Order with and without design in polycentric governance systems:

Exploring the role of independence and multiplicity in decision-making for WFD implementation processes

M. Sc./ M. Sc. Nadine Jenny Shirin Schröder

DISSERTATION

to obtain the academic degree Doktor-Ingenieur (Dr.-Ing.)

submitted to the

HafenCity University Hamburg

in the field of

Resource Efficiency in Architecture and Planning (REAP)

January 2024

Supervisors:

Prof. Dr.-Ing. Wolfgang Dickhaut, HafenCity University Hamburg

Prof. Nigel Watson, Lancaster University

Imprint

HafenCity University Hamburg
Henning-Voscherau-Platz 1
20457 Hamburg

DOI: 10.34712/142.59

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Deutsche Zusammenfassung

Im Jahr 2000 wurde die EG Wasserrahmenrichtlinie (WRRL) mit ihrer Verabschiedung das zentrale regulatorische Instrument der Europäischen Gewässerschutzpolitik. Allerdings wird heute bezweifelt, dass Deutschland, wie andere Mitgliedstaaten auch, die ambitionierten Ziele der WRRL bis 2027 erreicht. ‚Warum geht es nicht woran mit der Zielerreichung?' und ‚Wie sind Umsetzungsdefizite zu überwinden?' sind deswegen wiederkehrende Fragen. In der Implementierungsforschung konnten zu verschiedenen Zeiten und bei verschiedenen Politiken ähnliche Umsetzungsdefizite und -hindernisse beobachtet werden. Verschiedene Antworten auf die genannten Fragen wurden gefunden und Governance-Strukturen sind dabei ein Faktor. Zu einer dominierenden Frage wurde, ob Politikziele besser durch eine einzige Autorität oder durch nicht-zentrale Strukturen umzusetzen sind. Die Polycentricity-Literatur spricht in diesem Zusammenhang von monozentrischer vs. polyzentrischer Governance.

Diese qualitative Untersuchung trägt empirisch durch cross-lokale Vergleiche zur Beantwortung dieser Fragen bei. Sie fragt: Wie beeinflussen Implementierungsstrukturen (organisatorische Strukturen und institutioneller Rahmen), beziehungsweise Governance-Strukturen, die WRRL-Umsetzung, insbesondere auf lokaler Ebene und bezüglich der Umsetzung der WRRL-Vorgaben zum Flussgebietseinzugsmanagementansatz, zur Koordination über Grenzen und Sektoren hinweg und zur Öffentlichkeitsbeteiligung?

Die WRRL-Umsetzungsprozesse wurden in sechs deutschen Bundesländern mit dem Fokus auf Maßnahmen für Hydromorphologie und Durchgängigkeit von Flüssen untersucht, wofür das Polycentricity-Konzept genutzt wurde. Die Implementierungsstrukturen variierten über Bundesländer und Ebenen hinweg und innerhalb dieser und zeigten damit verschiedenste Abstufungen zwischen den Polen monozentrischer und polyzentrischer Governance. Daten wurden über die Analyse von Politik-Dokumenten, semi-strukturierten Interviews mit relevanten Akteuren und teilnehmende Beobachtung von Beteiligungsprozessen erhoben.

Gefunden wurden Umsetzungsmuster auf der Mikro-Ebene bezüglich Umsetzungshürden, Instrumenten, Umsetzungsstrategien, der Nutzung von Handlungsspielräumen und organisatorischer Strukturen. Diese Muster formten wiederum eine Mischung aus zentralen und dezentralen Umsetzungsansätzen auf der Makro-Ebene. Diese Mischung hatte zur Folge, dass Instrumente schwache Effekte zeigten, dass es an Einfluss verschiedener Ebenen und Sektoren aufeinander mangelte und dass Ansätze, die von Steuerungsebene und lokaler Ebene parallel verfolgt wurden, nicht zueinander passten. Nichtsdestotrotz, ermöglichte Polycentricity in den Systemen ebenso, dass sich Leuchtturmprojekte trotz der immensen Umsetzungshürden entwickelten.

Die Entstehung der gefundenen Muster sind teilweise auf Zufallsfaktoren und teilweise auf das Designen von Institutionen auf verschiedenen Ebenen zu verschiedenen Zeiten zurückzuführen. Änderungen wurden teilweise durch die WRRL ausgelöst, zahlreiche Strukturen existierten aber bereits vor der WRRL, wodurch Muster hauptsächlich auf Pfadabhängigkeit zurückzuführen sind. Durch die WRRL wurden vorrangig neue Ziele gesetzt und durch neue Instrumente versuchte die Steuerungsebene die Ressourcenausstattung existierender Akteure im Sinne der Umsetzung von WRRL-Maßnahmen zu verbessern. Die Beziehungen, also die Macht- und Abhängigkeitsverhältnisse, zwischen den Akteursgruppen hingegen wurden mit der WRRL-Umsetzung in Deutschland kaum geändert.

Insbesondere die Unabhängigkeit der Akteure in polyzentrischen Systemen erschwert es ein ideales Umsetzungsregime zu identifizieren, da eine Vielzahl von Akteuren denselben institutionellen Rahmen unterschiedlich nutzt. Es ist ebenso schwierig ein System hin zu dem Ideal zu verändern, wenn das Ideal bekannt wäre. Der Wandel müsste an vielen Punkten parallel stattfinden – orchestriert durch einen zentralen Designer oder abgestimmt durch eine gemeinsame Vereinbarung. Kumulatives, mehr oder weniger nicht auf ein Gesamtziel ausgerichtetes, Design hingegen dominiert, was der Natur polyzentrischer Systeme entspricht. Nichtsdestotrotz, Governance-Systeme können optimiert werden. Um die Design-Anstrengungen zu verbessern und zu beschleunigen ist Lernen notwendig.

Bislang wurde allerdings die immense Vielfalt an Umsetzungsansätzen kaum genutzt um in Governance-Fragen voneinander zu lernen. Deswegen hat diese Studie einen zyklischen Ansatz zu Governance entwickelt, welcher auf wiederholter Prüfung und der zentralen Bereitstellung von Daten basiert, um den Zugang zu Wissen und so das Lernen voneinander zu erleichtern und eine Systemoptimierung im Sinne multipler (neuer) Anforderungen zu beschleunigen.

Abstract

In 2000, the EU Water Framework Directive (WFD) became the central regulatory instrument of the European water protection policy. However, it is doubted that Germany, much like other member states, can achieve the ambitious aims by 2027. 'Why is the goal achievement stagnating?' and 'How to overcome implementation gaps?' are, therefore, reoccurring questions. Similar obstacles to implementation can be observed across time and policy issues in policy implementation studies. Multiple answers have been proposed and governance structures are identified as one important influencing factor. One key question became whether a policy is better implemented through a single ultimate authority or any non-central approach, what the polycentricity literature terms as monocentric vs. polycentric governance.

This qualitative study contributes empirically to these questions by a cross-local comparison. It asks: How do implementation arrangements (organisational structures and institutional settings), or governance structures, influence the WFD implementation, especially at the local level, and regarding the adoption of WFD prescriptions of the river basin management approach, the coordination across borders and sectors and public participation?

The implementation processes of the WFD were studied in six German states focussing on issues related to the hydromorphology and connectivity of rivers. For that, the polycentricity lens was used. The implementation arrangements varied across and within federal states and levels expressing various shades between monocentric and polycentric governance. Data were collected through policy document analysis, semi-structured interviews with relevant actors and participatory observation of participatory processes.

Micro-level implementation patterns have been found regarding implementation barriers, instruments, implementation approaches, the use of discretion, and organisational structures. These patterns resulted in a mix of central and decentral approaches at the macro-level leading to weak effects of instruments, lacking influences between levels and sectors and misfits of approaches taken by the steering levels in parallel to local levels. Nevertheless, the polycentricity of the systems also allowed lighthouse projects to develop despite the significant implementation barriers.

The patterns were found to be partially caused by fortuity and partially by the design of institutions at different levels and times – partially due to the WFD, but mainly path-dependent as structures existed before the WFD. Due to the WFD, primarily new goals were postulated and, through new instruments, steering-level actors attempted to change the resource endowments of existing actors regarding WFD measures. In contrast, relating structures between actor groups, and thus power relationships, rarely had been changed.

The independence of actors makes it difficult to identify an ideal implementation system because multiple actors use the same institutional frame differently. It would also be difficult to transform systems towards the ideal even if the ideal were known. Changes would need to happen at many points in parallel – orchestrated by a central designer or concerted through a joint agreement. Cumulative, more or less undirected, design, though, is dominating which fits the nature of polycentric systems. Nevertheless, governance systems can be optimised. To improve and accelerate the design efforts learning is necessary.

So far, however, the incredible diversity of approaches has been rarely used to learn from regarding governance questions. Hence, this study elaborated a cyclical approach to governance. This cyclical

approach is based on repeated assessments and a central provision of data. It shall simplify data access, thus, learning from each other and shall accelerate system optimisation to satisfy the multiple (new) purposes.

Acknowledgements

This thesis was a long and challenging, yet again and again inspiring journey. I thank the numerous people who accompanied me and helped me to complete this journey.

I thank my husband, my family and my friends for their warmth for helping me through the downs of writing this thesis and for celebrating the ups with me.

This research was enabled by a PhD scholarship from the Hans-Böckler Foundation awarded 2016-2020 and a scholarship by the Einstein Foundation Berlin awarded 2014-2016. The field work expenses were supported by the IRI THESYS GRADUATE PROGRAM (Integrative Research Institute on Transformations of Human-Environment Systems at Humboldt-Universität zu Berlin). Also the part-time work at Allianz der Öffentlichen Wasserwirtschaft (AöW) e.V. enabled me to cover my research expenses.

Especially, I would like to thank all interviewees for their openness and for spending numerous hours of their limited time answering my questions. I would like to thank Simon Henneberg for reflecting on my findings of practical aspects from various viewpoints and experiences in Brandenburg with me and for very open-minded discussions. I thank Barbara Schröter for an inspiring collaboration, especially in jointly organising our water governance workshop, and for providing feedback on my various papers. Further, I thank Helmut Middendorf for creating the two maps for me.

At the IRI THESys, I found a scientific home and enjoyed the opportunities to look beyond one's nose, especially regarding science communication. I thank Kathrin Klementz for her warmth and support, Timothy Moss for his scientific life experience and Nikhil Chaudhary for his creativity.

Prof. Andreas Thiel introduced me to international networking by supporting my first experiences with international scientific conferences. The working group of Prof. Jens Newig and his team retreats allowed me to participate in a very valuable peer exchange. I would like to thank Prof. Volker Lüderitz for his positive Feedback at the right point in time and for opening up a new way.

Finally, I would like to thank Prof. Nigel Watson for supporting me in developing my ideas through constructive feedback and stimulating questions, and, Prof. Wolfgang Dickhaut for stimulating me to rethink my overall results and for guiding me to finalise this PhD research.

- For all who want to make our environment more livable -

1 Introduction

"We believe this is not a policy design problem, but largely an implementation problem."

(Carvalho et al., 2019: 1235)

The EU Water Framework Directive (WFD) was ratified in the year 2000 and needed to be transposed into national law by 2003. It unites multiple previous water regulations and thus became a central regulatory instrument of European water protection policy. The WFD aims for a good ecological and chemical status to be achieved in all European Waters by 2015 with possible deadline extensions until 2027 (BMU, 2010). Process requirements are intended to support the achievement of the material goals: Water monitoring programmes were required to be established by 2006. Three six-year management cycles are prescribed. Each starts with producing or updating River Basin Management Plans (RBMPs) and Programs of Measures (PoMs) and ends in 2015, 2021 and 2027, respectively. Competent authorities which produce RBMPs and PoMs are to be designated. Measures are to be realised, evaluated, and reported on by the end of each cycle. Furthermore, the WFD encourages public participation and prescribes the planning along river basin boundaries. Despite these prescriptions, this directive is called to be a directive of a new generation, because it is known for its flexibility: By requiring the subsidiarity principle, the WFD allows decision-making to be made at the level of government closest to the water problem (Khalid et al., 2018). Intending to avoid problems of fit (Fichter and Moss, 2004), the WFD, further, leaves vast room to operationalise the ecological goals and process requirements differently. A vast plurality of approaches among and within the member states developed because they made use of the resulting discretion.

Nevertheless, 2015 elapsed and the experiences of the last few years show that the WFD's ambitious aims will not be reached by 2027 either (e.g.: European Environment Agency, 2018b; LAWA, 2018b; Reese et al., 2018). The status assessment results for all river basin districts are difficult to be directly compared between the first and second RBMP cycle due to differences in monitoring methods and status assessment. Overall, though, the results do not show a trend of improvement which would promise an overall goal achievement until 2027 (see Figure 1).

Germany is part of the river basins with the highest percentage of water bodies not being in a good status (see Figure 2 for the ecological status or potential in European river basin districts and the bar chart (Figure 3) for Germany). By 2015, only 8.2% of the country's surface waters fulfilled the criteria of the good ecological status or potential and none those of the good chemical status (84% met the chemical goals if ubiquitous compounds were not considered) (LAWA, 2018a). The LAWA report revealed that the implementation of many measures, which had been identified as necessary for goal achievement, had not even started. The largest gap between identified but not yet implemented measures occurs to measures regarding nutrient pollution from agriculture and toxic substances as well as to hydromorphology and connectivity measures (LAWA, 2018a).

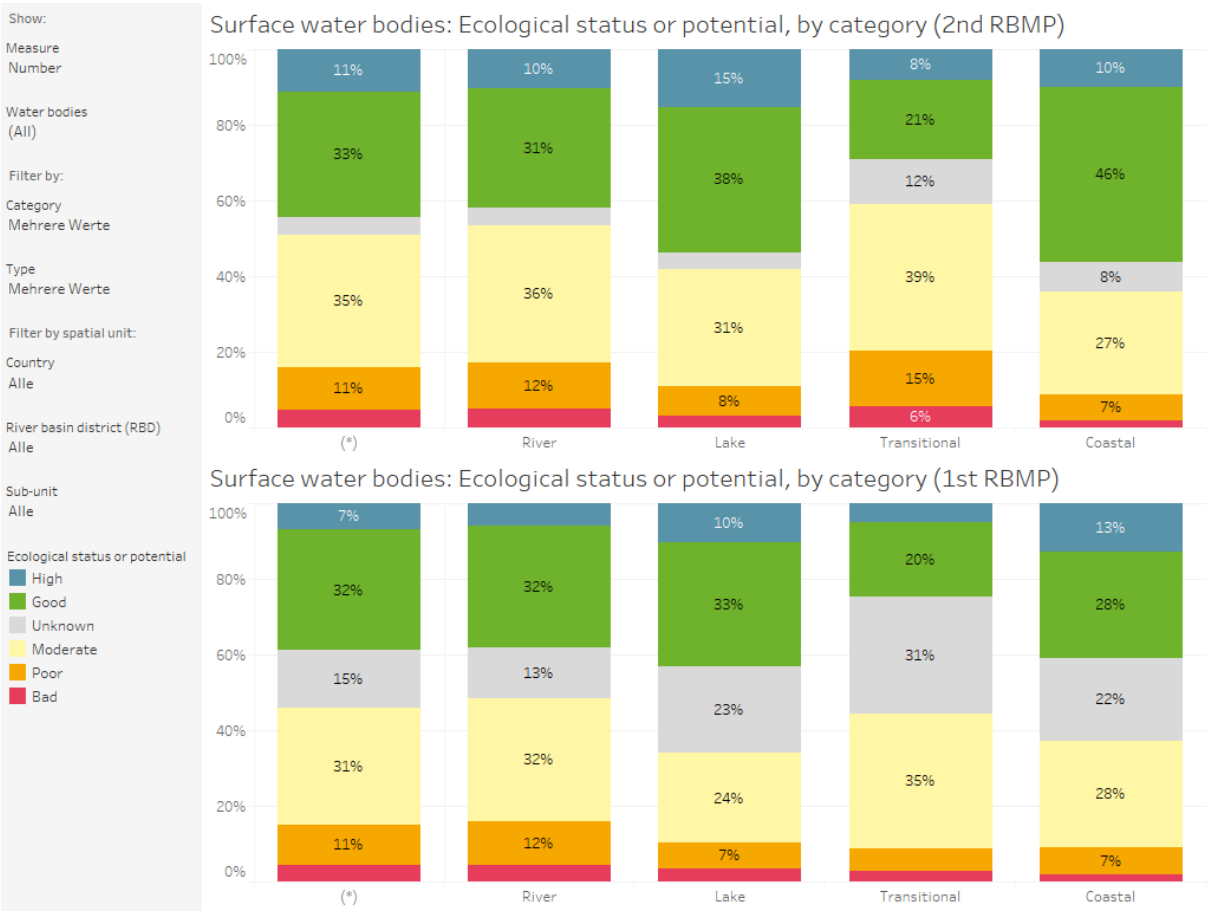

Figure 1 Ecological status of all (*) European surface water bodies in comparison between the 1st and 2nd river basin management plan (European Environment Agency, 2018a)

At the EU level in 2015, 10% of the hydromorphological and diffuse sources measures have been completed, 75% were reported as ongoing and 15% have not yet started. Significantly delayed were also measures concerning water abstraction (31 river basin districts or 23 %). (European Commission, 2015)[1] Later implementation reports only notified on the implementation progress that "some measures are completed" in most of the river basin districts of most of the member states and that "some planned measures are completed" in several river basin districts (European Commission, 2019a: 183, 2021: 4).

[1] There are difficulties to quantify the implementation progress and the implementation gap, because it is difficult to count measures especially those which tackle hydromorphology: For example, how to compare a measure along a 500-m-river-stretch for achieving river continuity and a 5.000-m-river-stretch for restoring habitats and river continuity? The German planning documents also do not allow to conclude at what length of a water body hydromorphological measures are necessary. This is a technical problem what hardly could be solved without a detailed central planning or reporting by the local-level based on detailed assessments. Furthermore, usually there is more than one option to address a stressor. Therefore, it is not surprising that later implementation reports do not try to seriously assess the implementation progress based on numbers of completed measures. However, there are also significant delays in the response of nature to measures making it difficult to assess the implementation progress based on the changes in the numbers regarding the status of water bodies. Therefore, especially nature conservation associations are interested in numbers of implemented measures.

