complex problem domain into the picture (a process of selection), by putting certain aspects on the foreground and others on the background (a process of focusing) and by using certain aspects as the overarching elements within which the rest fits (a process of embedding).

Dewulf et al. (2011) demonstrate the importance of framing in their study of the Tabacay project in the Paute catchment in Ecuador, Southern America. They show that different actors frame the problem differently (erosion, sedimentation, insufficient drinking water, etc.) resulting in a fragmented problem domain. In this case, formulating the issue in terms of 'erosion', for example, bring actors into the picture who suffer from the loss of 'fertile soil' (for example, farmers at the Tabacay level), while a formulation in terms of 'sediment' directs the attention towards actors who suffer from the 'dirt' carried by the river (for example, water power plant at the Paute level). Dewulf et al. (2005) show that attempts to interconnect this variety of frames was productive in generating a joint sense making of the problem situation. The importance of connecting technical and scientific frames to frames of other actors emerged as a crucial aspect in this case. Through a translation of technical language to language that is closer to the language other actors use, frame interconnection was realized.

When people frame problem situations differently, ambiguity arises (Dewulf et al. 2011). This is a specific kind of uncertainty that cannot be solved by simply generating more information, because actors frame usable and relevant information and knowledge in different ways (Van Buuren and Edelenbos 2004, Dewulf et al. 2005). In other words: they interpret and value (process of selection) data and information differently. This results from the simultaneous presence of two or more ways of framing the situation. Information providing doesn't solve this. Instead a coordination or interconnection of frames is needed to realize mutual understanding. This is called the interaction dimension of framing (Dewulf et al. 2011). Interaction and framing are prominent in complex systems such as water

and climate. Water governance across actor frames is therefore our fourth focal point.

Water Governance Exceeds Public, Private and Societal Spheres

Water governance issues and processes do not stop at the borders of public spheres and governmental institutions. It concerns also other actors in the playing field, such as NGOs and (organized) citizens. The transition in modern water management from technocratic towards more adaptive and democratic approaches is widely acknowledged (Sabatier et al. 2005, Van der Brugge et al. 2009). There are all kinds of initiatives that illustrate this development: citizen participation, public private partnerships, civic environmentalism and community based initiatives (Brunner and Steelman 2005).

Public participation and interactive policy-making is spread all over the world. Stakeholder involvement goes around under a lot of labels such as citizens panels, citizens charters, interactive decision-making, governance, and so on (Edelenbos et al. 2010). Main motives to involve stakeholders in decision-making are diminishing the veto power of various societal actors by involving them in decision making, improving the quality of decision making by using information and solutions of various actors and bridging the perceived growing cleavage between citizens and elected politicians. These arguments can also be found in literature about governance (Sørensen and Torfing 2007). Environmental issues are so-called 'wicked problems' which – according to theories of governance – require the involvement of various stakeholders (Koppenjan and Klijn 2004). Citizens and social groups show their self-organizing ability to develop and implement well-founded plans through citizens' initiatives (Edelenbos 2010, Edelenbos et al. 2010). These people are often retired, highly educated and – very important – are equipped with local knowledge of the specific locations.

A Dutch case illustrates this focal point. In the east of the Netherlands the river Waal runs through the cities Nijmegen and Lent, which means that in cases of high water discharge, a bottleneck may be formed in the populated areas so close to the river banks. To address this matter the area became one of the 39 measures in the Dutch Program Space for the Rivers (Warner et al. 2012). In this program it was decided by local, regional and national government that the river Waal had to be broadened by dike reallocation. However, the area was also allocated for the creation of new housing. This meant existing building plans had to be altered. Although the private housing corporation and the city council of Nijmegen were not happy with this change of plans, a new plan was developed. As harmony between the stakeholders developed, they decided that the dike would be reallocated (Van Buuren, Edelenbos and Klijn 2010).

Inhabitants of Lent, however, were less happy with the new ambitions for city development. Approximately 50 houses would be demolished to realize the reallocation. The inhabitants developed a plan of their own, the 'Lents Warande' plan. However, this plan did not meet national objectives in discharge

amounts, and national governmental actors therefore did not consider it a feasible alternative. Local stakeholders were still not convinced of the long term prognoses and plans, but had to give up in the end as the national government (House of Representatives) decided in favor of dyke reallocation. This example demonstrates that many stakeholders participate in water governance and that even when public-private partnerships reach agreement, they still might encounter resistance from, for instance, inhabitants. Arranging connections does not occur without tensions. Therefore, public/society interaction will be the fifth focal point.

Closing and Prospect to Contributions to this Volume

This chapter has discussed the development of fragmentation, its role in water governance and the need for connective capacity in water governance to overcome fragmentation and integrate approaches, actors, frames and many more. This connectivity will be analyzed based on two analytical dividing lines. First, we have discussed three carriers of connective capacity: individuals, instruments and institutions. Second, we have discussed five focal points for our analysis: government layers and levels, sectors and domains, time orientation of the long and the short term, perceptions and actor frames and public and private spheres. With this point of departure we will be able to gain insights of the nature and the strengths and weaknesses of connective capacity in water governance in various countries and in various cases.

There are limits to connective capacity. Not everything has to be connected at the same time with the same level of intensity (Edelenbos 2010). Energy and time effort put in one connection cannot be invested in another connection at the same time. It is about a delicate balance between exploring and exploiting relations and connections (March 1999, Duit and Galaz 2008). If this balance is found, integration will lead to adaptive water governance systems with a high capacity for exploration with an equally high level of capacity for exploitation (for example, Duit and Galaz 2008: 321). In the chapters of this book an inquiry is made into connective capacity, its failures, its successes, its effects and its development. The next section will discuss the structure/grid of the book and introduce the individual chapters of this book.

Book Structure and Outlook to the Book Chapters

In this book we will discuss the notion of connective capacity by the combination of two perspectives: carriers and focal points of connective capacity. The three carriers and five focal points result in a grid in which the chapters of the book are positioned. The contributors to this book will discuss theory and empirics of water governance, with an emphasis on a combination of one carrier and one focal point. Table 1.1 outlines this book's structure.