

Chapter 1

Introduction

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This book is about governance for drought resilience. But that simple sentence alone might rouse several questions. Because what do we mean with drought, and how does that relate to water scarcity? And what do we mean with resilience, and why is resilience needed for tackling drought? And how does governance enter this equation? We argue that governance assessment—the study of restricting and facilitating characteristics of a governance setting—can greatly aid implementation of drought adaptation measures, thereby increasing drought resilience. In this chapter we will first discuss the occurrence of drought in (Northwest) Europe, and why governance matters for increasing drought resilience (Sect. 1.1). Second, we will shed more light on the notion of governance and how governance is dealt with by us (Sect. 1.2). Third, we will review existing governance assessment methods (Sect. 1.3). Fourth, we will use this knowledge on governance and governance assessment to introduce our key principles in governance assessment, and discuss how we have applied these in a real-life project setting (Sect. 1.4). Fifth, and last, this chapter ends with an outlook into the rest of the book, to guide the reader in reading (Sect. 1.5).

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1.1 Introduction: Why Governance for Drought Resilience?

Drought and water scarcity are very visible and prominent problems in some areas of the world. In Europe the south of the continent is very prone to drought, and suffers great (economical) damages as a result of it. In Northwest Europe drought is generally not recognized as a major problem. Water surplus—for instance in flooding—receives much more attention and is generally the focus of water managers. However, even though drought may not be as visible as flooding, that does not mean it does not exist. For instance, the heat wave and drought of summer 2003 caused the loss of thousands of human lives in Europe and had a financial impact of 13 billion euros (COPA COGECA 2003). Agricultural production declines as a result of precipitation shortages, reduced groundwater levels and so on. Nature areas suffer from drought as well, due to drops in groundwater levels, more competition for remaining water supplies and increasing eutrophication. Freshwater management plays a vital role in both the supply–demand balance as well as the effects drought has on water quality. Thus, drought and water scarcity in Europe have an impact on agriculture, nature, freshwater—and as a result also impact the economy as a whole and people’s health. In this book we will mostly discuss ‘drought’, but that is not to exclude water scarcity. Rather, we use ‘drought’ as common denominator for both the issue of drought as well as water scarcity.

Drought can occur in virtually any climatic regime, in both high and low rainfall areas. In contrast to aridity, which is a permanent feature of the climate and is restricted to low rainfall areas, drought is a temporary water shortage condition compared to an average situation. It is usually the consequence of a natural reduction in the amount of rainfall received over an extended period of time, which can be caused or aggravated by other climatic factors, such as high temperatures, high winds or low relative humidity. Drought can also be induced by human factors, causing, for instance, excessive demands over a supply–demand system. Following this, and depending on the main causes or impacts, some definitions of droughts have been proposed, which are usually grouped into four types (Wilhite and Glantz 1987):

- meteorological drought, which is mainly due to a long period of no or very low rainfall;
- hydrological drought, which is characterized by river flows that are below average;
- agricultural drought, which refers to a soil moisture deficit affecting crops;
- mega drought, which is a persistent and extended drought that lasts for a much longer period than normal.

Additionally, some authors will also consider another type called ‘socioeconomic drought’, which occurs when the demand for water exceeds the supply. Here, it may be important to highlight the difference between drought (and drought impacts) and water scarcity. Water scarcity and drought are two interrelated but distinct concepts. Water scarcity may result from a range of phenomena, which may be produced by

natural causes, such as drought, but can also be induced by human activities only, or, as is usually the case, may result from the interaction of both (Pereira et al. 2002).

Drought is expected to increase in the future as a result of climate change. In 2007 11 % of the European population and 17 % of the European territory were affected by drought (EC 2007). Already, it can be noted that the number of people and areas in Europe affected by drought and water scarcity has increased with 20 % between 1976 and 2006 (EC 2007). The total cost of these 30 years of droughts amounts to 100 billion euros (ibid.). This makes it very important to deal with drought and water scarcity now, and to increase drought resilience before the problem grows even bigger. In the 2007 Communication the European Union clearly states that devising effective drought risk management strategies has to be regarded an EU priority.