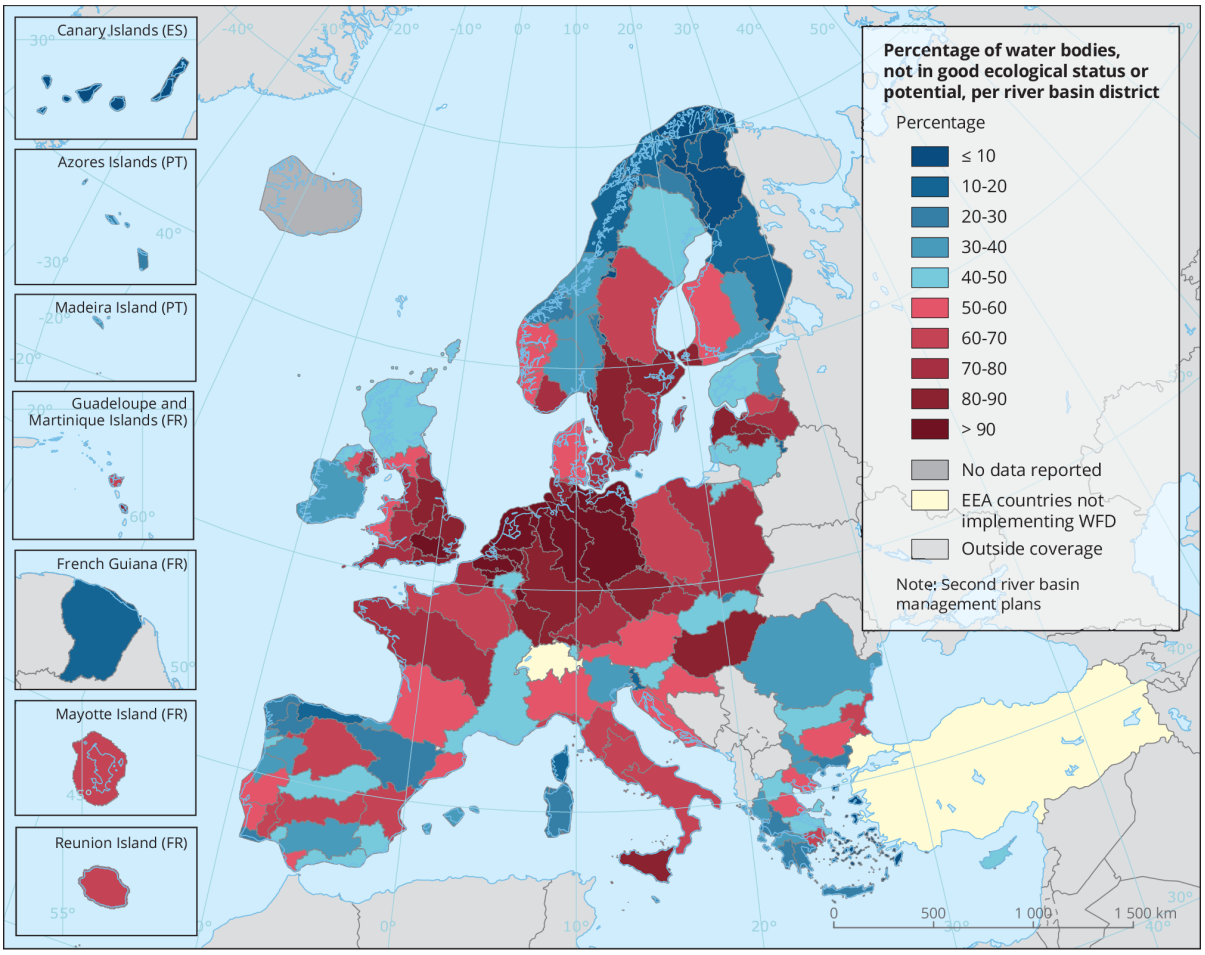

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Figure 2 Percentage of water bodies not in good ecological status or potential, per river basin district across all member states, 2nd river basin management plans (European Environment Agency, 2021)

Expectations of German practitioners when the goals could be achieved became more pessimistic over the years (Weyand, 2020, 2022). In the year 2000, the average believed the goals could be achieved around 2027 (90%-percentile until approximately 2035); in 2019, on average, goals were expected to be achieved between 2060 and 2070 (90%-percentile until 2100) (Weyand, 2020). The Umweltbundesamt (UBA) and the German Environmental Ministry (BMUV) estimated different rates of goal achievement for surface and subsurface water by 2045 based on planned measures (see Figure 4) (BMUV/ UBA, 2022).

Why is the goal achievement stagnating? Since the WFD's inception diverse possible explanations have been discussed from the social science perspective resulting in a growing body of literature (e.g.: Beunen et al., 2009; Boer et al., 2016; Boeuf and Fritsch, 2016; Domorenok, 2017; Moss et al., 2020; Zingraff-Hamed et al., 2020; Wuijts et al., 2023). In October 2017 the European Commission started the official fitness check of the directive (European Commission, 2017), which was finished in 2019. Throughout this process, predominantly interest associations also published position papers on their evaluation of the WFD. The position papers collected for Germany mainly addressed WFD prescriptions and the interactions with other EU regulations; governance questions only played a minor role (see the compilation of positions for the ver.di Bundesfachgruppenvorstand Wasserwirtschaft (Schröder, 2019)). Overall, there is no single answer how to achieve the WFD aims, but there are good reasons to put the implementation within the member states in the focus. The EU stated (Executive Summary of

the Fitness Check (European Commission, 2019b: 3)): “The fact that the WFD’s objectives have not been reached fully yet is largely due to insufficient funding, slow implementation and insufficient integration of environmental objectives in sectoral policies, and not due to a deficiency in the legislation.” Similarly, Carvalho et al. (2019) conclude in their survey paper that there is no policy design problem, but an implementation problem which implies that the governance needs to be improved (Daly et al., 2016).

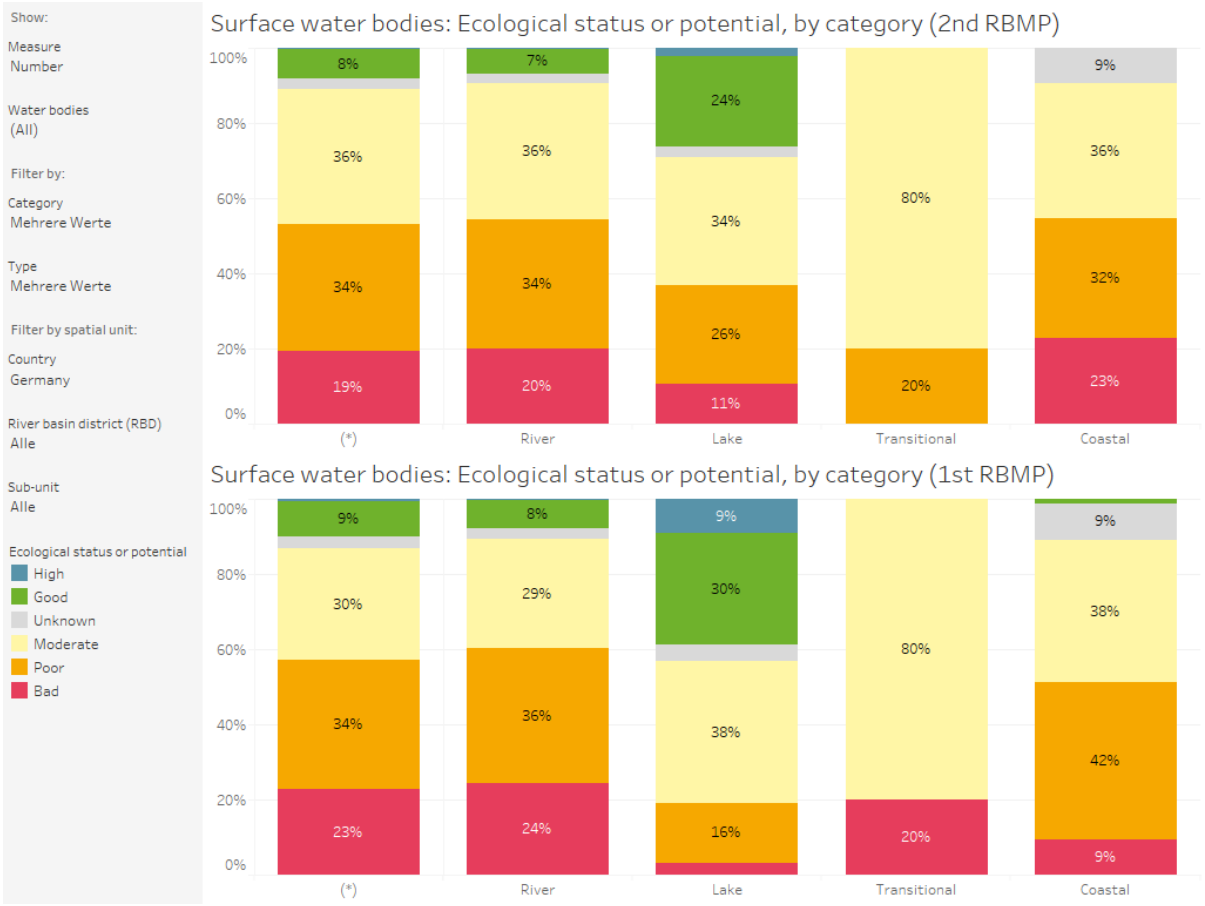


Figure 3 Ecological status of all (*) German surface water bodies in comparison between the 1st and 2nd river basin management plan (European Environment Agency, 2018a)

In general, EU policy implementation deficits are tried to be explained by a lack of political will (Indset and Stokke, 2015), in a management approach by a lack of capacities or by a misfit between European policies and domestic institutions, processes, procedures and cultures (Boeuf and Fritsch, 2016).
From the implementation literature we know general obstacles why policy implementation repeatedly shows deficits: “(1) tractability of the problem, (2) lack of clarity of goals, (3) weak commitment of those responsible for implementation, (4) insufficient resources (means) available to achieve goals (ends), (5) inadequate access to information, (6) inappropriate assumptions about cause- and- effect relationships, (7) dynamics of enforcement, (8) conditions specific to developing countries, and (9) different styles due to cultural variations” (Mitchell, 2018: 272). Obstacles which also have been found to varying extents in this thesis.

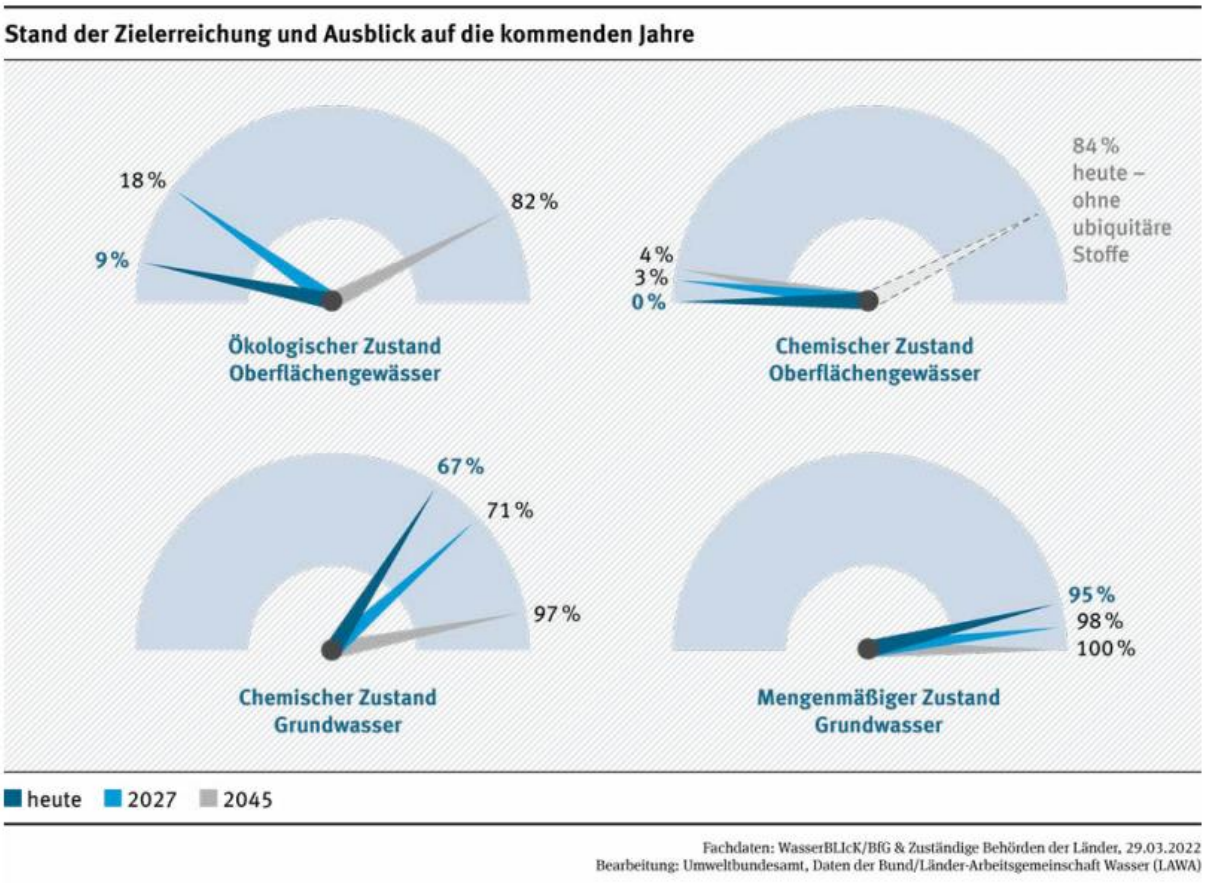


Figure 4 Status of WFD goal achievement and outlook: Ecological status of surface waters (upper left), chemical status of surface waters (upper right) [dotted: 84 % today – when not considering ubiquitous compounds], chemical status of groundwater (lower left), quantitative status of groundwater (lower right) – today ('heute') and expected share of goal achievement by 2027, 2045 (BMUV/ UBA, 2022: 17)

Usually, there is no single reason for implementation deficits. Previous research on the WFD implementation in the city-states Berlin and Hamburg (Schröder, 2014) showed also an influence of the multiplicity of decision-making centres, their location at different levels and their roles (task distribution and combination) for measure implementation itself but also for coordination processes. The multiplicity of centres, levels and roles was partially institutionalised through organisational structures.

However, so far implementation arrangements were insufficiently studied (Sager and Gofen, 2022; Wuijts et al., 2023). Implementation arrangements subsume institutional settings[2] and organisational design and forms – overall the polity. In contrast to policy as the content, polity is the structural dimension of decision power allocation (Sager and Gofen, 2022).

Observing the failing achievement of WFD goals and these insights led to the questions of this cumulative thesis, and specifically this framework text, which go beyond the single papers:

How do implementation arrangements, or governance structures, influence the WFD implementation, especially at the local level? How do implementation arrangements lead to a slow measure realisation, but simultaneously to lighthouse projects and in general to a diversity of approaches regarding the

[2] Please be aware that the term institution is used here in the tradition of New Institutional Economics. An institution is distinct from an organisation, although organisations also provide institutional frames, e.g., to their employees or members. See the glossary for details on the term institution.

adoption of WFD prescriptions of the river basin management approach, the coordination across borders and sectors and public participation? This scientific objective shall be explored through the following sub-questions:

- What patterns and differences can be found regarding different systems, their components or single aspects?: How is the WFD implementation organised? Which actors are relevant for WFD implementation in general and measure realisation in particular? What is characterising them, their role, their discretion and the structures they are embedded in? Which processes can be found and who is (not) involved?
- What influences local-level decision-making, especially whether and what measures are taken?: What caused the patterns and deviations found - what is a matter of design and what is a matter of fortuity? What could be designed?
- How to improve WFD implementation? How to cope with polycentric governance systems when implementing a policy?

A comparative approach was chosen because it promises to show potential leverage points for improving implementation by learning from commonalities and differences across cases. The study object is Germany. Its implementation arrangements are studied with the lens of polycentricity (see section 3).

German actors work within many river basins with a high percentage of water bodies which did not yet achieve the good ecological status. Furthermore, the German states are characterised by a similar cultural background and regulatory frame (transposition into the National Water Law) but can be expected to follow different approaches in implementation due to Germany's federalism.

Germany's WFD implementation processes and procedures can be understood as an example of polycentric governance. The larger federal states ('area states') are, in contrast to the smaller city-states, characterised by even larger numbers of levels, actors and possibilities for variations in implementation arrangements. The WFD goals interact with other water and land uses and their related interests. This adds another layer of multiple decision-makers and increases the system's complexity. The various constellations of multiple decision-makers make Germany an interesting study object. It allows to learn more about the effects of polycentricity on policy implementation. This knowledge in turn shall help to understand WFD implementation better and to think about viable improvements.

While the authorities focus on documenting the implementation progress, water governance systems have been rather scantly researched to their full complexity – not only in the context of the WFD (Huntjens et al., 2011). Therefore, this research project, further, intends to capture the complexity of the analysed water governance systems through its explorative approach.

In the following, I refer to the publications which have been written for this PhD[3] with the abbreviation for the papers provided in Table 1 in section 4. All other publications, which are related to this PhD and also listed in Table 1, are referenced like any other literature. Terms, which are explained in the glossary (section 7), are underlined when used the first time in section 5. German words are italicised.

[3] Meant are publications which are considered for marking this PhD.

2 State of research and research focus

"*All policies require some institutional arrangements to convert abstract policy ideas and desires into real-world actions designed to alter the policy addressees' behaviour*".

(Steinebach, 2022: 227)

Beyond the designation of competent authorities and the preparation of RBMPs and PoMs, the WFD leaves much discretionary leeway to the member states on how they implement measures, which processes they establish and which organisational structures (Indset and Stokke, 2015) they use, to achieve WFD goals. It is assumed that customised approaches lead the member states to reach a better institutional fit, a better fit to local circumstances and needs (WFD, 2000, preamble (13)). This flexibility, for what this directive was called to be a directive of a new generation (Jager et al., 2016), was expected to allow better goal achievement.

This flexibility left it to the member states whether to seek for, e.g. spatial, fit, or whether to implement the WFD within pre-existing organisational structures. Thus, the member states can consider contrasting findings regarding different approaches when choosing their strategy, such as:

- The participation of non-state actors in planning has advantages (Wright and Fritsch, 2011), but there is also a tension between ecological effectiveness, participation and democratic legitimisation (Lundqvist, 2004). The participation of citizens could even be difficult due to the very high complexity of water systems (Ker Rault and Jeffrey, 2008).
- Considering that also other policies need to be implemented in parallel, conceptual problems of a river basin approach (the approach to achieve spatial fit) could already be shown. This highlights that some problems are solved by a river basin approach while new problems with other policies are brought up. Therefore, it might be more reasonable to work with and across borders instead of trying to eliminate all borders in an attempt to find the perfect fit (Moss, 2012).

Research shows that the WFD is indeed implemented through a diversity of arrangements – a diversity which can be found among water governance systems globally (Özerol et al., 2018): Various approaches regarding public participation were found across 13 member states (Jager et al., 2016) as well as regarding institutional arrangements in the Baltic Sea region (Nielsen et al., 2013) and the German federalism is called to have produced 16 different experiments (Newig et al., 2016). Which different spatial strategies and practices regarding the river basin approach, though, developed and how they affect implementation is rather scantly researched (Hüesker and Moss, 2015).