But in order to optimize drought resilience not only the physical situation must be studied and worked on. The governance setting matters a great deal in determining the effectiveness of drought adaptation measures and facilitating their implementation. Governance ultimately revolves around the social, organizational, political and juridical dimensions and how actors operate in these dimensions to work on issues such as drought resilience. In many instances (technological) innovations for increasing drought resilience do exist, but their implementation is hampered because of factors in the governance setting. As an example, an innovation is developed and tested by a local actor, but its upscaling for broader application is limited because actors in the region do not engage in intensive networking or suffer from the 'not invented here' syndrome and the resulting lack of ownership decreases the potential to upscale. Another example is when the ideas for an innovation do exist, but resources lack to fund their proper development, as a result of little experienced urgency for change at regime level. In other words; governance matters, and governance is broader than just the (governmental) actors and their adoption of drought resilience measures.

In the upcoming chapters governance and the role of governance in drought resilience will be further discussed, translated into a fully developed governance assessment model, and applied to real-life cases. Through this discussion, development and application we want to provide assistance to practitioners working on increasing drought resilience. This book is primarily written by scientists, but strongly embedded in our interaction with practitioners. Some chapters are also co-written by these practitioners. We believe that this work on the edge of science and practice contributes to an innovative perspective on drought resilience, and is an example of the novelty and applicability of our work.

1.2 Defining Governance

Governance has been extensively discussed in political sciences and public administration literature. It is often presented as part of a more general shift from government to governance (Kooiman 1993, 2003; Klijn and Koppenjan 2000). Governance in that sense is the interaction of public and private actors aimed at solving societal problems or creating societal opportunities in an institutional

context with a normative foundation (summary from Bressers 2011: 25; based on Kooiman 2003: 4). Government is thus no longer the sole decision-maker, and allows for direct influence of other parties. The advantages of this are numerous, for instance greater support from stakeholders, higher quality of work as a result of expert and layman input, and greater legitimacy of decisions (van Schie 2010: 33; Termeer 2009: 300). Another effect of the shift to governance is the increase in organizational adaptivity (Teisman 2008: 358). Flexibility and changeability are more included from the start onwards in decision-making processes. At the same time, the inclusion of other stakeholders besides government is not risk-free. Accountability is a real issue when decision-making is shared (Koliba et al. 2011: 35–36; van Kersbergen and van Waarden 2004; Sørensen and Torfing 2005). Furthermore, some stakeholders are more vocal than others, which might result in an unrealistic representation of some interests above others.

Water governance—drought governance being a part of that—concerns the same multi-actor approach in the field of water. For water, governance is very important, because water is a complex and highly interconnected system which touches upon many others domains and fields such as agriculture, economic development, social development, ecology and health (Edelenbos et al. 2013: 2). This means many stakeholders are involved, each with very different stakes (Leach and Pelkey 2001; Kuks 2004). In such a field it is almost impossible to realize change in just a top-down hierarchical manner. Rather, more bottom-up, horizontal and multi-stakeholders approaches are required (Edelenbos et al. 2013: 2). Especially in the light of the fact that even though numerous methods and technologies exist to solve water problems such as water pollution, water supply and water surpluses, it is highly noteworthy that implementation is often still lacking. That has led some to argue that not a lack of water technology is what causes the current ‘water crisis’ (UNDP 2013: iv) but rather a lack of water governance (UNESCO 2006). Perhaps as a result of that, water governance is an upcoming theme in the field of public administration (Edelenbos et al. 2013; de Boer et al. 2013; Edelenbos and Teisman 2011; Teisman and Edelenbos 2011; Bressers and Lulofs 2010; Huitema et al. 2009; Kampa 2007; Pahl-Wostl 2007; Gopalakrishnan et al. 2005; Kuks 2004).

The rationale for the shift from government to governance is the fact that awareness has increased that monocentric government models and approaches are incapable of handling persistent uncertain and complex situation (Edelenbos et al. 2013; Kickert et al. 1997; Koppenjan and Klijn 2004; Van Buuren et al. 2010). The required adaptivity cannot be found in solely governmental steering. Koppenjan and Klijn (2004: 95–100) define governance as a fundamentally different form of response to uncertainty than traditional responses. Governance then is a way of linking complex interactions between actors in solving difficult problems (ibid.: 99), whereas more traditional responses rely more on research, go alone strategy, only limited consultation, and top-down steering.

The *degree of actor involvement* is therefore an important characteristic of the governance approach. But governance is more than ‘just’ including more actors. It also concerns the *multiplicity of all levels and scales* involved and the *varying problem perceptions and objectives* that occur in such a multi-scale, multi-actor

environment. This reality poses an issue that has been called ‘multi-level governance’. Blomquist and Schlager (1999: 7, 39–43) also emphasize the relation between the many facets of the problem and the horizontal and vertical coordination this requires. The same goes for Rosenau (2000: 10–11).

As done in this book, O’Toole (2000: 276–279) treats governance in the context of studies of the implementation of policy strategies. He adds to the multi-level, multi-actor, multi-problem perception aspects ‘the multivariate character of policy action’. He refers to Milward and Provan (1999: 3), who state: ‘The essence of governance is its focus on governing mechanisms—grants, contracts, agreements—that do not rest solely on the authority and sanctions of government.’ *The instruments and strategies* available and required therefore also increase.

O’Toole (2000) also points to the work of Lynn et al. (2000a, b), who approach governance from the public management perspective. They begin by noting that policy programs are implemented in a web of many diverse actors. As a consequence, the model of governance they develop concentrates not only on the objectives and instruments of policy, but also the resources and organization of implementation. Their model differs from usual overviews mainly because it clearly shows that these aspects of organization and resources can take a wide variety of forms and have a multi-functional character (pp. 257–258). Peters and Pierre (1998: 226–227) also consider a/o. the ‘blending of public and private resources’ to be features of the governance concept. This brings a fifth element into the picture, namely that of the available *resources and responsibilities*.

A classical definition of the concept of ‘policy’ is that of an actor striving to attain certain goals with certain means. Compared to this concept the multiplicity of all elements is striking in the discussion on ‘governance’. No longer is one dominant actor supposed to govern a certain sector, but a multiplicity of them, operating at multiple levels simultaneously influencing developments in the sector. Furthermore goals are not rationally chosen purposes, but often the result of clashes and compromise from different problem perspectives. Means not only consist of the multiplicity of policy instruments that blend in various strategies, but also of the responsibilities and resources given to again often multiple organizations to use them in practice.

Applied on implementation processes, this exploration of the governance literature leads in our opinion to the following elements of governance (Bressers and Kuks 2003):

1. Levels and scales (not necessarily administrative levels): governance assumes the general multi-level character of policy implementation.
2. Actors and networks: governance assumes the multi-actor character of policy implementation.
3. Problem perception and goal ambitions: governance assumes the multi-faceted character of the problem perceptions and resulting goal ambitions of policy implementation.

4. Strategies and instruments: governance assumes the multi-instrumental character of policy strategies for policy implementation.
5. Responsibilities and resources for implementation: governance assumes a complex multi-resource basis for policy implementation.

This leads us to define governance in general, and drought governance more specifically, as the combination of the relevant multiplicity of responsibilities and resources, instrumental strategies, goals, actor networks and scales that forms a context that, to some degree, restricts and, to some degree, enables actions and interactions. In Chap. 3 we will explain further how on the basis of this conceptualization of governance an assessment method is developed and how this method works in practice.

1.3 A Short Overview on Existing Governance Assessment Methods and How We Relate to Them

Governance, and more specifically drought governance, thus requires an encompassing method of assessment, one that is not too strictly focused on a single aspect of the water domain. However, assessment methods for water governance are scarce, and often lack integrality or scientific foundation. As van Rijswijk et al. (2014) state in their recent article on water governance assessment:

However, an increasing amount of integral assessment approaches appear, but these approaches often lack scientific substantiation and grounding (OECD 2011, 2014). The information and knowledge base on which they rely can be very weak and fragmented. Integral and interdisciplinary assessment methods are scarce, partly for the reason that such integral and interdisciplinary assessments are particularly complex to develop and implement.

Van Rijswijk et al. work on an attempt to create greater coherence between perspectives on assessment and relevant parts of water governance assessment. This results in a list of ten building blocks, varying from knowledge, values and involvement to responsibilities, regulations and arrangements (2014: 739). However, although that does create greater insight into the components of water governance and how diverse water governance assessment is, it does not yet lead to a clearly implementable method of water governance assessment.

This is the issue for most of what is out there on water governance assessment. Drought governance assessment as such is a much underdeveloped field, which is why we investigate primarily water governance as a more general field in this section. The step towards a more integral approach is increasingly made, and the relevance of water governance assessment is not widely disputed. But work that takes a step further towards concrete assessment method building is still very limited. Sometimes assessment methods take a step towards a more normative approach. An example here is the OECD Principles on Water Governance (brochure OECD 2015b). These are principles to provide a framework to understand

whether water governance systems are performing optimally and help to adjust them where necessary. The analytical assessment model underlying these principles is more a building block approach with identified gaps and possible bridges between them. That is of course part of the movement towards an integrated assessment tool, but not yet a full tool itself.