The diversity partially results from path-dependency (Jager et al., 2016). The approach of the degree of fit or misfit of EU prescriptions to local policies and institutions, though, was found to be too static to explain the diversity of adaptation processes of local structures and institutions to EU prescriptions (Liefferink et al., 2011).

The variation in the distribution of responsibilities across actors and levels, nevertheless, can be expected to cause different problems of spatial fit and institutional interplay (Fichter and Moss, 2004). This needs different forms of coordination across borders and sectors as well as participation to fulfil the WFD prescriptions or institutions for conflict resolution (the Baltic Sea region lacked the latter (Nielsen et al., 2013)). The multiplicity of actors offers a seemingly infinite number of cooperation opportunities between different groups of actors. Differences in the results of planning and the success

of implementation are also therefore presumable. However, it stayed unclear, whether the flexibility of this directive also improved its implementation.

Ecological aspects, possible technical limitations of WFD implementation, the appropriateness of monitoring procedures (Zingraff-Hamed et al., 2020), as well as various dimensions of water pricing and cost recovery (Albiac et al., 2020; Berbel and Expósito, 2020; Macháč et al., 2020) have been studied and discussed among practitioners. The WFD implementation processes have been studied at different levels (Ignar and Grygoruk, 2015) and in various phases: The processes of public participation, river basin management plans (Blackstock, 2009; Larsen, 2011) and the transposition into national law have been compared. A meta-analysis of studies on WFD implementation (Boeuf and Fritsch, 2016), in particular participation, planning, river basin management, policy integration, economic analysis and ecological status and goals, showed that the research focussed rather on institutional novelties, such as public participation, and earlier phases of the WFD cycles than on WFD implementation as a dependent variable, planning according to river basins or ecological scales and interplay between the WFD and other policy sectors: Only 24 % out of 89 papers studied causal relationships or evaluated the implementation (Boeuf and Fritsch, 2016), only two of these papers studied the WFD implementation as the dependent variable (Moss, 2004; Liefferink et al., 2011). Studies on policy integration often focussed on the WFD, in chosen member states, only in relation to one more policy, sector or law (Ignar and Grygoruk, 2015), such as climate change (Blackstock et al., 2009; Larsen, 2011), forestry (Keskitalo and Pettersson, 2012), and the Flora-Fauna-Habitat-Directive and the Conservation of Wild Birds Directive (Beunen et al., 2009). Overall, WFD research needs in-depth, qualitative studies which explore "the exact nature of individual governance-related and institution-related bottlenecks and their influence on overall implementation shortcomings" (Zingraff-Hamed et al., 2020: 22).

Similar to policy implementation research in general, there is still a gap in studying the local level of WFD implementation. Liefferink et al. (2011) as well as Sevä and Sandström (2016) point to the importance of the local level or 'street-level bureaucrats' for the diversity of implementation approaches. These actors significantly influence policy implementation due to their autonomy and discretion. However, little is known about these actors so far, especially in the field of environmental policy and governance (Sevä and Sandström, 2016) and how the organisation, the implemented policy, the profession or the state or country influence them (Gofen et al., 2019).

In Sweden, it has been found that less than half of the municipalities' implementation aligned with the programs of measures (Sevä and Sandström, 2016). In Germany river basin communities shall coordinate activities across the federal states (Fichter and Moss, 2004). The river basin communities, though, lack own planning competencies. Measures are still realised within administrative boundaries by organisations which already existed before the WFD (Fichter and Moss, 2004; Hüesker and Moss, 2015) – as in most of the EU member states (Voulvoulis et al., 2017). Therefore, every state can follow its own implementation approach due to Germany's federal structure. Further, local-level actors also have been found vital for WFD implementation (Koontz and Newig, 2014; Hüesker and Moss, 2015) – similar to Sweden. The discretion at this level has been found large. The states' programmes of measures have been found to not pre-structure local-level decisions in a way that only defined decisions are possible (Albrecht, 2013). Local-level actors still need to draft (informal) management concepts to justify their decisions (Albrecht, 2013). Across European river basins local-level actors, further, often prioritised measures based on limited finances, cost-efficiency or conflicts towards other sectors. Thus, simpler measures were favoured over projects which consider complex situations of multiple stressors and larger scales with multiple stakeholders (Carvalho et al., 2019).

The local level is also important for the integration of different policies. While various environmental directives by the EU may have potential synergies with WFD goals, also many conflicts with these directives are perceived at the local level when they are put into practice (Zingraff-Hamed et al., 2020). Further, decisions could be justified based on different policies. This would raise the probability that actors abide by old routines (Sevä and Sandström, 2016).

Due to the role of local-level actors, a technical approach to improve PoMs of managing for multiple stressors, improving the diagnosis or increasing PoM's ambitions, as suggested by Carvalho et al. (2019), seems not promising to overcome the implementation deficit. Instead a good understanding of local-level implementation processes and influences on them (Sevä and Sandström, 2016) - the governance dimension of WFD implementation (Zingraff-Hamed et al., 2020) - seems indispensable to identify the needs for improving WFD implementation which are viable.

There are several conceptual approaches to fill the gap regarding the influences of diversity in the polity of implementation, the implementation arrangements (Sager and Gofen, 2022), on policy implementation. According to Sager and Gofen (2022), these are, for example, institutionalism, multi-level governance and evaluation and performance management models.

Acknowledging the increasing complexity of governance and its importance for successful policy implementation, I chose to look at the implementation arrangements through the lens of polycentricity. Polycentricity is an expression of increasingly complex governance systems. "'*Polycentric' connotes many centers of decision-making which are formally independent of each other. Whether they actually function independently, or instead constitute an interdependent system of relations, is an empirical question in particular cases. To the extent that they take each other into account in competitive relationships, enter into various contractual and cooperative undertakings or have recourse to central mechanisms to resolve conflicts, the various political jurisdictions in a metropolitan area may function in a coherent manner with consistent and predictable patterns of interacting behavior. To the extent that this is so, they may be said to function as a 'system'*." (Ostrom et al., 1961: 831) As a lens (Blomquist and Schröder, 2019) the concept of polycentricity may guide the analysis like other concepts, such as federalism, multi-level governance and markets, but with a different focus. It allows to look at decision-making structures beyond level structures. Instead of restricting the view to particular actors, like state actors or private actors, it directs the focus to all kinds of actors who independently decide in governing a good. It looks at systems as a whole and also captures emergent orders (Blomquist and Schröder, 2019). Thus, it is more open and encompassing than other approaches to study implementation arrangements. Further, by analysing the independence of actors, it also considers the power dimension which received limited attention in comparative water governance research so far (Özerol et al., 2018).

The idea of polycentric governance is used increasingly in research (Jordan et al., 2018; Thiel et al., 2019; van Zeben and Bobić, 2019) and the performance of polycentric governance is widely debated (Ostrom et al., 1961; Ostrom, 1972; McGinnis, 1999; Ostrom and Parks, 1999; Huitema et al., 2009; Schlüter et al., 2010; Aligică and Tarko, 2012; Pahl-Wostl et al., 2012; Morrison et al., 2023): How does polycentricity or do constellations of governance structures relate to the performance of governance systems? Are policies better implemented through a single organisation or multi-actor or multi-actor-type implementation arrangements (Andersson and Ostrom, 2008; Steinebach, 2022)? Often polycentricity is used normatively and associated with values such as better performance, like a more

efficient, resilient, flexible or sustainable provision or production of public services (see section 5.1.3 for details on the debate concerning the performance of polycentric governance systems).

The numerous definitions of polycentric governance (an overview is provided in the Identifying polycentricity paper), though, illustrate the fuzziness of this concept. These definitions highlight different elements and features. Including these elements in or excluding them from a polycentricity definition may affect whether systems are identified as polycentric and how their performance is evaluated. For example, some definitions require systems to exhibit effective coordination to qualify as polycentric (Pahl-Wostl and Knieper, 2014). However, not defined is how effective 'effective coordination' needs to be, in contrast to, e.g., fragmented systems. Without clarifying the conceptual base no reliable estimates about the performance of polycentric governance systems can be generated.

In contrast to a normative view, I consider polycentricity to be a phenomenon one needs to cope with when implementing policies. There is no ideal type of polycentric governance system or arrangement. Regarding the phenomenon of polycentricity, it is said that a majority of governance systems is to varying extents polycentric – especially water governance systems (Waylen et al., 2019). Especially through the interaction with other policies' goals and instruments (here e.g. renewable energies and nature conservation) and other interests (e.g. land and water use), the multiplicity of centres increases tremendously for water-related issues. Thus, even a water sector which seems to be rather centrally organised so far, is part of a polycentric governance system if policies such as the EU WFD shall be implemented.

Thiel et al. stated that challenges of implementing the WFD relate to the polycentric nature of water governance itself (2019). A few WFD implementation studies focussed on polycentric governance questions: More central approaches offered guidance and funding for a more integrated water management, but lacked the inclusion of local knowledge in the planning (Nielsen et al., 2013). More polycentric systems appeared to produce a higher quality of ecological outputs than monocentric systems (Newig and Fritsch, 2009). Mixed results were found on the effectiveness of polycentric governance and different planning phases and levels were distinct in their polycentricity characteristics (Newig et al., 2016). Similarly, my master thesis about the WFD implementation in Berlin and Hamburg showed the strengths and weaknesses of the differing distribution of responsibilities within and across levels - more or less polycentric governance systems: Differing veto power constellations and conflict situations were answered through varying coordination and cooperation processes. None of the governance systems showed a substantially better policy implementation than the other system: A slower approach close to catchments was contrasted by advanced but much less integrated single measures (Schröder, 2014). Overall, there is a research gap concerning the advantages and limitations of the co-existence of many jurisdictions and institutional arrangements as they exist in polycentric governance systems (Moss, 2012).

3 Research design and methods: From Seeing Polycentrically to Analysing Polycentrically

"Both the structure and the behavior of the system need analysis before any reasonable estimate can be made of its performance in dealing with the various public problems arising in a metropolitan community. "

(Ostrom et al., 1961: 831)

The conceptual fuzziness of polycentricity as well as the complexity of polycentric systems as a phenomenon urged me to intensively reflect on identifying, analysing and comparing polycentric governance systems: The Identifying polycentricity paper and the book chapter (Blomquist and Schröder, 2019) present the developed conceptual background of this study.
In focusing on the functioning of systems, I applied a minimum definition of polycentricity: Polycentric governance systems are characterised at least by a multiplicity of independent decision-making centres, which are governing a certain good or problem within defined system boundaries (see Identifying polycentricity paper). Reflecting on this, polycentric governance systems appeared to be only comparable regarding their multiplicity of decision-making centres if centres are considered specific to a good/ problem in focus, the centre's tasks/responsibilities, the level in focus and analytical system boundaries. Further, centres may have key tasks regarding the good/ problem in focus, they may have similar aims or they may only be functionally interlinked - otherwise actors are not considered to be decision-making centres in the system (see Identifying polycentricity paper).

Operationalising this insight for this research project means refining the task of WFD implementation. WFD implementation documents distinguish between different important water management questions: Hydromorphology and connectivity measures and measures regarding nutrient pollution from agriculture and toxic substances showed the largest gap between the number of measures which had been identified as necessary for WFD goal achievement and the number of measures which have not been realised yet (LAWA, 2018a). I chose to focus on the problem of improving the hydromorphology and connectivity of water bodies (without issues of hydropower) at the level of measure realisation and how it is affected by other levels. This task is related to an identifiable sub-set of actors, who influence WFD implementation concerning this particular problem (for key actors see section 5.1.1). While the ecological system boundaries are cross-cutting due to the river basins, the German states were approached analytically as institutional system boundaries. However, throughout the study, the district and county levels showed to provide more and relevant institutional variances.

The German states are all characterised by a multiplicity of independent decision-making centres implementing WFD goals, but they vary in the degree of multiplicity, the independence of actors and actor-types. The German states are characterised by three to four (Bogumil and Jann, 2009) general purpose administrative levels (municipalities, counties, district governments/ middle authorities (state-wide responsibility below ministries)/ none, ministries) and various special purpose authorities as well as public and private entities. Selected were the six German federal states of Saxony, Saxony-Anhalt, Hesse, North Rhine-Westphalia, Thuringia and Lower Saxony. Three are from the former East and three from the former West of Germany and they represent the different general-purpose administrative level structures (see Table 4 in section 5.1.1).

The numerous other definitional elements of polycentricity I understood as potential factors influencing a system's functioning and as an approach for capturing the complexity in implementation

arrangements. This approach accepts complexity: The overall policy implementation may (is likely to) be the result of the sum of multiple decisions, taken in parallel and/ or in sequence. This approach assesses systems as potentially polycentric – 'seeing polycentrically': Seeing polycentrically means using an inquiry approach to "ask before reaching conclusions about the nature, operation, and effects of complex governing arrangements" and to use an emergent approach for "developing an understanding of emergent situations" (Blomquist and Schröder, 2019: 46, 45).

This inquiry approach (for details see Blomquist and Schröder (2019)) encompasses various questions (see also the summary in Table 3 in section 4) which were asked to explore the WFD implementation governance in Germany. Among those, this research project focussed on questions about the centres themselves and their multiplicity, independence and interdependence, about coordination and effects for understanding the functioning of the overall system and the individual rationales for decision-making. Through the chosen focus on hydromorphology and connectivity (hydromorphological alterations are the good/ problem in focus which in turn influence the ecological status of water bodies), the biophysical characteristics were assumed to be sufficiently similar among the decision-making centres. Some answers to questions about social problem characteristics, emergence, transition and decline of decision-making centres could be found due to the interrelation of all the underlying issues.

3.1 Explorative approach: Informant selection instead of case selection

The explorative approach applied here results from the limits to achieving sufficient knowledge about the system before the actual data collection as well as from the obstacles to applying classical research design approaches. First, relatively little was documented about the WFD governance structures in the federal states and especially about the actual measure implementation. If at all, successful projects have been documented either in practitioner journals or by science, but the reports rather focused on the ecological or technical aspects than on governance questions. Failed projects are totally missing. Second, classical research designs such as defining the governance structures or the effects (most similar or most different approach) combined with researching the variability of effects or the governance structures respectively would require access to a sufficient number of cases fulfilling the pre-defined characteristics. However, this requires knowledge (e.g. through documentation) about such cases. Furthermore, for example, measure implementation progressed differently. Measures might still have been in the planning phase or realised, but it was still too early to measure ecological effects or the monitoring did not fit the measure scale. Achieving case comparability at the design stage would have been extremely difficult or such a research design approach would have needed several phases of data collection – too large for a PhD.

Accepting the system's complexity, this explorative approach aimed for a comprehensive understanding of the overall system before deriving case comparisons. Hence, it followed the idea of selecting informants, here interviewees, instead of cases. **Three criteria** have been applied to select interviewees: A) role for WFD implementation, B) diversity and C) actual decision-making.

A) Many actors are influencing WFD implementation even with a focus on hydromorphology and connectivity measures. For the sake of limiting the number of interviews, only key centres regarding the implementation of hydromorphology and connectivity measures were considered. Centres with similar aims, for example, angling associations, or functionally interlinked centres, for example, city planners, were disregarded. Nevertheless, representatives from German nature conservation associations were selected as informants for an alternative appraisal. They take a strong ecological

perspective, have a general interest in successful WFD implementation and are thus critical observers. Often these actors would need to be categorised as centres with similar aims, but partially also conflicting goals, and sometimes they also implement measures themselves which are flagged as WFD measures.

B) I intended to capture the diversity of organisational structures across and within states. The chosen federal states represent the three different overarching administrative structures in Germany (excluding city-states). Within each state, I looked for actors implementing the WFD, such as steering-level actors, WFD addressees (actors who are expected to realise measures) and other actors who actively realised measures or fulfilled important tasks. I tried to interview at least one representative of every actor type (institutionally defined entities such as municipalities or special-purpose associations). By applying the most different approach, I expected to gain more insights regarding general governance questions (e.g., who should realise measures).

C) To gain a better understanding of the functioning of a system, actors were selected who actually fulfilled a role no matter whether actors were officially responsible for fulfilling the task. Therefore, some actors have been interviewed because they had realised WFD measures despite not being WFD addressees. Furthermore, to grasp the actual decision-making, actors have been selected who were relatively independent decision-makers, but not those who only fulfilled commands with little discretion. Additionally, it was intended, although not always possible, to interview the actual decision-makers instead of their superiors who lacked hands-on knowledge and knowledge on the rationales of the actual decision-makers.

3.2 Data collection for an open exploration

Interviews build the core of the collected data and have been complemented by documents and participatory observation. The practical aspects of data collection are elaborated in the following.

For each state, official websites, policy documents and recorded information from participatory processes have been analysed. Before and during the interviewing phase it helped to prepare interviews. Afterwards, it supported the data analysis and evaluation.

Practically, interviewees have been identified through three different methods: a) Documents and websites, b) events and c) snow-balling. a) Documents and websites named responsible persons due to the WFD's reporting requirements, while event documentation through presenters and content more often led to identifying relevant decision-makers. b) The more fruitful way of identifying active implementers was the participation in various events, e.g. generally on WFD implementation organised by interest associations (two to four per year since 2015) and participatory processes of the German federal states (12 processes between 2017 and 2019). This participation allowed approaching participants and presenters with some exploratory questions on their responsibilities, tasks and knowledge. c) Once a few persons were identified, the snowballing method was used. Especially medium-level actors (middle authorities and district governments) were asked to recommend further contacts and to name active implementers. This helped to find small-scale actors. This approach was used until a point of saturation when it seemed that the different roles in each state and the diversity of WFD addressees had been covered.

Interviews were conducted in German via telephone (the majority) or face-to-face and lasted on average about 2 hours. It has been one-by-one interviews, but in rare cases also talks with 2 to 3 persons in a group. Overall, this resulted in 70 interviews - an average of 12 interviews per state. At

the end of 2022, these basic interviews were amended, via telephone or web conference tools, by four additional interviews to reflect on the study results (for details see chapter 5.3).

The interviews were semi-structured with mostly open-ended questions aiming for much free-flowing talking. Interviews often started with a few very general questions such as how actors plan measures, how they generate ideas for measures, with whom they cooperate, or, which participation/cooperation processes they use and participate in and why, or what role they play in WFD implementation. My interview guidelines elaborated more specific questions to make sure that all basic aspects were covered. With newly revealed insights some questions for digging deeper have been added to later interviews throughout the interviewing period.

Participatory observation complemented the extensive interviewing process. It allowed to glance at interactions among various actors, as well as at viewpoints of actor-types which were not selected for interviewing; information presented to the participants supported the contextualisation and analysis of insights from interviews and document analysis. Furthermore, observations provided instances to relate interview statements on processes with own impressions. Although interactions may change from event to event, participatory observation allowed comparisons on the role of participation for implementation systems. However, the observation was availability-driven: During the period of data collection (2017 – 2019), I participated in any process for which I got to know the date and the permission to participate sufficiently early. Some states invited openly, e.g., on websites, others only through non-public channels.

In the analysis of this PhD, I use the interview number '[Ix]' and the process observation number '[Ox]' to refer to interview statements or, respectively, particular aspects which had been observed in participatory processes (see Annexe I 9.1 for a complete and numbered list of interviewed actors and observed processes).

3.3 Data Analysis: Deriving similarities and differences with a flexible case delineation approach

Due to the vast empirical complexity, these polycentric governance systems seemed to be difficult to be compared. However, it showed to be fruitful to derive and delineate cases after data collection instead of identifying cases theoretically at the stage of research design. This approach allowed to accommodate the different degrees of cross-local differences and similarities with only little knowledge about the systems' characteristics and functioning at the stage of research design.

Taking a 'bird's-eye-view', I looked iteratively for any cross-cutting patterns in the collected data. Some of these patterns, including unexpected relationships, already became apparent in the interviewing phase. These were used to refine interview questions and led to an in-depth analysis. Other patterns needed to be explicitly and systematically explored.

To identify patterns, I analysed homogeneity (the majority of instances is similar but some instances deviate) and heterogeneity (a majority of instances is dissimilar, but some instances resemble each other). Patterns were searched regarding a) (non-)actions, e.g. collaboration or the (non-)realisation of WFD measures, b) settings, e.g. organisational structures or institutions (such as funding schemes, interplaying regulations) and c) rationales and reasoning, e.g. regarding their role or actions.

After identifying patterns to be analysed in-depth, the narratives of interviewees have been analysed iteratively in three rounds. First, direct and explicit statements have been extracted in which

interviewees provided mechanisms and causal links. Alternatively, statements have been identified which can be related to existing governance-related theories. Second, more indirect and implicit statements regarding the same issue, but, e.g., only dropping key terms, have been identified. The third round reviewed and checked the categorisations made in the first and second round. Whenever possible, the information was triangulated with insights gained from participatory observation or document analysis. However, that was less rewarding in terms of local-level implementation.

Overall, this procedure generated cross-local comparability along the kinds of decisions to be taken. It also led to a very flexible case delineation with varying levels of comparison and varying subsets of cases (Table 2 in section 4 shows the unit of analysis of the PhD-related papers analysing cases).

3.4 Limitations of this explorative approach

The applied research approach showed limits which are A) general to the data collection method and B) others which are specific to the explorative nature of the approach.

A) Interviewing, as well as participatory observation, bear some limitations as methods, which are not specific to the overall approach applied here:

- Complicated access to interviewees: unwillingness to give interviews (time constraints, no permission to be cited), or no water sector-related staff, or only interview with a person other than the actual planner (less knowledge about details).
- Especially authority employees from higher levels tended to talk about which kind of processes or characteristics of processes would be expected as politically correct and tried to avoid talking about problems or critique. Sometimes this also seemed to be a result of not knowing lower-level processes very well.
- Interview data were generally less reliable on issues from the beginning of WFD implementation (personnel changes, remembering capacity of interviewees). Furthermore, some interviewees were not sure what kinds of things they could share and speak about. Vagueness and contradictions could partially be solved by triangulation.

Seeing only what is observable and having a position as a participant generally limits research through participatory observation. Additionally, participatory processes here could not be studied to the extent it was intended to: The states and different organisers followed different policies in making dates of participatory processes public before the event. Some organisers were reluctant to allow the participation of an observer. Several processes happened only once or twice a year and some were postponed several times, so that even 3 years were not sufficient to at least attend each of the repeating processes once.

B) For the sake of achieving a large breadth and depth in understanding the water sector's part in WFD implementation, other actors have not been interviewed. However, some questions analysed here following the identification of patterns would profit from including additional viewpoints from other actors. This research design leaves this up to follow-up research. In contrast, this explorative approach allowed to include or deepen issues throughout the overall interviewing process. This, however, caused, in combination with the limits of interviewing as a method, varying data sets. Not all interviews generated sufficient data for all kinds of analyses that have been conducted. Therefore, the number of cases varies depending on the completeness of single data sets. Nevertheless, all interview data have been useful in adding knowledge puzzle pieces to the understanding of the overall system.

4 Overview of publications

Several publications were produced throughout this PhD project (see Table 1 for the references, publication status and purpose): nine papers, one book chapter and one science comic (published as a discussion paper). Three papers were written to communicate some results to German practitioners and therefore published in the journal with the highest run in the German water sector '*Korrespondenz Wasserwirtschaft*' (upon invitation by the journal editor). Due to authorship rules, five papers count for this cumulative PhD while the other publications contributed to learn about different formats, to prepare my research and to publish additional results.

While some publications resulted from cooperations as a follow-up of different scientific events, most conferences were used to get early feedback on topics which were chosen to be developed for a publication (see Annexe I 9.4 on conference presentations). Additionally, some topics were presented upon invitation to practitioners.

Table 1 PhD related publications which count (not) for the PhD

Shortcut	Publication	Status	Purpose
	**Schröder, N. J. S.** (2018). The Lens of Polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance. *Environmental Policy and Governance, 28* (4): pp. 236–251.	Paper published	PhD
	Özerol, G., Vinke-de Kruijf, J., Brisbois, M. C., Flores, C. C., Deekshit, P., Girard, C., Knieper, C., Mirnezami, S. J., Ortega-Reig, M., Ranjan, P., **Schröder, N. J. S.**, & Schröter, B. (2018). Comparative studies of water governance: a systematic review. Ecology and Society, 23 (4): 43.	Paper published	(PhD)
	**Schröder, N. J. S.** (2019). IWRM through WFD Implementation? Drivers for Integration in Polycentric Water Governance Systems. *Water, 11* (5): 1063.	Paper published	PhD
	Blomquist, W., **Schröder, N. J. S.** (2019). Seeing Polycentrically. Examining Governance Situations Using a Polycentricity Lens. In: Thiel, A., Blomquist, W., Garrick, D. E. (Eds.). *Governing Complexity: Analyzing and Applying Polycentricity* (Cambridge Studies in Economics, Choice, and Society). Cambridge. Cambridge University Press: pp. 45-64.	Book chapter published	(PhD)
	**Schröder, N. J. S.**, Chaudhary, N. (2020). Trapped between barriers OR Flowing despite barriers? THESys Discussion Paper No. 2020-2. Humboldt-Universität zu Berlin, Berlin, Germany: pp. 1-13. *Also published in German:* WRRL-Umsetzungshürden: Unpassierbar oder durchgängig für Maßnahmenträger? THESys Discussion Paper No. 2020-1.	Discussion papers (science comics) published	Experimenting with science communication/ for practitioners [in German and English]

	**Schröder, N.J.S.** (2020). Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 1 - WRRL-Zielerreichung zwischen Plan und Machbarkeit. *Korrespondenz Wasserwirtschaft*, 13 (9): pp. 490-497.	Paper published	For practitioners [in German]
	**Schröder, N.J.S.**, Newig, J. and Watson, N. (2020). Bright spots for local WFD implementation through collaboration with nature conservation authorities? *Water Alternatives* 13 (3): pp. 582-617.	Paper published	PhD
	**Schröder, N.J.S.** (2020). Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 2 – WRRL-Zielerreichung zwischen Freiwilligkeit und Pflicht. *Korrespondenz Wasserwirtschaft,* 13 (12): pp. 687-694.	Paper published	For practitioners [in German]
	**Schröder, N.J.S.** (2022). Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 3 – WRRL-Zielerreichung zwischen fachlichem Anspruch und Beteiligung. *Korrespondenz Wasserwirtschaft*, 15 (1): pp. 21-30.	Paper published	For practitioners [in German]
	**Schröder, N.J.S.,** Watson, N. (2024). Assessing participatory process-system linkages in polycentric water governance systems: Insights from WFD implementation in Germany. *Review of Policy Research*: pp. 1-36.	Paper published	PhD
	**Schröder, N.J.S.** Assessing the multiplication capacity of participatory processes in polycentric water governance systems.	Paper awaits revision	PhD

The publications take different perspectives (see Figure 5): They focus more on single actors or whole systems. Further, some papers rather use the in-depth analysis of own empirical data as a main source of argument, while others focus on the conceptual base of researching governance by systematising water governance research or developing the understanding of the concepts/ lenses used for research, especially polycentricity. These different perspectives are accompanied by varying case delineations across the publications as elaborated in the data analysis section (see an overview of the units of analysis in Table 2).

Further, the choice of states and basic interviewees, the different case delineations, as well as the choice of additional interviewees for the reflections of the overall results in this framework analysis result in a variance of geographical coverage of this thesis (see Figure 6 and Figure 7).

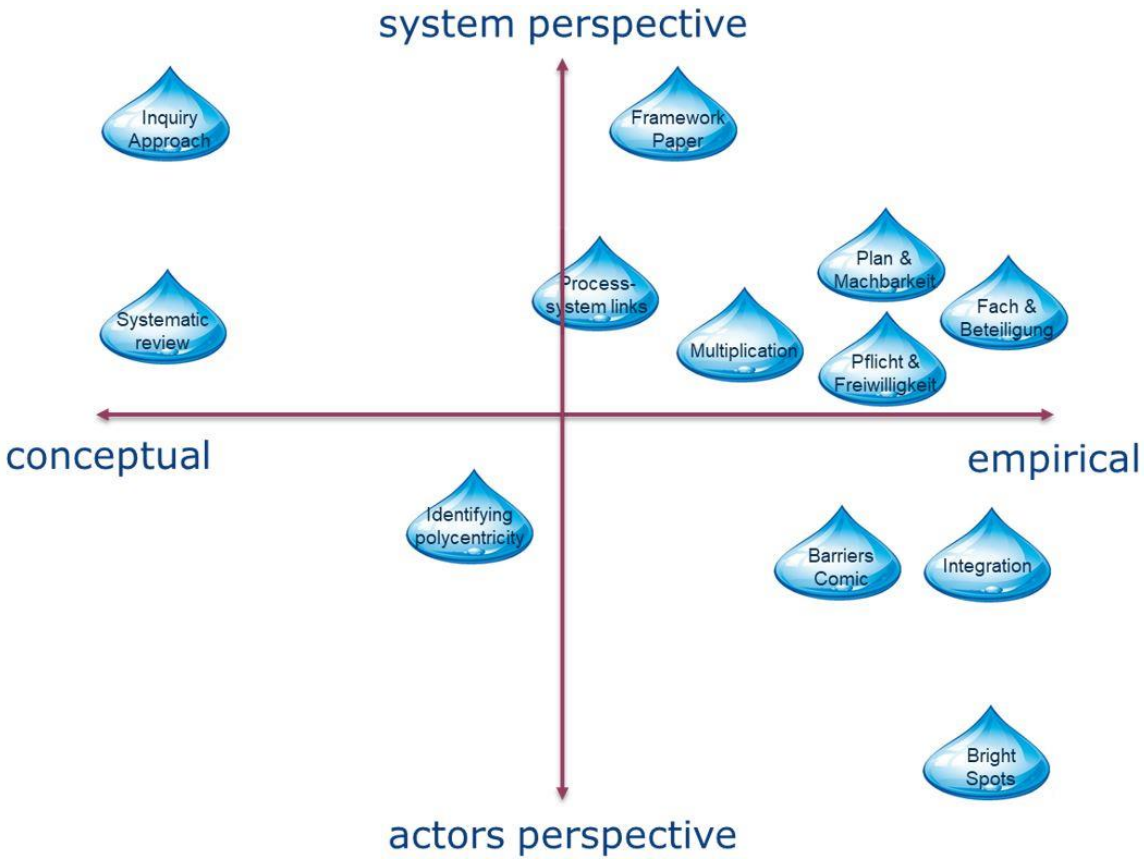


Figure 5 Analytical focus of PhD related publications (own depiction)

Some of the publications are more strongly related to each other regarding content: Thus, the book chapter continued thoughts on identifying and researching polycentric governance systems of the Identifying polycentricity paper. The Integration paper laid the foundation to identify the special collaboration between WFD planners and nature conservation authorities which was analysed in detail in the Bright spots paper. While the Process-system links paper finds that the analysed participatory processes strongly rely on multiplication to have any effect on the existing governance systems, the Multiplication paper analyses the multiplication capacities of such a process in detail. And, while the comic gives an overview of implementation barriers (also elaborated in the Bright spots paper), the three practitioner papers discuss implementation along three big debates on how implementation should happen: plan vs. feasibility, voluntary vs. obligatory approaches, ecology-oriented planning vs. participatory approaches. Table 3 shows the research questions and core results of the PhD-related publications. Whose cohesion for this study is elaborated in the following, main section.

Table 2 Case delineation of PhD publications

Paper	Unit of analysis (case)	Reason
	Conceptual paper: two states	Cases were only used for illustration (data from master thesis on Berlin and Hamburg).
	18 individual WFD addressees and other actors realising WFD measures out of five states	The actors decided independently how to handle integration necessities (only 5 states, because the paper was written before the data collection was completed).
	19 collaborations (individual WFD addressees and other actors realising WFD measures with nature conservation authorities) out of six states	The integration paper found the collaboration with one actor-type dominating and with another actor-type at least present while other WFD addressees had not been found engaged in collaboration.
	21 processes out of six states	Processes are organised by different actors within a state and their characteristics vary within and across states.
	One process supported by data of the other processes which were analysed in the process typology paper	The focus on one case allowed an in-depth illustration of multiplication which was found to be an issue across the states. The case with the most complete data set was chosen.
	The six states as one case	Cross-cutting implementation barriers were analysed. This allowed glancing at the question of what barriers are independent of state structures and to what degree.

Figure 6 The six federal states which have been analysed in detail (basic interviews, document analysis and participatory observation) and the river basins they belong to. The interviewees have been located at the offices of their organisations. (own depiction)

Figure 7 Geographical coverage by additional interviews and case data used for the conceptual paper complementing the detailed analysis (own depiction)

Table 3 Questions and core results of PhD related publications

Publication	Question
	Core results
	Water governance is in focus of a growing body of literature establishing an own research field: What is the state of scholarship on comparative water governance? What are trends, gaps, and ongoing issues to be resolved as the field progresses? How is water governance defined, conceptualised, and assessed in different contexts?
	The field of comparative water governance studies shows strong variances, especially regarding the use of definitions of water governance, as well as specific aspects and forms. It is often studied through sub-elements of governance such as legislation and public participation. Comparative studies are often qualitative and small-N, although there is an increasing number of quantitative and large-N studies that aim to synthesise findings across different settings. Future research needs diagnostic approaches that consider context and problem characteristics allowing the derivation of general insights but also not generating too simplistic blueprints. The balance between small-, medium-, and large-N studies should be improved. Longitudinal comparisons should be conducted to identify temporal governance trends and patterns.
	How to operationalise polycentricity to distinguish polycentric governance from other kinds of structures and to analyse differences in their functioning? Recognising the contrasting definitions of polycentricity in the literature, the paper asks: Do we really know what polycentric governance is, when we see it? And, do we all see the same when we see it?
	Existing definitions of polycentricity vary in terms of structures, processes and institutional frameworks; in terms of the degree of autonomy or independence of actors to be considered as decision-making centres (formally independent, de-facto independent, relatively . . . semi, substantive, etc.), in terms of diverse types of organisations, and differing scales and levels, and in terms of overlapping and redundancy. What all definitions share is referring to the existence of 'multiple decision-making centres' expressed in terms of actors, units, elements, authorities and organisations. The paper elaborates five characteristics which determine a multiplicity or a singularity of centres: good or problem specificity, task specificity, necessary independence to be considered a centre, analytical system boundaries and level/scale specificity and functional overlapping. Based on the described conceptual refinements, propositions, meant as a research agenda, on the relationship between multiplicity characteristics and the functioning of a system are remarked.
	What questions could or should be asked to identify patterns and to understand and evaluate complex governance arrangements which are potentially polycentric? How to examine governance situations using a polycentricity lens?
	The book chapter provides a way of identifying and characterising polycentric governance in the challenging situation of countless forms and variations that actual polycentric arrangements may take and their continuous change over time. It could or should be asked: questions about the decision-making centres themselves (their influence, functions, scales and levels, duplication, overlap, redundancy); questions about the social problem characteristics; questions about independence and interdependence among centres; questions about

	coordination (identifiable ways, levels, conflict solution); questions about emergence, transition, and decline of centres; questions about effects.
	How do local WFD policy addressees adopt integrated management practices? Who is involved? What drivers and obstacles are important for integration?
	Integration attempts were found along all phases of measure planning (mainly at the idea development stage and in approval procedures), but also had been institutionalised. Integration was driven by goal realisation considerations and regulations. The range of involved actors varied across cases, but lower nature conservation authorities were most often involved across cases and states.
	Despite the overall implementation deficit and common barriers, there are several local cases across the country where WFD measures were realised: What kinds of conflicts arise at the local level and through what mechanisms does cooperation support WFD addressees in coping with implementation barriers? As coordination and collaboration are not omnipresent amongst the cases, what supports the emergence of such relationships?
	The bright spots of WFD implementation are characterised by the presence of highly dedicated individuals and, often, collaboration between WFD planners and (lower) nature conservation authorities, although the relationship between the two actors showed to be ambivalent. Such collaboration provided those realising WFD measures with access to the instruments of nature conservation law. Although the WFD prescribes sectoral integration, such cooperation did not evolve everywhere. Contrasting non-collaborators, collaborating actors showed low independence, meaning no or only few alternative means to cope with implementation barriers, and physical proximity between WFD actors and nature conservation authorities.
	What mechanisms provide linkage and enable influence between participatory processes and wider, especially polycentric, governance systems?: How is decision-making regarding WFD implementation structured? How are participation and its outputs understood and what is participation designed or intended for by organisers? How are linking mechanisms influenced by dimensions of participation and polycentricity?
	The decision-making power regarding WFD measure implementation showed to be widely spread across multiple actors which often had no ultimate planning power in their area of responsibility. In none of the analysed processes decision-making power was transferred from actors to the process and only a small share of local-level decision-makers is directly involved in participatory processes by higher levels. Nevertheless, the organisers of participatory processes intended to positively influence the wider governance system by influencing participating decision-makers, but also the constituencies. Participatory processes and governance systems showed to be linked through mechanisms with two directions: aggregation of information into one decision and multiplication in which many decision-makers are influenced by one or few other decision-makers. The nature of these links makes involvement (direct or no direct influences on decision-makers through process design variables) and process decisiveness (power transfer: binding or no binding decisions) important variables for the effectiveness of these links. The multiplicity and independence of decision-makers in polycentric systems hamper the achievement of ideal aggregation and multiplication through participatory processes.