In 2013 the UNDP published a report with a framework for water governance assessment. This governance assessment framework consists of three basic components (actors and institutions, governance principles and performance) (UNDP 2013: 8). Together these form ‘water governance’. These components are further described, and then assessed with an eight-step method (from clarifying the objectives and conducting a stakeholder analysis through deciding an assessment framework and selecting indicators to analyzing results and communicating them) (ibid.: 18). More concretely, each of the three basic components is discussed with a ‘how to’ approach for its assessment. However, the discussion remains rather theoretical and general. It very accurately points at all the facets encompassing water governance and how these interact, but does not yet lead to a directly implementable assessment method.

The OECD is, however, engaged in an extensive exercise to come towards such an integrated tool, or an integrated set of indicators. As a first step they have created an overview of all indicators and assessment tools that they knew of (OECD ‘Inventory of Water Governance Indicators and Measurement Frameworks’—version July 10th 2015a). In this inventory they list a whole lot of indicators, but also databases, guidelines, maps, and assessment tools. Focusing on the assessment tools, they mention 25 assessment tools, partially already listed by earlier such effort (e.g. UNDP 2013). Some of the assessment frameworks come from large supranational organizations, such as multiple assessment tools from the UN (different programs). Others include for instance the work of Van Rijswijk et al. (2014) mentioned above, but also the work of the authors of this book. Many of the mentioned assessment tools have a specific focus, for instance gender (UN WWAP UNESCO, Project for Gender Sensitive Water Monitoring Assessment and Reporting), solidarity (UNDP Global water solidarity, Certificate for Decentralized Water Solidarity), or sanitation (for instance UN-Water, WHO, GLAAS Global Analysis and Assessment of Sanitation and Drinking-Water, and IDB, IWA, AquaRating). Others focus more on example setting and best practices (for instance UN-CEPAL, Best practices in regulating state-owned and municipal water utilities). What is noteworthy in this excellent overview of assessment methods is that many methods focus on specific aspects of water governance, for instance law, economy, human rights, governmental action, etc. Many instruments are also evaluation or monitoring assessment methods of specific plans, policies or actions, rather than assessment tools for a full governance setting.

The OECD inventory also includes the governance assessment method discussed in this book. For obvious reasons it is included as having a specific focus, namely drought resilience. But actually that is not entirely correct, as the basic features of the method are much wider applicable than solely for drought governance

assessment. In relation to the three sections of the diagram of OECD principles (effectiveness, efficiency and engagement) we concentrate primarily on the effectiveness part of the diagram.

1.4 Towards Constructing Our Own Governance Assessment Model

Although water governance assessment is undoubtedly an upcoming theme and assessment methods are increasingly developed, we do still see a gap from the theoretical recognition that water governance assessment is needed and what components should be part of that assessment to the development of an actual hands-on but science-based assessment method. We will provide such a method in this book. This method is based on our work in an European Interreg IVb NWE-project, called Benefit of Governance in Drought Adaptation (abbreviation: DROP). In this section we will provide some insight into this background of our work before the upcoming chapters will describe our assessment method in full detail.

As we have discussed in Sect. 1.2 we view five dimensions as central to water governance assessment: (1) Levels and scales; (2) Actors and networks; (3) Problem perception and goal ambitions; (4) Strategies and instruments; (5) Responsibilities and resources. These dimensions are based on study of scientific literature and earlier research. The resulting assessment method—further discussed in upcoming chapters—has been applied on several case studies. Predecessors of the present assessment method have been used in an EU six-country study on water governance (Bressers and Kuks 2004) and a study on Greece (Kampa and Bressers 2008). Later, also further studies in The Netherlands (a/o. de Boer and Bressers 2011), Canada (de Boer 2012), Romania (Vinke-deKruif et al. 2015) and Mexico (Franco-García et al. 2013; Casiano and Bressers 2015) were done with a further developed version of the assessment method. The final elaboration of the method and its most extensive application thus far, however, has been in the above-mentioned ‘DROP project’. DROP was about drought, as a specific subfield of water management more in general. It was a project on the edge of science and practice. The project started in 2013 and continued till the end of 2015.