	What factors influence the multiplication capacity of participatory processes?
	Various factors in the chain are necessary for successful multiplication. They can be clustered in the functions of receiving (receiving and influencing capacities), multiplying (the existence of potential multipliers and multiplication channels to the constituencies, the actual multiplication behaviour of process participants and the actual functioning of the multiplication channel) and sending (communication about multiplication and accessibility of process content). These factors have also been found because interviewees had mentioned them as not functioning appropriately. Factors disconnecting the multiplication chain from sender to receiver varied across cases, but no process expressed a complete chain and thus a fully functioning multiplication mechanism. Thus, the processes were, through multiplication, only weakly linked to the wider governance systems. The costs for process organisers to improve multiplication can be expected to rise with the multiplicity of actors being not directly involved but expected to be positively affected by a participatory process. Further, participants cannot simply be expected to function in the interest of process purposes - as service providers.
	Which governance-related barriers to WFD implementation can be found across the German states?
	Across the German states, a lack of motivation, staff and financial resources, land resources and institutional interplay (especially with nature conservation regulations, renewable energy law and agricultural policy) impedes the realisation of WFD measures at the local level. The barriers are presented roughly in the sequence they play out as a measure would not be initiated if there is nobody who is sufficiently motivated to spend time on planning. Finally, the comic spotlights state's instruments to cope with these barriers, as well as strategies by local actors.
	What effects have plans and concepts such as management plans and water development concepts on measure implementation? What requirements should these plans and concepts meet?
	The paper shows strong variations in the scope, principles and use of plans, as well as functions for steering actors and WFD addressees. River basin management plans were found to have a limited influence on measure choice while lower-level concepts contributed more to improve ecologically relevant decisions. Implementation barriers are elaborated together with solutions, which are most often locally grown and individual. Implementation was found to be rather driven by feasibility, interests and occasion than by higher-level plans or ecological deficits. Hence, the plan design should align with the motivation type of WFD addressees.
	Can we achieve an encompassing implementation based on incentives (voluntariness principle) or do we need to assign duties?
	The paper shows that in applying the voluntariness principle in Germany even motivated WFD addressees report that they deem their measures neither being sufficient in quality nor in quantity to achieve the WFD goals. It presents kinds of stewards (*Kümmerer*) – instruments which the states used to motivate WFD addressees, and it compares their capabilities and limits. The paper distinguishes between three degrees of motivation to realise WFD measures and compiles instruments to overcome implementation barriers categorised according to their effects on differently motivated actors. It argues that an encompassing implementation would be neither achieved under current conditions nor by

	assigning duties. Further implementation barriers persist and need effective solutions in order to establish working routines which could lower the necessity for motivation. Furthermore, like in an experiment not only ecological plans but also governance structures need to be assessed cyclically and adjusted when appropriate.
	What role can participatory processes play in WFD implementation and for its success?
	Although a majority of actors consider participation to be useful for WFD implementation, many of them also consider participation less successful in their states. The paper provides an overview of what the EU, process organisers, participants and other actors expect from participatory processes. Different formats and network options have been found. More specialised knowledge was shared than experiences or strategic knowledge – contrasting what was expected by participants. Knowledge was shared more top-down (by organisers) than bottom-up (by participants). Detecting that no decision-making power was transferred to participatory processes, the paper questions who is the decision-maker and who the stakeholder in the investigated processes. It argues that the participatory processes need to be adjusted to the kinds of decisions to be taken and that the multiple processes should be networked.

5 Cohesion among the publications: WFD implementation in polycentric systems

The ambitious goals of the WFD would have required ambitious implementation processes at a good pace because ecological studies show that measures unfold their positive ecological effects with retardation (LAWA, 2018b). Nevertheless, a large gap between identified but not yet implemented measures was found (LAWA, 2018a). If those measures were in a queue on the way to be implemented, one could argue it simply needs more time. A deadline extension would eradicate our implementation deficits. However, the situation is more complex. One cross-cutting observation of this study is, that measures are rarely in a queue to be implemented. In contrast, many of the actors, which are expected by the states to implement measures, often do not realise measures or realise other or less effective measures than identified. This hampers the evaluation of the progress of the implementation.

In carving out the cohesion among the publications of this PhD study and going beyond these publications, I explore here the question of what can be learned about policy implementation in polycentric governance. Thus, the observed, insufficient measure realisation but also lighthouse projects and, in general, the variations in approaches to measure planning, coordination and participation can be explained. Beyond that, usually, not only practitioners want to know the panacea, or more realistically solutions which guarantee substantial improvements. The results of this study, however, suggest that governance structures promising even such solutions are difficult to be identified, as well as implemented.

In the following, patterns which have been found across the states are summarised. The identification of patterns shall support the assessment of solutions. Solutions need design, and probably some sort of (re)designing implementation arrangements. Therefore, it is also analysed what the identified patterns caused and what this tells us about the design potential in polycentric governance systems. Finally, a cyclical approach to governance is discussed to improve WFD implementation.

5.1 Observable patterns and exemptions: WFD implementation in Germany

Implementation "is not just a rational follow-up of decision making but a process in which different actors compete over the meaning and the consequences of a policy"

(Beunen et al., 2009: 58)

The data have been collected according to questions of the lens of seeing polycentrically (Blomquist and Schröder, 2019). Due to the vast variance of implementation arrangements, the identification of patterns depends on the level of detail for typifying them and was difficult. Due to the interaction of varying aspects considered by the lens, the patterns are clustered here closer to the implementation praxis. First, patterns and noteworthy exemptions among different aspects (components) of systems are elaborated (section 5.1.1), which are patterns regarding measure realisation, interactions and processes, steering instruments and competencies. All these aspects in their peculiarities shape the different governance systems. The patterns which have been found across systems or their sum effects respectively, further, form patterns at the system's level (section 5.1.2) regarding the system's overall functioning, such as interactions among different implementation steps and levels. Overall, with the patterns found the system's functioning could be contrasted with the theoretical advantages and disadvantages of polycentric governance systems (section 5.1.3).

5.1.1 System components perspective: steering, action and competencies

Actors with key roles regarding hydromorphology and connectivity were actors who are planning specific WFD measures, actors who (potentially) frame the discretion of planning actors such as steering authorities and actors with issue-specific intermediary roles. The former decided whether and what measures were planned. Steering authorities developed funding schemes and regulations. Intermediary functions were, e.g. convincing and motivating WFD addressees or facilitating implementation through monitoring. Even when focusing on centres with key tasks, ignoring actors with similar or interlinked tasks, none of the chosen states resembled the other states regarding its overall setting of actor types (see Table 4). This setting included state and non-state actors. Throughout delving into the analysis of organisational structures an increasingly complex picture unfolded showing extensive variances in implementation approaches also below or within the general administrative structures of the chosen states (see section 3). The variances of approaches were much more extensive than expected at the beginning of this study.

Measure realisation

The states applied the 'voluntariness principle' (*Freiwilligkeitsprinzip*)[4] for measures on hydromorphology and connectivity, meaning that the actors cannot be forced to realise such measures. Instead, the steering authorities established funding programmes to incentivise the measure realisation. To the actors who were expected by the steering level to realise WFD measures and who were addressed in such a way I refer here as 'WFD addressees'. These actors used their discretion by deciding whether and what WFD measures to realise, how to fund those measures and whom to coordinate and cooperate with.

[4] It is argued that a duty to realise hydromorphology measures cannot be enforced because it is difficult to argue that a particular measure needs to be realised at a particular place by a particular actor and that the same effect could not be achieved by a measure at another place.

The steering level across the states primarily addressed local-level actors with water maintenance tasks. Water maintenance tasks encompass the management of flood protection, the drainage of fields and shipment. Usually, responsibilities for water's maintenance are distributed according to water's importance distinguishing at least waters of first and second order. Sometimes additional criteria apply. This distinction does usually not cover whole rivers but only river stretches. Hence, catchments can be found where various actor types are responsible. Despite the commonality that water maintenance actors were addressed, water maintenance was organised very differently across and within the states.

Table 4 shows the actor types of interviewees and WFD addressees[5] covered by this research project. Similar sub-sets of actor types can be found across the states: for example, municipalities and county-free cities were expected to realise measures in five states and state agencies/ state companies in four states or district governments in the other two states (steering tasks were fulfilled by other departments of the district governments). Various types of associations were WFD addressees in five states.

Several barriers hamper the WFD implementation across the federal states (for details see the Integration and the Bright spots paper, Schröder and Chaudhary (2020)) which in general reflect the barriers repeatedly found in policy implementation research (Mitchell, 2018):

- Motivation: The interviewees rarely stated that funding programmes were an incentive. Often it needed other goals beyond the WFD goals to incentivise action, such as synergies with primary tasks of flood protection and field drainage or the improvement of recreation areas. Even (initially) motivated people felt overwhelmed by the implementation barriers.
- Staff resources: While all actors and levels recognised a lack of staff resources to fulfil WFD tasks, WFD addressees were very differently provided with staff. This ranges from voluntary executives (unpaid) of small maintenance associations and (voluntary) mayors without any water-related background to highly specialised departments of district governments, state companies/ agencies and large associations. Thus, many actors already lacked capacities and know-how to contract the WFD planning out to planning offices.
- Financial resources: Probably, most water sector actors would agree that financial resources are a barrier to WFD implementation (Schröder, 2020a; Schröder and Chaudhary, 2020). Just increasing funding programs, though, would be short-sighted (for the moment), because the devil is in the details. While state actors (districts and agencies) were comparably well-capitalised, WFD addressees and other actors relied on funding and own capital. Problems arose from eligibility criteria (exclusion of particular measure or actor types), application (criteria on planning details for application) and processing procedures (clearing deadlines), co-payments (amount, allowed sources of co-payments), pre-financing necessities (higher than fluid capital of an actor), or the sanctioning of mistakes. EU funding sources were perceived as even more bureaucratic and thus problematic than state funding. Through the required time and know-how for application procedures, the financial implementation barrier is strongly interlinked with issues of staff resources. Only a few interviewees stated that funding applications require effort, but are reasonably manageable.

[5] This mirrors the time of data collection – in Thuringia the actor-type setting changed in 2020 because water maintenance associations were established. These replace the previous organisational structures for water maintenance, flood protection and WFD implementation.

- Land resources: Land acquisition was the most important barrier for those who were already active in measure realisation (motivated and expecting to handle the financial costs) (Schröder, 2020a). Land is completely distributed and the right of property is strongly protected by law in Germany. A combination of high market prices and a low willingness to sell, especially agricultural, land made access to land difficult. Even public actors showed reluctance to provide land for measure realisation to other public actors. Overall, buying, leasing, transforming or swapping land was time-consuming and thus delayed or prevented WFD planning projects.
- Institutional interplay was found in goals, as well as instruments to achieve policy goals. This concerns land-requiring policies, such as agricultural policy, nature conservation and renewable energies, across the states, because the land serves different purposes or cannot host different habitats. Goal conflicts, such as conserving a habitat/ species or allowing the dynamic development of a river, could only be solved politically (weighing up priorities) if no win-win-solutions could be found. In contrast, instrumental conflicts might be reduced without giving up the goals for which the instruments were developed (e.g. calculation of land for subsidies or manure application).

Despite the overall lack of measure realisation, there are in all states highly dedicated actors realising hydromorphology and connectivity measures at the best. These dedicated actors could be found among all types of WFD addressees as well as among actor-types which are not expected to realise WFD measures, such as landscape planning associations, county authorities (water/ nature conservation) and special purpose associations (with other water-related tasks). And they could be found independently from resource provision. It is the individual person, its attitude and stamina and the local context this commitment stands and falls with. These dedicated actors found individual and local solutions to overcome implementation barriers – not only by their tenacity and inventiveness but by using their discretion (see 'competencies').

Several organisations have been found which differ from the identified actor types. Their organisational structures had been adjusted locally – often before the WFD in order to better fulfil water maintenance tasks. These were individual solutions. However, in terms of WFD implementation, these solutions helped WFD addressees to overcome some of the implementation barriers. Especially, these organisational solutions were better endowed with staff resources. Sometimes, they were more flexible in handling financial issues, or, internalised cooperation and, thus, made cooperation among different actor groups more permanent. The special organisational solutions which have been found encompass, first, the joint exercise of water maintenance (and WFD) tasks of several municipalities through larger entities like umbrella organisations, e.g., a county authority (North-Rhine Westphalia), a special purpose association (for wastewater (Hesse), or a water maintenance association (Thuringia), and second, the contracting out of tasks, e.g., some municipalities to a landscape planning association and the middle authority to the land company (both Thuringia).

Several WFD planners perceived the collaboration with lower nature conservation authorities as essential to realise their measures – without the collaboration, the WFD measures would not have been realisable (see Integration paper, Bright spots paper and Table 3). They used collaboration especially for financing measures and to overcome the pitfalls of WFD funding programmes, but sometimes also to acquire land and political support (see Bright spots paper).

Table 4 Actor types fulfilling tasks of steering or measure realisation and coverage with interviews

Actor type	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
Ministry		◊	◊	◊	◊	◊
Middle authority		◊			◊	
Supporting technical authority	◊		◊			
District governments	◊			◊ ◊ ◊		
State agency	◊	◊			◊	◊
Counties (Water authorities)	◊	◊	◊	◊	◊	◊
Counties (Nature conservation authorities)		◊				◊
County-free cities	◊		◊	◊	◊	◊
Municipalities			◊		◊	
Maintenance associations		◊				◊
Water and soil associations						
Special-law water associations				◊		
Special purpose associations			◊		◊	◊
Nature conservation associations		◊	◊	◊	◊	◊
Landscape planning associations	◊				◊	

Light orange: actor with steering tasks; Dark blue: the state level expects this actor type to realise WFD measures; Light blue: actor type generally not expected to realise WFD measures but single actors found taking measures; ◊ at least one actor/ WFD addressee exemplarily interviewed

Coping with implementation barriers of land resources showed rather no patterns, solutions showed strong variances (see also Schröder (2020a)): Actors tried to acquire land when the idea for a measure was born (buying, swapping, plot realignment and so on). Other departments engaged in buying or renting, stockpiling, land when offered on the market (if somehow suiting the purpose). Actors only

developed measure ideas when land became available. Or, it was avoided to plan measures which require land (e.g., beyond the water channel).

Considering the identified barriers and available coping strategies, it is not surprising that most of the interviewed WFD addressees followed feasibility criteria rather than scientific standards or ecological/ technical/ functional criteria for planning WFD measures. This feasibility approach orientates less on what pressures are there and what is necessary to be done than on where land is accessible and what is possible to be done.

Interaction/ Processes

There is a clear difference between integration or participation processes by actors with steering functions and WFD addressees. While processes by (mainly) steering authorities were often mentioned on websites and described as meant to fulfil the WFD's prescriptions on encouraging public participation, processes by WFD addressees were usually not mentioned, even not in general (see Process-system links paper).

Processes by steering authorities and other high-level actors (see Process-system links paper) were comparably large-scale, often covering whole states, regions or catchments, and often they had an information-giving character. The participatory processes followed rather hydrological or hybrid boundaries. Hybrid means they followed hydrological boundaries as long as they stayed within a federal state, or, it means that unrelated sub-catchments were merged into administrative units. Some process boundaries deformed over time – aligning more with, e.g., district boundaries. Some processes, in the following, changed their names. Others had not adjusted (reduced) their members list, although actors beyond borders did not participate anymore (but maybe stayed informed via e-mail). The detailed analysis showed that decisions were rarely taken within these processes or by their organisers. Instead these processes or their organisers intended to influence participants in their decision-making and, as participants were often only representatives, intended to influence the represented groups of actors (see Process-system links paper). Therefore, these processes rely on multiplication processes between participants and non-participants to affect the larger governance systems. However, the analysis also found several barriers to successful multiplication (see Multiplication paper).

In contrast, lower-level processes were less institutionalised and small-scale (involving authorities, associations and riparian owners, who are directly affected by the measure). The integration attempts reported by the interviewees were very diverse regarding when (from the idea development stage to approval and construction) and whom to integrate and for what purpose (see Integration paper and Bright spots paper). The integration attempts were more vertical in scale and more sector-oriented than public. They often intended to improve goal achievement and to fulfil rules of institutionalised approval procedures[6]. Thus, these processes were more apt to affect the decisions of their organisers although they were not predominantly meant to fulfil WFD prescriptions on public participation. This study does not allow to draw conclusions on how much these processes were used in overall local-level WFD planning. It can be assumed, though, that plan approval rules cause a widespread use of

[6] Plan approval procedures (*Plangenehmigungsverfahren* and *Planfeststellungsverfahren*) examine, according to the federal Administrative Procedures Act (§74 VwVfG, 2003 and last amended 2021) the permissibility of space-consuming construction proposals. The procedures differ regarding whether only the directly affected public or the wider public is consulted before the decision. These procedures are led by county authorities such as lower water authorities or at the district level by higher authorities.

participation and integration to, at least, a minimum. Some interviewees reported to avoid such processes by avoiding measures which require approvals[7].

Exchange among WFD actors was found at the ministry level in LAWA working groups and at the WFD addressee level in water neighbourhoods as well as at the county level:

- The LAWA (German Working Group on water issues of the Federal States and the Federal Government represented by the Federal Environment Ministry) allowed the exchange and coordination among the state ministry representatives, e.g. on monitoring, assessing the water status and reporting to the EU. However, it seems governance questions played a minor role there, as interviewees rarely had an idea of what structures and instruments were used in other federal states.
- Water neighbourhoods were found in three out of the six federal states: In Hesse, they were organised/ supported by the GFGmbH (Gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung; sub-company of the DWA)[8] and in Thuringia and Saxony by the DWA (Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V.; network of professionals of the water sector which is active in setting technical standards and offering training). The water neighbourhoods focussed on the exchange of experiences, ecological aspects, legal requirements, the use of instruments (e.g. plot realignment) and solution approaches. One water neighbourhood has been usually led by one or two voluntary persons. There were different approaches among the states to finance the water neighbourhoods or the membership. These influenced the participation of actors. However, the neighbourhoods had in common that already highly dedicated WFD addressees participated rather than those who still needed to be motivated.
- In Thuringia, a regular exchange among the lower water authorities (county level) was also mentioned.

Steering instruments

The federal states used various instruments intending to tackle implementation barriers. Some instruments addressed multiple barriers (participation was also used as an instrument, but already elaborated in 'interaction/processes'):

- Motivation/ stewards (*Kümmerer*): Thuringia, North Rhine-Westphalia and Lower Saxony addressed the motivation of WFD addressees by non-financial instruments: In Thuringia, water advisors (three to five for the whole state placed at the Thüringer Aufbaubank) approached WFD addressees since 2011. They advised on identifying measures and funding sources and supported applying for funding as well as realising measures. Since 2017, water advisors in North Rhine-Westphalia (placed at the district governments and the Kommunal Agentur NRW GmbH) should motivate WFD addressees as well as reveal implementation barriers, because the state funding programme was not used to the extent expected. Lower Saxony followed a different approach. Since 2015, it financed staff by 80 % at 12 chosen water maintenance associations (pilot project water alliances (*Gewässerallianzen*)). This one person at each association was expected to

[7] Maintenance measures, for example, do not require approval procedures, but what kind of measures are still maintenance and what measures need to be classified as a construction (river training) requiring an approval is a matter of definition (and discretion).
[8] The GFGmbH also organised/ supported water neighbourhoods in Saarland and Rhineland-Palatinate.

coordinate and pursue WFD measure realisation professionally. Additionally, between 2014 and 2019, municipalities could ask the Kommunale Aktion-Umwelt U.A.N. e.V. for advice and ideas on measure realisation (project *Wasserrahmenrichtlinien-Infobörse*).

- Funding schemes: All six states offered funding programmes to incentivise WFD measure realisation. Five of them required co-payments by WFD addressees, only Saxony-Anhalt offered 100 % funding of eligible measures (nevertheless it also did not fund the planning necessary to apply for funding). Further, variations among the funding schemes resulted in the financial barriers reported above, which are, hence, of varying importance from state to state.
- Measure identification/ water development concepts: In all six states water development concepts (under varying names and with varying focus) and feasibility studies were known as plans of greater detail below RBMPs and PoMs (Schröder, 2020a). In five states the development of such concepts was funded by the state, in a few of them already before the WFD. They should provide ideas, as well as allow to steer what measures are realised or by whom (in combination with funding schemes). How much these concepts had actually been used, cannot be answered by this study. However, a plurality of individual approaches by WFD addressees had been found for generating and prioritising ideas for measure realisation, for assessing costs and the necessity for plan approval procedures, for communicating the necessity of measures and for generating roadmaps for actions on occasion. Some approaches to identify measures without developing a concept were also found: The collection of measure ideas through the area cooperations in Lower Saxony and through water shows[9] in Saxony are examples for that.
- Problem/ barrier identification: Knowledge about implementation barriers was collected through the aforementioned water advisors. In Lower Saxony, barriers were identified and documented in detail by the NLWKN (state agency) in a pilot project in 2012 (*Pilotprojekt Maßnahmenakquise* und Teilprojekte NLWKN (NLWKN, 2012)). In Hesse, though, for similar purposes, the ministry undertook a visiting tour to municipalities (starting as a pilot project in 2016: *Kommunalbereisung*) and recognised that their data banks did not mirror what measures were realised actually (e.g. because measures were not reported).

No (new) instruments have been mentioned that address the issues of land access or that deal with conflicting goals or integration respectively.

Competencies

None of the institutional settings determined particular decisions for actions to implement the WFD locally. They only prevented particular actions. The committed actors used their discretion in defining the kind and scope of a measure, e.g., to sell it as a maintenance or flood protection measure. This changed the rule system to be applied for further planning steps, e.g., rules on funding, plan approval procedures and who gets the power to influence the project. These actors also changed their discretion range through cooperation and collaboration with other actors: They, for example, had to apply additional criteria to measure planning (including changing or lowering goals), but were also eligible for other funding or land access options or had to follow other procedural rules. Figure 8 illustrates that actors acted within multiple rule systems which frame their decisions and discretion. These rule systems were sometimes applied all in parallel or could be chosen to some extent. Overall, discretion

[9] The authority/ the responsible actor for maintenance, where required together with other actors, walks along the river and examines the necessities for action.

varied with the kind of decision to be taken. However, interviewees were also found to perceive their discretion differently when the same or similar rule systems[10] applied.

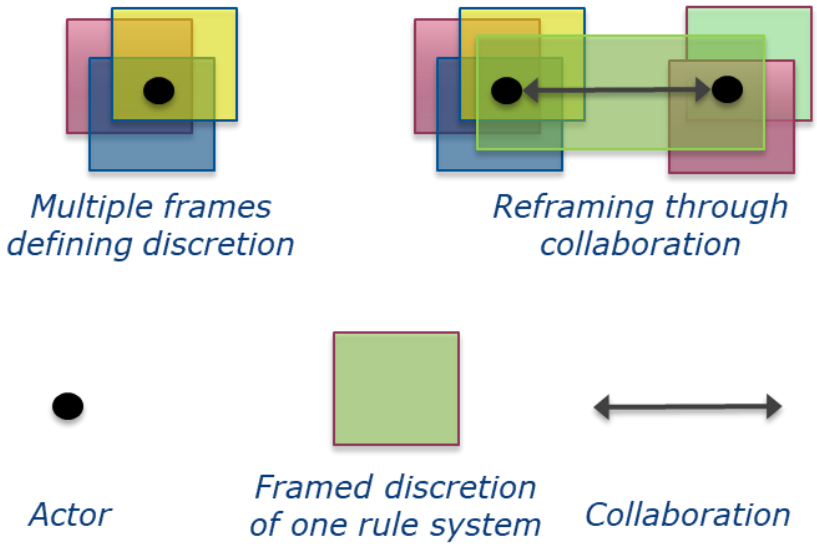


Figure 8 Illustration of multiple rule systems that frame but rarely determine decisions for action. (own depiction)

The responsibilities of each actor were clearly defined along territorial boundaries (states, counties, municipalities, catchments, river stretches) and tasks. The definition of responsibilities reduced territorial overlapping (see Identifying polycentricity paper) to overlapping among different levels (e.g. municipalities within their district). Functional overlapping stayed strong through the ecological interconnections in water systems – actors interacted with each other socially and ecologically without sharing tasks. Thus, there was more functional overlapping than territorial overlapping among the actors. Therefore, redundancy, if at all, was found among actors of different levels and types rather than among those of the same level and type.

Despite the little redundancy examples of taking over tasks could be observed. Taking over tasks is understood here as fulfilling tasks which the usual actor of this actor type does not consider its primary tasks. Actors doing so used their discretion to fulfil additional tasks and were also found among different types of actors:

- Thus, locally a lower water authority in cooperation with the lower nature conservation authority offered advice to water and soil associations within their county and tried to motivate them (until 2016 they additionally financed the co-payments required by the state's funding scheme) similarly to the aforementioned stewards (NRW). Also similarly, a landscape planning association engaged in motivating its member municipalities and in developing a water maintenance plan which provides ideas for river restoration projects (Thuringia).
- Examples could also be found for WFD measure realisation: Steering authorities realised measures as part of pilot projects and nature conservation associations, e.g., for showcasing how a measure

[10] Rules on WFD planning and funding, flood protection, nature conservation and compensation and so on as well as rules of organisations are laid down by different levels (state, district, county, municipality, organisation, department and so on). Thus, there were no two interviewed actors in this study acting within the totally same set of rules. Nevertheless, different perceptions could be observed regarding some of the large-scale rule systems.

could be realised in a participatory manner (Schröder, 2014). Other actors such as counties, umbrella organisations or landscape planning associations, took over WFD measure realisation more regularly because maintenance tasks were already transferred to them prior to the WFD or tasks were contracted out. Sometimes, measures were realised officially by the WFD addressees (e.g., for signing contracts) but the driving force in the background (e.g., providing ideas, identifying funding sources and convincing other actors) was another actor such as a nature conservation authority.

Taking over tasks in general was driven by very different incentives: improving the effectiveness or efficiency through local self-organisation, sustaining the workforce of the own organisation, lobbying, personal conviction regarding WFD aims or experimentation for improving implementation to name a few. While taking over tasks was incentive-driven, some institutional settings reduced incentives for non-addressees: named were, for example, funding schemes which excluded particular actor types or project types from state funding, or associations' laws which prevented experiments of adjusting organisational structures[11].

5.1.2 Systems perspective: inconsistencies through a mix of central and decentral approaches

Looking at whole systems instead of single actors and processes, a mix of elements of a central and a decentral implementation approach can be observed.

A central approach constitutes (see Figure 9), here, central goal-setting (by the WFD and operationalised by the member states' competent authorities) and developing a plan centrally. This plan defines what needs to be done (by the federal states) and it is laid down in the form of river basin management plans, programs of measures (by federal states' ministries) and potentially by more detailed plans (e.g. mandated by ministries). Local actors would simply realise the measures mentioned in the plan(s) at prescribed places and times. Monitoring authorities can then evaluate whether measures have been realised as defined and whether these measures show the intended ecological effects. This way, the procedure is often[12] communicated.

In contrast, following a decentral approach, goals might still be provided centrally (by law). However, ministries would only try to change incentive systems by available steering instruments, such as funding programs, taxes and information campaigns. Ministries would report measures (here to the EU) which had been reported by local actors or had been otherwise ascertained by monitoring authorities. For determining what needs to be done, local actors may collect, at the beginning, what they consider to be necessary for goal achievement. It is up to decentral actors, then, what measures to realise, to what extent, as well as how to realise them.

In reality (see Figure 10), there were centrally developed plans (mostly by ministries) which only had been partially used by local WFD addressees[13], e.g. because those plans were not sufficiently detailed or because those plans did not consider restrictions (see Integration paper; Schröder, 2020a; Koontz

[11] This was commented by a participant during the discussion of the expert talk on governance which was part of the National Water Dialogue (see Table in Annexe I 9.4).

[12] For example: The measures of the water sectors, which a member state undertake at a river basin within its territory, were to be determined in a programme of measures. ("Die wasserwirtschaftlichen Maßnahmen, die ein Mitgliedstaat innerhalb seines Hoheitsgebiets für ein Flusseinzugsgebiet vornimmt, sind in einem Maßnahmenprogramm festzulegen." (BMU, 2004: 12))

[13] Similarly, the programmes of measures have been found to not guide the measure selection in England (Giakoumis and Voulvoulis, 2019).

and Newig, 2014). WFD addressees, if they became active at all, also realised other measures which they considered to contribute to WFD goal achievement and those they would be able to realise despite the observed overarching implementation barriers. These measures were sometimes also sold as, e.g., flood protection or nature conservation measures and were, thus, not reported as WFD measures. Hence, monitoring/ steering authorities may face difficulties to evaluate and report what has been done – a problem which some interviewees explicitly recognised. The collection of measure ideas by WFD addressees in area cooperations (*Gebietskooperationen*) in Lower Saxony is an example of a decentral approach. The measure collections were intended to be part of the planning documents but rarely found their way into RBMPs/ PoMs (Koontz and Newig, 2014). Probably, this was also caused by the level of aggregation in RBMPs/ PoMs.

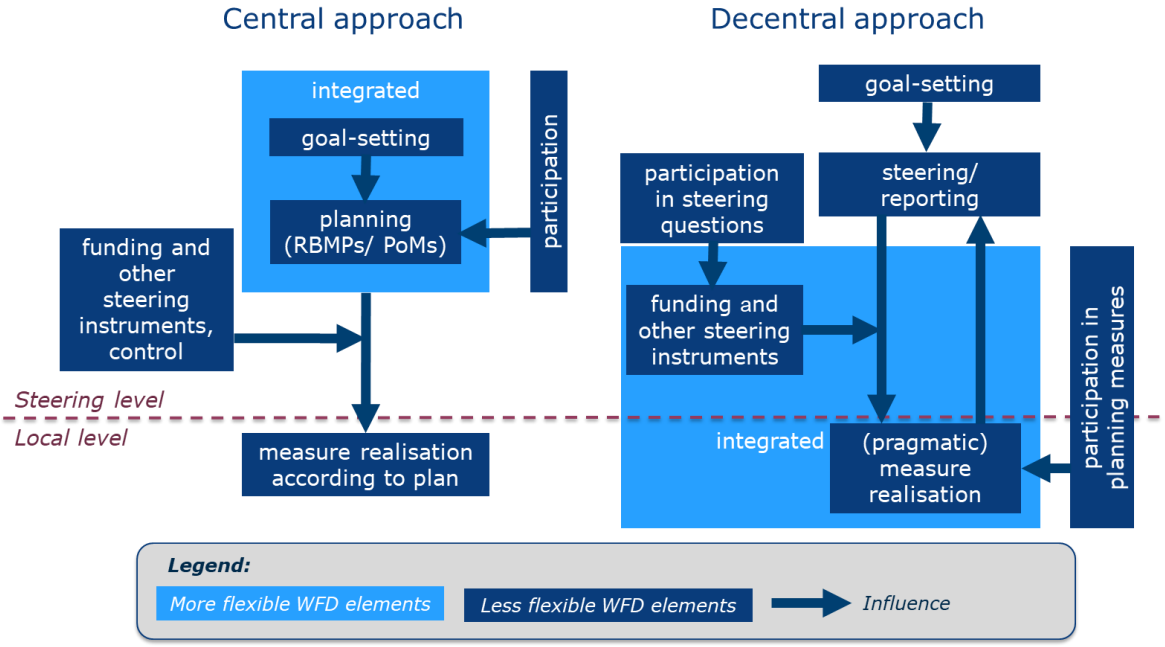


Figure 9 Coaction of WFD instruments according to a central/ decentral implementation logic (own depiction)

Also, the use of public participation shows logical inconsistencies. Participation in the form of hearings is prescribed for the compilation of RBMPs/ PoMs and should be encouraged at all levels. Rimmert et al. (2020) showed that comments from the public only scantly affected the compilation of RBMPs/ PoMs. The comments from the public could strongly affect these plans and plans could be considered by WFD addressees. However, if these WFD addressees would (they partially do - as described above), furthermore, organise their own participatory processes, one might ask why should the public participate twice in the same decision. And, who solves issues of legitimisation, if the results of doubled participation are conflicting[14]?

Similar to public participation appears the integration with other sectors' interests (considering other sectors' interests in WFD planning, as well as considering WFD interests in other sectors' planning). As Bathe (2010) found, the RBMPs/ PoMs did not ensure coordinated and integrated planning. In fairness, it is necessary to say that these plans as a central instrument are hardly able to do so in the given decentral implementation arrangements as this study found. In contrast, conflicting interests were

[14] Conflicting results are likely if the experiences with 'yes we need more renewable energies… but do not install wind power in my backyard' are considered.

most often weighed up against each other in the aforementioned plan approval procedures at the local level. So far WFD goals got no priority by law. Thus, political decisions were moved to the local level – political decisions of what goals get prioritised, locally and in sum in society as a whole, if win-win solutions cannot be found. One actor in Berlin called it very tellingly 'compromise driven failure in goal achievement' ("*kompromissgetriebene Zielverfehlung*").

In theory, the WFD generally allows to prove that other societal interests outweigh WFD goals justifying lower goals. However, no process was found that would mirror local-level weighing-up processes towards evaluation and reporting at the ministry level. Such a process would have completed a decentral approach. In fairness again, trying to mirror the results of local-level weighing up would have certainly outrun the ministries' capacities. Hence, it is not surprising that the problem of justifying exemptions was early approached rather conceptionally (with its own strand of WFD-related research, e.g., UFZ et al. (2007), Boeuf et al. (2016), Bolinches et al. (2020)) and centrally.

As long as the implementation arrangements do not provide the conditions (such as access to land, finances and personal, and priority for WFD goals) to approach WFD implementation technically (like the DPSIR[15] approach), implementation deficits are inevitable: fewer measures, less than optimal measures and implementation delays (summing-up with the retardation of ecological answers). Highly dedicated individuals may overcome implementation barriers and may convince other actors. However, it can neither be expected that all barriers can be pulled down everywhere, nor that all WFD addressees are highly dedicated. Despite their above-average efforts, many WFD addressees doubted that they were implementing measures to a sufficient extent for goal achievement by 2027 (Schröder (2020b) and interviewees).

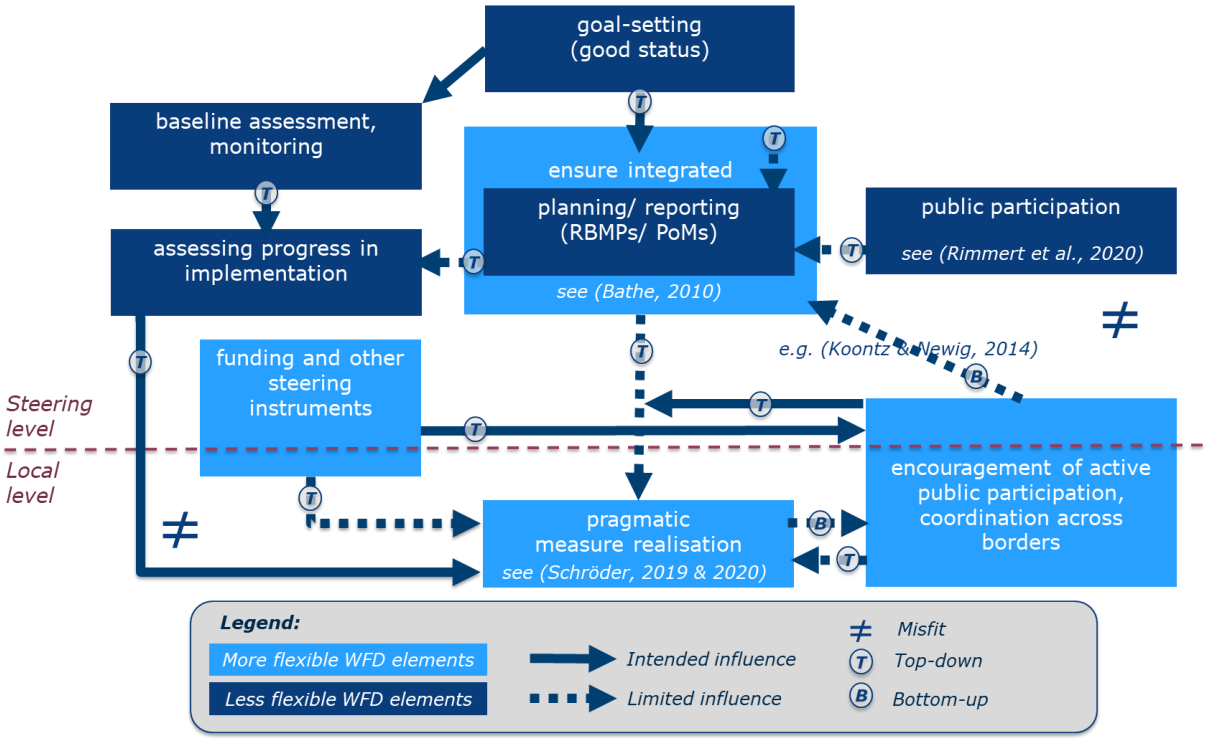


Figure 10 Actual WFD implementation: a mix of central and decentral approaches (own depiction)

[15] A model for describing causal chains and regulatory circuits: Driver – Pressure – State – Impact – Response.