Eleven partners formed the project team; six regional water authorities (practice partners) and five knowledge institutions (science partners, also known as ‘governance team’). The project was based in five countries: The Netherlands, Germany, Belgium, France and the United Kingdom. In each country one region—in the Netherlands two regions—was studied by the scientific partners and drought adaptation measures were implemented by the practice partner.

The practice partners in DROP implemented various drought adaptation measures. It differed per partner what was done. In the region Twente, the Netherlands,

brook restoration measures were carried out, such as removing drainage systems, muting ditches, shoaling streams, and constructing water storage areas. Apart from that, water management plans were written for local farmers to aid drought adaptation on parcel level, and two studies were conducted (one about level-dependent drainage and one on surface run-off). In the region Salland, also in the Netherlands, two structures were built as part of a larger plan where the double-edged sword of too much water and too little water is addressed simultaneously by a set of structures that combine discharge and pumping functions. The project also paid attention to optimization of water management. In the region Flanders, Belgium, instruments for drought monitoring and impact modelling were set up, combined with information provision on drought. This resulted in among others the inclusion of drought as one of the four main themes on a web portal, where the developed drought indicators are published and disseminated.

In the region Eifel-Rur, Germany, the focus was on preventing deterioration of water quality in the water reservoir system. This was done by investigating possible changes in the inflow over the last decades, to see if trends could be distinguished. Based on this study, the management plans for discharge downstream of the reservoir system can be checked and if necessary adapted. In the region Brittany, France, two strands of work were carried out. The practice partner developed an innovative lock for the dam of a reservoir that prevents salt water intrusion when boats pass the dam to and from the ocean. One of the scientific partners developed a tool that forecasts inflows to the reservoir during low flow season and therefore aids anticipation of critical situations. Last, in the region Somerset, United Kingdom, a whole set of innovative approaches was implemented to increase drought resilience, examples of which are modelling and technology transfer, water demand management, soil moisture data collection and analysis, different cover crops, and all kinds of measures aimed to conserve the peat soils, such as scrub clearance, re-grading peat soils and improvement of structures that retain rainwater.

These six regions were grouped in three pilots. The pilot Nature predominantly focused on drought adaptation measures with regard to preservation of the natural environment. The two practice partners in this pilot were Twente and Somerset. The pilot Agriculture predominantly focused on drought adaptation measures in relation to agriculture. The two practice partners in this pilot were Salland and Flanders. The pilot Freshwater predominantly focused on drought adaptation measures for the preservation and management of freshwater reservoirs. The two practice partners in this pilot were Brittany and Eifel-Rur.

The scientific partners in the DROP project team, called ‘the governance team’, worked on governance assessment of these same six regions. They visited the regions twice, and spoke with the regional water authority, also many other regional and local stakeholders. Based on these conversations they were able to create a region diagnosis on the five dimensions we discerned above and following that diagnosis also recommendations for the future. These recommendations were multi-level; sometimes matters that could rather easily be picked up by the regional water authority itself, but in other cases also broader recommendations for the

national level, with lesser possibilities to influence it directly by the regional water authority that was practice partner in the project.

The regional visits by the governance team were one type of the site visit exchanges that took place in the DROP project. Another type of exchange was the ‘drought team visits’; where several experts on drought from the water authority went to visit their partner region; for instance Twente experts visited the region Somerset to learn about drought adaptation for nature there. Likewise, experts from Somerset visited Twente. These drought team exchanges took place twice, just like the governance team visits. A third set of exchange was the stakeholder exchange. In this exchange a group of approx. 5–10 stakeholders visited the partner region. These stakeholders were representatives from local/regional governmental agencies, NGOs, businesses also local farmers. These visits took place once during the project’s duration. A last form of exchange was the full partnership meetings of the project team, where partners shared their work thus far, the lessons they had learned, and the plans they had for the future.