5.1.3 Advantages and disadvantages of polycentric governance

Polycentricity researchers discuss several advantages and disadvantages of polycentric governance systems regarding their performance (Baldwin et al., 2023). In the following, these advantages and disadvantages are summarised before it is evaluated to what extent these issues could be observed in the analysed cases.

Compared to monocentric systems, some researchers expect polycentric systems to induce efficiency and correct mistakes due to structures which are similar to markets (Aligică and Tarko, 2012). They would produce institutions with good fit due to the plurality of decision-makers, and, the design of new institutions by the multiplicity of decision-makers would increase the adaptive capacity of systems (Carlisle and Gruby, 2017). Others expect a doubling of activities or counterproductive activities if coordination fails (Huitema et al., 2009). On the one hand, coordination is limited by transaction costs and cooperation is generally difficult due to the complexity of polycentric systems (Huitema et al., 2009); decision-makers face difficulties in achieving and sustaining agreements (Ostrom and Parks, 1999). However, conflicts also generate information, thus, efficient conflict-solving mechanisms can contribute to achieving long-lasting agreements (Ostrom and Parks, 1999). On the other hand, multiple decision-makers are expected to better self-coordinate if they are not disturbed by a central actor (Aligică and Tarko, 2012). This reflects Ostrom (1972), who stated that polycentric systems are only efficient if administrative units fit the effect scales of diverse public goods, if cooperative agreements among administrative units are developed for joint activities and if agreements are available for decision-making to solve conflicts. Informal mechanisms may support scale adjustment for achieving fit between administrative units and effect scales – in monocentric as well as polycentric systems (Ostrom et al., 1961), but the finding of optimal solutions is in no case guaranteed (Ostrom and Parks, 1999).

More centralised systems are expected to face the problem of worse compliance and implementation of decisions (Schlüter et al., 2010). These systems would become victims of their own bureaucratic structures and complex communication channels; control costs would rise to an extent that systems become inefficient and these systems would not be able to adapt to local needs (Ostrom et al., 1961). In contrast, polycentric systems would have the advantage of low control-costs and could better adapt to problems of different scales and local needs (Ostrom and Parks, 1999; Huitema et al., 2009). However, polycentric systems would also be likely to miss scale-effects, if the decision-making units are very small (Huitema et al., 2009), and would not govern in the interest of the wider public (Aligică and Tarko, 2012).

Further, public participation would be more difficult to be organised in polycentric governance systems, because a central actor could more easily provide feedback to the public. Similarly, management experiments would face more difficulties if organised in polycentric governance systems. However, due to the multiplicity of actors more experimenting with new approaches and learning is expected in polycentric systems. (Huitema et al., 2009)

All these advantages and disadvantages can be traced back to the basic characteristics of polycentric governance systems, multiplicity of decision-making centres and independence, and overlapping. If multiple decision-makers exercise their autonomy, they likely choose more or less different approaches – to basic strategies (efficiency, compliance, management experiments), but also to interactions (coordination to adjust fit and to achieve scale-effects, cooperation agreements, conflict solutions) and in terms on what incentives they react (all other aspects and learning). Overlapping

allows redundancy in decision-making (doubling, counterproductive activities) and taking over tasks from other decision-makers (mistake correction). The effects might be evaluated as good or bad – for single decision-makers, as well as a sum effect. Any kind of external influence, such as central prescriptions, is likely to change the decision-making base of every single actor positively or negatively – again with individual and sum effects. What changes is that this influence is not based on the knowledge of local decision-makers, even when included initially. This knowledge might get lost through considering multiple localities, through differing interpretations along the long communication channels and through the reaction time that gets longer through complex communication.

Hence, it is not surprising that this study found examples of most of the named advantages and disadvantages. What differed was the relative frequency of such examples – whether it could be identified rather as a pattern or an exemption:

- Across and within the states, varying approaches locally and at the steering level – implicit **experimenting** – were found. As expected explicit management experiments were the exemption, but also existing, e.g. the water alliances (see steering instruments in section 5.1.1) and other pilot projects. Due to the difficulty to conduct, or enforce, such experiments, the participation was voluntary. Despite the many experiments which provided a basis for **learning**, the experiences were rather scantly used for learning cross-locally, especially regarding governance issues. This appraisal considers the existence of and participation in exchange processes which was marginal compared to the overall number of decision-makers. The written documentation, papers and reports, that could also provide the basis for learning, elaborated rather technical or biological topics, and sometimes participatory processes.
- A majority of the analysed decision-making centres worked within the **scales** that were defined by their territorial responsibility. This means they worked at very different scales. One scale effect is whether at least one person being responsible for water topics can be employed. The small-scale actors often had no staff for that. A few actors managed to adjust for scale effects by transferring tasks e.g. to umbrella organisations (see measure realisation in section 5.1.1).
- A majority of the analysed WFD addressees used a minimum to medium form of **coordination** and participation (see interactions/ processes in section 5.1.1). Those actors coordinating extensively or avoiding it completely were the exemption. A stronger form of **collaboration** was used in some of the analysed cases to overcome implementation barriers (see Bright spots paper). Nevertheless, only a few actors could be found where **cooperation** was institutionalised beyond single projects and is thus more long-lasting. Overall, this picture shows that the WFD addressees followed the prescriptions of higher levels which require plan approval procedures for most of the WFD projects. Coordination was found being intensified when more conflicts were anticipated for achieving the plan approval. However, it is debatable whether these established plan approval procedures can be considered to be successful **conflict-solving mechanisms**. Interests are weighed up against each other, but if win-win solutions are not found in these processes, the protection of the status quo is likely weighed higher. This causes WFD projects to fail.
- The **doubling of activities** could be observed regarding plans, concepts and public participation concerning the same river. They are, though, of varying detail due to different levels of abstraction (see section 5.1.2). Counterproductive activities are thinkable when WFD addressees do not coordinate their activities. A lack of horizontal coordination among WFD addressees was found (see Integration paper and section 5.1.1 Interaction/ processes). It is, though, outside the focus of

this study to evaluate whether WFD activities were actually counterproductive for achieving the good status (activities of other sectors were reported to be counterproductive). In contrast, **taking over tasks** was found to be possible but rather the exemption (see competencies in section 5.1.1). By design, true redundancy was avoided by defining responsibilities (for maintenance and approvals), probably due to the general disreputability of redundancy. Taking over tasks rather happened across levels and was based on the active use of discretion.

- As measured by the progress in measure realisation and goal achievement widespread **non-compliance** can be observed in these polycentric systems. However, also exceptionally engaged individuals could be found, who try to realise WFD measures against all pushbacks. Control instruments for the realisation of hydromorphology measures have not been established. Even no duty was codified because of the anticipated problems of arguing for a responsibility (see voluntariness principle in section 5.1.1). Therefore, there are no **control costs**, but probably they would be high. Despite there being no actual duty, in a few cases, the steering level tried to increase the perceived responsibility (and their own knowledge about the progress) by establishing soft control instruments: Saxonian counties were expected to report the planning progress in the regional working groups [O4] and WFD addressees of North-Rhine-Westphalia were expected to insert measures in WFD measure overviews which they plan or deem to be necessary ([O9], MUNLV des Landes Nordrhein-Westfalen, 2018).

Regarding WFD implementation, overall, the system perspective shows that the possible advantages of polycentric governance systems have been overestimated. In other words, the exercise of autonomy led automatically to the adoption of different approaches – ongoing experimentation can be expected in polycentric governance systems (Carlisle and Gruby, 2017); however, the analysed systems did not provide sufficient incentives for realising the advantages of polycentric systems – for encompassing coordination, cooperation, taking over tasks and learning.

Noticeable is also that problems of non-compliance and control-costs could be observed which are associated with centralised systems in the performance debate. The statements about centralised and polycentric systems seem to assume ideal poles of systems. Statements on centralised systems somehow ignore that large systems, even when centralised, need a division of labour, and that not all kinds of tasks (or most of them) can be prescribed down to the last detail. This leaves room for interpretation. Always some sort of discretion (independence) is left to the actual implementer who thus can become an actor with decision-making power. Therefore, most implementation systems are to some degree polycentric and need to cope with that phenomenon.

Further, those who expect lower control costs in polycentric systems probably assume that a central goal aligns with the goals of (local) implementers or that there are no central goals (whose implementation needs to be controlled). However, it is in the nature of our societies to set goals centrally (by democratic institutions) which are (by democratic legitimisation) in the interest of the wider public – especially in environmental protection. It is also known, that these goals do not necessarily align with local interests. Regarding WFD implementation, local goals and needs often do not align with the rather centrally set WFD goals (or the measures that are necessary to achieve the goals).

Policy implementation systems need to be conceived as polycentric systems with centralised goal-setting – centralised in the sense that the goal-setting is disconnected from implementation and that goals are set by higher levels than where the goals shall be implemented. What differs among policies

and systems is the degree of independence, higher or lower, in decision-making which relates to the kind and extent of decisions, necessary resources and veto-power by other actors. The independence is influenced by the implementation arrangements and thus by design decisions of multiple levels.

Decisions concerning what parts of a system should be designed should consider the potential advantages and disadvantages of polycentric governance systems. What does that mean? It should not only be asked how a particular group of actors could be incentivised to implement particular measures but also how it could be made possible for unexpected actors to take over tasks if they are motivated to do so. How could local goals and needs be aligned with central goals? It should also be thought unconventionally: e.g., funding the construction of kindergartens when WFD measures are implemented (conventional would be, e.g., the coupling of WFD measures with flood protection and nature conservation). How could cooperation be incentivised and fostered making actors increasingly use of cooperative advantages? How could exchange formats be established or offered and actors incentivised to use them, learn from them and be supported to adjust the system based on that learning? How can coordination be incentivised and prescribed – improved and extended compared to now? What aspects need prescriptions (control and sanctioning) and what aspects need flexibility? All those questions cannot necessarily be answered before a policy is to be implemented. Therefore, the functioning of the implementation arrangement needs to be observed and adjusted over time.

In general, this study showed that some arrangements by design influenced incentives positively, but also precluded commitment, experimenting and taking over tasks if independence was reduced inappropriately.

5.2 Design, fortuity and independence in decision-making

In the Netherlands, "the implementation of the Water Framework Directive (…) as well as other EU environmental directives, has led to a Gordian knot of legal and administrative procedures, especially when looking at the implementation at the local or regional level. Choices about local and regional developments need to be made, but each actor is waiting on someone else (…)."

(Beunen et al., 2009: 66)

For developing thoughts about improving WFD/ policy implementation it is important to know what role design plays in creating order in the sum of implementation processes because improving implementation from a governance perspective requires (re)designing governance structures: Which of the observed and described implementation patterns here are a result of (central) design? And, what can be (re)designed?

5.2.1 What was designed?

Changing a system purposefully requires knowing what causes the various actual patterns. However, the systems' complexity limits tracing back patterns to single institutions or unravelling the sum effects of institutions clearly:

The organisational structures, mainly water maintenance actors, were found to influence the staff number for WFD planning (e.g. for planning measures, 'bureaucracy', court procedures), the staff's know-how (e.g. pre-planning for funding applications, contracting processes, knowledge on synergy potentials) and the financial power (e.g. for co-payments) and the risk propensity (e.g. liquid resources for pre-financing), but also the availability of own land, access to public land, possible mechanisms to make land available (buying, swapping, plot realignment), the flexibility on the land market (readiness, paying market prices) and the recognition of an actor in the region (that land is offered). They also

affect how the political will to realise measures might be influenced (in municipalities the political will might be influenced by citizen movements positively or negatively) and what discretion an individual planner has in setting priorities. Some organisations' internal habits/ conventions drive how a WFD planner approaches public participation, sector integration or any cooperation in a project.

Thus, several implementation barriers or patterns were found more regularly linked to some organisation/ actor types. However, organisations' internal structures and relational structures varied also within types (as used here in Table 4): Municipalities, for example, although belonging to the same type varied in size and department layouts (task combinations and separations), and some associations transferred tasks to umbrella organisations by institutionalised collaboration with other associations (see section 5.1.1). Thus, the organisational type is only one proxy to assess the conditions under which WFD measure realisation decisions are taken. Hence, what measure can be regarded as feasible for an actor does not only vary across organisational types but also within, hampering the steering level to tailor steering instruments to policy addressees – the higher the multiplicity of actors the more difficult.

The patterns of implementation barriers can be traced back to higher-level or earlier decisions concerning especially the design of funding programs and other laws and regulations, as well as decisions of not changing the system (e.g. no special access to land or additional actors only being responsible for WFD implementation). Thus, the voluntariness principle caused that the motivation to act was actually very much up to individuals, their incentives for action and non-action and local context, and thus up to fortuity instead of designed implementation arrangements.

While the influence on basic implementation conditions could be traced back to particular institutions, none of the institutions alone provided sufficient power to explain the actions of local-level actors. A huge diversity of approaches regarding coordinating with whom, when and how, regarding using collaboration, coping with barriers, public participation and using discretion could be observed. Among the reasons that interviewees provided for their decision-making are those which can be categorised as constituting the institutional setting and those which are up to fortuity (in the sense of less designed factors):

- The latter comprises individual reasons for motivation (e.g. interest in angling), the choice or avoidance of cooperation partners due to physical proximity (cooperation with known individuals or due to personal ties) or personal sympathies and antipathies, the participation in processes due to physical proximity, reasons unrelated to processes (known persons, change in employment) or habituality (persons who were initially invited for different reasons and continued to participate), personal habits, two offices held by one person simultaneously, and occasions of getting the ball rolling (e.g. flood events, citizen movements).
- The former comprises formal and informal rules resulting from laws, regulations, organisational structures, conventions and so on.

Although single institutions did not qualify as explanatory, in sum the identified institutions created dependencies and independencies which could qualify as explanatory for actions, if combined with fortuity factors, as analysed in the example of collaboration between WFD planners and nature conservation authorities (see Bright spots paper). In this setting, fortuity factors created physical proximity between collaborators (e.g. due to former employments of individuals or offices close to each other), while collaborators were, caused by the institutional setting, less independent in their goal achievement. This combination supported that collaborators found each other and incentivised

collaboration through its benefits for both actors. Further research would be necessary to verify this causal relationship and to detect further relationships.

5.2.2 What could be designed?

The observed complexity of institutional and fortuity factors and implementation patterns not only impedes the identification of causalities regarding what was designed and what could be designed. Therefore, I roughly unravelled how the mentioned institutions structured WFD implementation, and when and by whom these institutions were established in order to assess what could be designed to change implementation patterns.

The literature on institutions groups rules along their characteristics (formal/ informal, in-use/ on-paper), their origin or level of effects (operational/ collective/ constitutional (Kiser and Ostrom, 2000)) or their admissibility (demanding/ allowing/ prohibiting action). Further, Ostrom proposed eight design principles which concern the functioning of rules and which characterise the management of robust common pool resources: Well-defined boundaries, congruence between appropriation and provision rules and local conditions, collective-choice arrangements, monitoring, graduated sanctions, conflict-resolution mechanisms, minimum recognition of rights to organise and nested enterprises (Ostrom, 1999; Cox et al., 2010). I, though, attempted to group the identified institutions according to how these institutions pre-structure WFD implementation processes. Imagining a societal map like a game or traffic system, I categorised institutions as providing directions to actors or defining a (starting) position for each actor and providing relations between actors. Thus, institutions structure which vehicles (and size) are used, which routes are allowed to be taken, what are destinations and which destinations are accessible (on streets or off-street or for what vehicle), and who has the right of way. Like a traffic system institutions structure, but do not determine individual actions. I categorised the different types of rules in the following (see Figure 11):

- Positioning structures:
    - Roles
    - Responsibility rules
    - Choice rules
    - Resource rules
- Relating structures:
    - Hierarchy rules
    - Competition rules
    - Coordination rules
    - Conflict-solving rules
- Directing structures:
    - Goal setting rules
    - Procedural rules (without relating rules)

Table 5 compiles the institutions which were most often mentioned to influence interviewees' decision-making on WFD measures and categorises them according to their structuring function and the time when these rules were established (prior to the WFD or due to the WFD; independent of the WFD means that there might have been significant changes to rules throughout WFD implementation).

Interestingly, through the WFD new directing structures (environmental goals) were added to the system, but the relating structures stayed unchanged (within the water sector (Fichter and Moss, 2004) and between the WFD goals and other sectors' goals). Meanwhile positioning structures are partially

addressed according to the new directions: The higher-level authorities tried to influence, redesign, the conditions provided by existing organisational structures, however without changing the actual structures. The authorities tried to do so through the described steering instruments (funding schemes, advisors, partially funding staff), but also other actors partially took over some of these steering tasks (see section 5.1.1).