Exchange and mutual learning were therefore important aspects of the work in DROP. For governance assessment this meant that a strong focus laid on interaction and exchange, and that there was a lot of room for discussion, and on the spot science. This gives our assessment model a specific place in the wider array of assessment approaches out there, as discussed in Sect. 1.3. Distinguishing characteristic of our approach—compared to other governance assessment approaches—are the following ones. (1) Many approaches of governance mix elements of descriptive nature and elements of normative nature, while our approach tries to clearly separate the descriptive elements (the five dimensions of governance discussed at the end of Sect. 1.2) and the normative aspects (four criteria we employ in our assessment, namely intensity, flexibility, extent and coherence). (2) Furthermore our approach derives the normative criteria from a specific goal, namely the feasibility and likelihood of realization of a certain category of measures or projects (in this case the promotion of drought resilience). Thus the normative component is limited and focused. That does not mean that more ethical approaches (‘good governance’ like the one of the OECD) are wrong, just that they have another focus. Our approach could be considered more practice-oriented—with the risk that it can only be applied ethically in cases that the projected policies and projects serve ‘good’ goals. (3) Our approach makes a clear separation between the conditions and the activities. In many approaches ‘governance’ is used for both the process and the contextual conditions for the process. In our approach ‘governance’ is just used for the context. It is even a very distinguished characteristic of our approach that not everything (the circumstances and the process) is put in this one basket, but that the governance context and the process are seen as related but separated so that it is possible to study the impact of the governance conditions on the process. This again makes it relatively practice-oriented.

1.5 Outlook and Reader Guidance

In this book the work conducted in the DROP project is discussed and complemented with additional comparative analysis. We have constructed the book in several distinctive sections. The first section of the book provides an introduction to our work. This chapter is the first step in that.

Chapter 2 (Stein et al.) elaborates on the European policy perspective on drought and water scarcity. Stein et al. provide the reader with extensive knowledge into the directives and plans behind current European perspectives on drought. In doing so they show how the past two decades have seen a transition from scattered policies on generally broader water governance issues towards more direct policy actions to adapt to and mitigate droughts. Despite more European attention, the effectiveness of drought policies still largely depends on the national and regional translations into initiatives and plans.

As a result of that the study of the national and regional governance context becomes all the more important in assessing drought resilience. Chapter 3 (Bressers et al.) discusses in detail the Governance Assessment Tool as developed and refined in the DROP project. The authors discuss the origins of the tool in contextual interaction theory, the dimensions and criteria that form the backbone of the tool and the matrix that originates from these dimensions and criteria. In these matrix evaluative questions are formulated that can be asked to local and regional stakeholders. Based on their answers and insights a judgment can be reached on whether the governance circumstances investigated in that matrix box are supportive, restrictive or neutral for drought adaptation. Through the collection of data on all matrix boxes a visualization can be developed which shows in one quick glance the governance state of affairs in that region. To create a more precise visualization, arrows can be added to each box indicating upward or downward trends for that box. This inserts a longitudinal aspect into the visualization. Chapter 3 ends with a discussion of the GAT application in the DROP project, in order to discuss our lessons learned and problems and opportunities we ran into while applying the instrument.

After this chapter we precede to the second section of the book; that of the case chapters. Each of the six regions from the DROP project is discussed as a case study here, and chapter authors show how they have applied the GAT to that case, what results they found, and what main messages they distill from that.

Chapter 4 (Vidaurre et al.) discusses case study region Eifel-Rur. Based on the application of the GAT they conclude the current governance situation in Eifel-Rur is 'intermediate', hovering between fully supportive or fully restrictive. Especially the flexibility (room for manoeuvring) and the intensity (sense of urgency) of drought governance in Eifel-Rur have much room for improvement. At the same time, the authors witness an already occurring improvement in these criteria. As a result of their analysis the authors reach a list of recommendations for the Eifel-Rur region. For example, they advise to diversify strategies for drought preparedness by

connecting with water scarcity and climate change debates, to further develop water demand management, and to increase synergy with farmers.

In chap. 5 (Browne et al.) the region Somerset is analyzed. In Somerset there was a shift from increasing drought awareness when the project started to resistance to the topic of drought during later phases of the project, as a result of severe flooding in the winter of 2013–2014. The chapter authors discuss the fragmented nature of the English water sector and the split responsibilities that exist as a result of that. The discussion on water and drought in the UK is very politicized and emotive, and this has an impact on how the topic has to be addressed in order to increase drought resilience. To deal with this, the chapter authors call upon the decision-makers in the UK to engage in collaborative processes of water governance instead of the current silos.

Chapter 6 (La Jeunesse et al.) assesses the French region Brittany, and therein the Vilaine river basin. The governance of the Vilaine river basin, and more specifically of the area around the Arzal dam, largely revolves around the multi-user conflict in the area and realizing drought awareness. Awareness about the effects of climate change on drought is low. The general judgment of the region's governance is moderately positive, but due to the limited attention for climate change and insufficient knowledge about the effects of drought on the area, the authors advise to enhance knowledge and cooperation on climate change and its impacts on drought, and increase foresight and sharing forecasting information.

The next chap. 7 (Troeltzsch et al.) gives an account of the governance situation in the Belgian region Flanders. The authors classify the current state of affairs as 'intermediate'. Especially in terms of responsibilities and resources there is room for improvement. A reason for this is the fact that there is no assigned budget for drought. Overall, the authors say that Flanders is at early stage of establishing drought resilience measures. Through first activities motivation is increasing, and increasingly water scarcity and drought are integrated in some general water management strategic documents. The authors discuss how further realization can be sought through increasing awareness, mainstreaming drought risks and engaging with other public actors.

Chapter 8 (Özerol et al.) presents the results for the Dutch region Salland. They write that Salland has a neutral governance context regarding its drought resilience policies and measures. For Salland the most supportive dimension is levels and scales, whereas the coherence of strategies and instruments and the intensity of problem perspectives and goal ambitions are the restrictive contextual factors. Most matrix boxes are scored neutral. Important explanations of this are that drought measures are not integrated into existing water use and the dominance of flood management over drought management. Positive aspects are the existence of trust and collaboration. As a result, the authors recommend to increase awareness and understanding of drought (management) and actively enable non-governmental parties to share responsibilities.

Chapter 9 (Bressers et al.) discusses the last case study; the Dutch region Twente. The governance assessment results of this region are mixed, leading to a moderately positive general judgment; varying from excellent in one box to

restrictive for other boxes. Excellent is the actor coherence in Twente, but more restrictive are for example the slow integration of the drought resilience awareness and the resulting reliance on voluntary preventive measures. Just like other chapters the recommendations for the region Twente partly also concern matters such as awareness and exchange. Another, more Twente-specific, recommendation is the upscaling from farm-level approach to full area-level approach, where work transcends farm-level voluntary measures (although those should be continued as well) and also includes larger scale measures to create more synergy between participating actors.

The third section consists of cross-cutting perspective chapters on the three topics of Nature, Agriculture and Freshwater—consistent with the three pilots of DROP.

Chapter 10 (Özerol and Troeltzsch) is the first of these cross-cutting chapters, and discusses the topic Agriculture. The chapter shows how there is a tension between the fact that agriculture is a key water user, therefore significantly impacting drought and water scarcity circumstances, yet at the same time not being prioritized over for instance drinking water and energy production. Awareness, both public and private, is low, also due to the low visibility of drought in Northwest Europe. Increasing this awareness has much potential for improving the way drought and water scarcity are tackled in agricultural production.

Chapter 11 (Furusho et al.) discusses the topic of Freshwater. Here, the same low visibility of drought hampers the uptake of drought adaptation measures. However, the authors point to the fact that everyone agrees with the importance of freshwater availability, and hence the topic of safeguarding future freshwater availability can be used as an entryway into more drought awareness. In order to facilitate this awareness building process the authors plead for more monitoring of water withdraws. The greater insight in the effects of water shortages in freshwater production can help to trigger action.

The last cross-cutting chapter, chap. 12 (Bressers and Stein) discussed the field of Nature. They apply contextual interaction theory to discuss the main conclusions for this field. Motivation is highly varied, and interestingly for cognition the authors conclude that awareness that drought is becoming a topic of increasing importance is recognized widely by nature conservation actors. It appears that for Nature the actors involved recognize the importance of drought better than for Agriculture or Freshwater. Unfortunately, these same nature conservation actors have limited resources. This means that for nature not the awareness among primary stakeholders themselves is the biggest problem, but their possibilities to address the issue properly are.

In chap. 13 (Larrue et al.) we discuss our application of the Governance Assessment Tool and the generic recommendations we can draw from the case studies and cross-cutting studies. The aim of this book as such is a double focus on both model development and refinement, as well as real-life application to regional drought adaptation. In line with the observations in the outlook above the chapter concludes with four overarching conclusions for the whole book: (1) Continuous focus on realizing awareness is needed, (2) An increase in preparation and

implementation of water demand management is required, (3) Flood and drought management need to be integrally dealt with, and (4) Tailored action is key in tackling drought and water scarcity effectively due to regional diversity.

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