Table 5 Structuring institutions

Structuring institutions	**Time horizon**
Directing structures	
WFD/ Germany/ state's water laws	Due to WFD
Nature conservation law	Prior to WFD/ independent of WFD
Other environmental laws	Prior to WFD/ independent of WFD
Agricultural policy	Prior to WFD/ independent of WFD
Plan approval procedures	Prior to WFD
Spatial planning	Prior to WFD/ independent of WFD
Positioning structures	
State's communication: voluntariness principle	Due to WFD (changing throughout implementation)
Water maintenance actors: rules on organisational type, responsibilities, funding (basis partially regulated by state, but internally adjusted)	Prior to WFD
State's funding schemes and advisors addressing water maintenance actors	Due to WFD
Relating structures	
Water maintenance actors: internal hierarchies and internal relations between members, agriculture and nature conservation (variations in organisational structures)	Prior to WFD
Informal beyond formal rules (water law): definition of maintenance vs. construction (interpreted by maintenance actors as well as lower water authorities)	independent of WFD/ discretion
Land access for flood protection	Prior to WFD
Nature compensation law and regulations: e.g. compensation conditions for measures which destroy nature	Prior to WFD/ independent of WFD

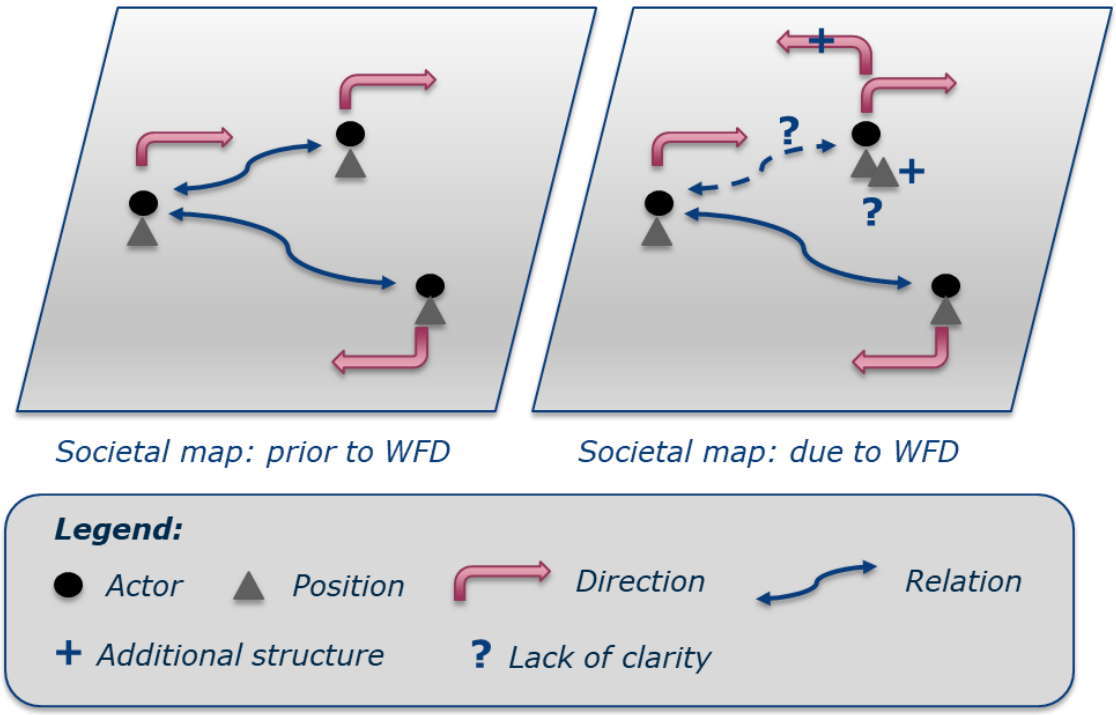


Figure 11 Structural change of the societal map due to WFD-related institutions (own depiction)

Institutions which were found here to be changed due to the WFD either needed only the agreement of a few other actors (e.g. funding schemes), or are goals which usually find social consensus as long as conflicting interests do not need to be weighed up against each other (e.g. cooperative implementation style: voluntariness principle, participatory processes without internal decision-making), or were pushed by obligations causing sanctions (e.g. transposition into national law, establishing RBMPs and PoMs). Only Thuringia fostered, centrally, larger changes in organisational structures from 2020 by establishing water maintenance associations by law. In sum, institutions with vincible opposition have been changed.

Organisational structures also changed over time, often prior to the WFD though. This change was driven by local actors attempting to improve their abilities to fulfil, e.g., water maintenance tasks. These local adjustments of structures led to incredible variations in implementation arrangements and caused the path-dependency in local-level policy implementation.

The aforementioned remarks already indicate it: the mentioned rules and structures were crafted at different levels, from the federal government over states, counties and municipalities down to organisations. Thus, it could be asked what designing a system means. The decision to assign tasks of a nature conservation authority and water maintenance to a single person (personal union), as well as the decision on how to regulate funding options, both, contribute to shape the overall governance structures. However, for sure, only parts of the system could be called to be designed centrally. Actors do not only use their discretion in making use of institutions but also in crafting them.

Hence, changing responsibilities and organisational structures centrally is a question of power and if successful also changes power relationships (Morrison et al., 2019). Therefore, changing the institutions, which shape WFD governance structures and which stayed unchanged so far, would have

caused more opposition and usually requires political willingness at several levels and opportunities for change.

Despite power, design is also a matter of knowledge. On the one hand, variations which result from local adjustments of structures and rules cannot all be known by a central designer. Thus, newly launched funding programs met different pre-conditions but were expected to set everywhere sufficient incentives for measure realisation. On the other hand, there is an incredible number of variances considering that several adjustments persist also if other parts of the institutional setting are newly or re-designed. Even if all the variances could be captured by a central designer, it would need to much capacities to craft institutions to that detail. Or, rules could be expected to be inefficiently used locally (when actors try to identify their specific case).

Additionally, (re)designing all institutions, that are relevant for implementing one policy, at once would go beyond the capacities of our democratic structures. And, usually, our democratic systems need to decide upon several societal goals processing several policies in parallel.

Hence, due to the limited power, knowledge and capacities, only single institutions were and realistically could be (re)designed since the WFD was put into force. Every change to the system leaves uncertainty about its effect on the overall policy implementation due to the overall, described complexity. Every change may cause increasing implementation efforts for some actors and decreasing efforts for others. Therefore, the sum effects of the institutions in place would need to be assessed repeatedly, also statistically, to provide the basis for accelerating incremental but tailored adjustments to a system's design. No such encompassing effort could be identified throughout this study.

5.3 Improving WFD implementation?

"*Having a deadline for attaining the policy objective of good status is important, but even more essential is to have a permanent framework for river basin management that addresses the delays in implementation of measures*."

(Carvalho et al., 2019: 1229)

How to improve WFD implementation is, based on the findings of this study, a difficult question. In the following, the study findings are used to discuss this question by distinguishing a theoretical and a practical ideal implementation system. The overall insights, in turn, are used to suggest and discuss a cyclical approach to improve the governance structures.

At the end of 2022, four additional interviews were conducted with actors who were, based on their actual and former positions and long-lasting experience, expected to have an overview of different systems within or beyond Germany: through working in state ministries (2) of states which were not covered before, the federal ministry (1) or a river basin community (1) which covered further states; through being a member of the LAWA (2) and other exchange and cooperation formats; and through working on WFD topics for many years. These additional interviews were conducted to refresh, discuss and reflect on the study results. Interviewees were asked for their opinions regarding ideal implementation arrangements and a cyclical approach to reduce implementation deficits. Further, they were asked how they would adjust implementation arrangements to make them more adaptive, whether experimenting and learning mechanisms would improve WFD implementation, and what would support systems in accelerating adjustments of implementation arrangements to accelerate the minimisation of implementation deficits. To keep interview statements anonymised despite the prominent position of these interviewees, the interview numbers (see Annexe 9.1 table on additional

interviews) were not linked to the information on the organisation and department of interviewees: Thus, the interview numbers signal what information was provided by the same person, but not which person of these four it was who provided the information. The interviews were conducted in German and statements have been roughly translated.

5.3.1 Governance in the practitioners' spotlight

37,7 %[16] of respondents in a survey among scientists and practitioners across the EU deemed it important to improve governance organisation (Zingraff-Hamed et al., 2020). In the EU Commission's implementation report (2019a) 71 river basin districts (50%) reported governance to be an obstacle to the implementation of measures identified in the first PoM, 54 river basin districts mentioned governance to be an obstacle for the second cycle, but none in Germany (European Commission, 2021). While interviewees provided several ideas to improve governance (of varying depth) when explicitly asked, governance issues, so far, played only partially a role in the various assessments in Germany: A) the participatory and exchange processes in the states, B) the WFD fitness check process of the EU, C) suggestions by the LAWA and D) the National Water Strategy.

The interviewees could provide numerous ideas to cope with the identified implementation barriers, and to optimise the implementation conditions. These were more or less tangible and usually only addressed single aspects, such as reducing bureaucracy in funding application processes or changing eligibility criteria. Some suggestions were too unspecific: 'More money', for example, leaves open whether a funding program needs to be stockpiled to allow more applications, the amount available for a single project, or the resources of a WFD addressee to pay co-payments or to pre-finance a project. Suggestions were comparably easily formulated because these ideas did not consider interaction effects in systems.

A) Exchange is generally possible in every process which brings multiple actors together, this study found a plurality of processes as described above. However, only a few process formats are purposed explicitly to allow exchange among water sector professionals, and rarely about governance structures (for details see chapter 5.1.1). Water neighbourhoods (not existing in all states) at least discussed the application of regulations. If they had, though, also discussed the options for changing higher-level parts of governance structures (no more detailed data on water neighbourhoods were gathered throughout this study), there would have been no strong links to feed considerations into higher-level decision-making. Although higher-level participatory processes (e.g. advisory councils and fora) seem theoretically an appropriate arena[17] to discuss the design of new instruments and legal acts, they were more often found intending to spread information about already launched institutions (see Process-system links paper). Thus, the exchange on governance structures was limited. However, it could be concluded that more professional exchange is necessary because open participatory process formats were especially attractive for actors from the water sector (in contrast to other stakeholders), because of expectations actors had from participating (Schröder, 2022) and because of questions which came up during processes, e.g. on the possibilities to change structures and the proceeding in other states [O9].

[16] Further aspects were ranked higher which also relate to governance. These were integration, cooperation and participation.

[17] In contrast to lower-level processes, higher-level participatory processes can be less measure-oriented due to their large scope. Their participants, especially representatives form interest associations, could better contribute knowledge about the general interests of their constituencies than 'local' or 'measure-specific' knowledge (see also Schröder (2022)).

B) The European Commission (2017) launched the fitness check of the WFD in October 2017 – an evaluation which is foreseen by the WFD itself (§19 (2)) 19 years after it was put into force. This evaluation assessed the directive's performance regarding its effectiveness, efficiency, coherence, relevance and EU added value (European Commission, 2019c).

- In the context of this fitness check various German and European actors, especially interest associations, published position papers discussing whether to re-open the legislative process of the WFD. These position papers focus on prescriptions of the WFD itself, interactions and the harmonisation with numerous other EU policies and some federal government policies. WFD aims need to be considered by other sectors to avoid inconsistencies and implementation and enforcement deficits (Schröder, 2019). The position papers rarely address the levels of the federal states and below. However, if so they stay vague: Many positions demand more staff and financial resources without specifying where and how, or, they mention only authorities but no other actors. They demand political will without specifying how, or where this should be shown. The RBMPs and PoMs should be strengthened as conceptual instruments for water development. All measures including who will implement them should be determined. However, the positions do not recognise the underlying governance structures leading to the separation between plans and implementation. A few positions explicitly demand changes in governance structures: For example, the authority structures would not fit the river basin management approach. The task distribution among political and administrative levels would lead to slow and non-transparent communication and decision-making processes. The expert knowledge would need to be developed in parallel with different authorities. Information and control instruments would be missing. The current governance structures should be reviewed. Overall, lower-level governance questions are captured insufficiently for actually addressing them systematically at the 'implementation level' which contrasts the policy 'design level' (although governance structures at lower levels are also designed but not centrally).
- The Commission itself concluded the fitness check at the end of 2019 stating that the deterioration of the water status was successfully slowed down, but that "no substantial progress in water bodies' overall status has been made". The Commission acknowledged that the integration of water policies in other policy areas had not happened at the necessary scale and that establishing a governance framework proved to be more difficult. The approaches taken by the member states would not be based on the pressures and impact analysis, monitoring data and integrative processes, but on easy technological fixes, budgets and policies already in place. Furthermore, the need for location-specific measures limits the enforceability, as well as "holding Member States accountable for the insufficient ambition of their water policy". Hence, the importance of rather local governance structures is seen. (European Commission, 2019c: 1, 2)

C) The LAWA also recognised, in October 2018, governance-related implementation barriers which were, however, only partially taken in the suggestions that the LAWA was asked to provide to the 91st Conference of Environmental Ministers of the federal states (LAWA, 2018b). The LAWA mentioned that it needs sufficient staff and financial resources at all levels and suggested adjusting several laws and regulations of the EU and the federal government. With the right of pre-emption, the funding of land acquisition and the land policy options of the states the LAWA suggested rather soft instruments to enlarge land access for realising measures. Overall, the barriers of conflicting interests, the influence of particular water uses and the time needed for realising a measure could be partially diminished through the suggestions made. A more of staff resources might diminish the problem of long-lasting

plan approvals and court decisions, but only partially, because no priority of the WFD was suggested. Thus, interests still would need to be weighed up against each other. The suggestions did not tackle the core of the actual governance structures as only the rise of motivation and acceptance of WFD addressees was suggested, but not a reorganisation of the task distribution.

D) In parallel to the fitness check of the EU, in Germany the Federal Environment Ministry started in October 2018 the National Water Dialogue with more than 300 participants[18] from the water sector, agriculture, associations, science, states and municipalities (BMUV, 2023b). The National Water Dialogue found the basis for the National Water Strategy which was finalised by the cabinet on 15th March 2023 (BMUV, 2023a). The strategy paper contains 78 actions related to 10 strategic topics (BMUV, 2023a). It describes the problems in more detail than the LAWA paper and expresses visions and challenges, but not all the problems and visions of the topics are translated into actions in the action program (e.g. integration in other sectors, clear and transparent priorities and assignments of responsibilities, the adjustment of principles of operation, exchange and learning across state boundaries, the evaluation of financial instruments). The actions regarding staff resources (no. 59) and land availability/ spatial planning (no. 8, 9, 21) are more detailed or complement one another with the LAWA suggestions. The water-related issues in other legal acts (no. 57) contain mainly other topics than those mentioned by the LAWA and are more related to legal acts from the water sector than other sectors. An overview, regarding how encompassing the interrelations among the various legal acts for implementation success are, might be provided by a combination of the position papers, the EU fitness check, the LAWA suggestions and the strategy. However, this overview would still miss various legal acts of other sectors below the state level. In sum, roughly six actions (out of 78) may contribute to adjusting the actual governance structures through adjusting legal acts and spatial planning and through supporting the establishing of administrative centres of competencies (no. 59) and fostering the inter-municipal collaboration (no. 58). Two more, on offering training for municipal decision-makers and maintenance actors (no. 65, 68), address the lack of know-how within the given structures which resulted from choosing the actual organisational structures.

Although governance structures played a rather minor role in the assessments of WFD implementation in the beginning, it seemed to get increased attendance more recently. Further, it needs even more attendance at all levels to improve implementation – also at and below the state level. This was neglected by the analysed assessments probably because of it being in the responsibility of other levels (see Box 1 in the following section on the tension to formulate tasks for other levels).

5.3.2 The ideal system…

… does not exist, cannot exist, is difficult to be identified and could not be centrally established.

Considering the identified implementation barriers, a **theoretical ideal** WFD implementation system in Germany needs to be characterised at least by the following aspects:

1) A sufficient number of actors, who feel responsible to realise measures and who actually realise measures
2) Sufficient financial resources for each of these actors to take necessary measures
3) Knowledge of what necessary measures are and how these measures are properly realised

[18] 19th November 2020 I contributed one out of two presentations to the online expert talk on governance and funding questions in the water sector: https://www.fresh-thoughts.eu/events/fachgesprach-governance-und-finanzierungsfragen-in-der-wasserwirtschaft/ (see also Annexe I 9.4).

4) Access to land resources to the necessary extent
5) Suitable participatory processes for solving interest conflicts to the greatest possible extent and for using synergies
6) Priority for WFD aims in case of irresolvable interest conflicts to the extent that the WFD is not allowing exemptions.

The additional interviewees basically agreed and suggested adding points to the list. First, an ideal implementation would need horizontal cross-sectoral strategies, e.g. the active use of synergies with species and climate protection [AI1], the passing of sectoral thinking [AI4], and vertical integration namely that state strategies fit into national strategies, e.g. how the strategy Wadden Sea 2100 relates to strategies fostering nature conservation, coastal protection or biosphere reserves [AI1]. It would need an intensified dialogue between the states and the federal government so that states could prematurely adjust their strategies to national strategies [AI1]. The use of synergies may contribute to a more of implementation and only a priority of WFD aims to full implementation. Meanwhile, strategies, which usually frame the instruments and rules which need to be developed, may (or should) contribute to achieving the formulated six ideal conditions, but are not a condition in itself.

Second, it would need more staff in authorities and bodies governed by public law [AI3], and, the WFD task needs to be internalised not only by the water sector but also by other policy sectors, such as agriculture, transport and urban development [AI4]. These amendments specify condition one, which is closely linked to the debates on assigning responsibilities and the voluntariness principle (see Box 1).

Overall, the listed aspects reflect a local-level, WFD-focussed perspective. Taking a system perspective, there are three aspects to be considered to increase the overall effectiveness of WFD implementation governance: First, interest conflicts need to be solved. Local priority setting allows the finding of local synergies in a way that multiple interests can be met. However, this often happens at the cost that less optimal measures regarding WFD aims are realised. Thus, an implementation deficit is conceivable. In contrast, a central priority setting might significantly reduce implementation deficits of the prioritised policy at the cost of other policies and local, synergistic solutions because of a less flexible institutional setting. Second, serious participation (in contrast to information) includes the realisation of compromises and, thus, in sum, less than optimal measures regarding one policy aim because win-win-win solutions are scarce. The picture, though, might look different, if various actors participate in decisions concerning implementation arrangements. Third, enforcing an implementation duty and installing staff may generate working routines in a way that less individual motivation is necessary to realise WFD measures everywhere. Nevertheless, it is also likely that some of those actors who are actually active would be less motivated in a less flexible institutional setting due to reduced synergistic options or controls and sanctioning. Hence, from a system's perspective, the theoretical ideal is a political decision on priorities: WFD vs. other goals, democratic values vs. ecological necessities and the sum effects of different incentive systems compared to each other and vs. their feasibility.

Box 1 Excursus on duty, voluntariness and assigning responsibilities

Although not explicitly mentioned as an amendment to the list of ideal conditions, assigning responsibilities as a topic suggested itself repeatedly throughout the interviews (the question should be 'who is responsible' [AI2]). The topic is debatable. I avoided framing condition one as the necessity to assign responsibilities. Basically, it is only necessary that any actor fulfils the task no matter who. Those researchers, who consider polycentricity to be normatively good, name taking over tasks from other actors without being responsible as one advantage of polycentric systems (see section 5.1.3) – a self-regulation function of systems. The interviewees, in contrast, see advantages in assigning responsibilities and sectoral divisions [AI4, AI2, AI3[19]], such as that the assigned actors also feel responsible for appealing[20] in case of missing the capacities (e.g. knowledge) to fulfil the assigned duties [AI4]. The necessity for assigning duties was emphasised although assignments were also often used to repel responsibility and caused difficulties if action needed to go beyond responsibilities [AI4]. Further, although leading actors, or each sector, would develop (departmental) egoisms [AI2, AI1]. Assignments would foster sectoral thinking about what needs to be overcome [AI4, AI1] for WFD implementation.

The interviewees emphasised that responsibilities need to be assigned [AI3, AI2, AI4] in a cascade [AI2] or to municipalities [AI3]. From the EU perspective, a member state is responsible for ensuring the goal achievement, thus the federal government could be tried in case of non-achievement [AI2, AI4]. Due to the federal structure of Germany, though, this level refuses the responsibility [AI3] and the state ministries have been reported to the EU to be responsible. Furthermore, municipalities were not considered to be the state but would be responsible as well [AI2], what needs to be clarified [AI3].

There is a financial tension between the three levels due to the responsibility question: Strategy implementation would be easier if the federal government could endow action programmes with financial resources, elsewise the states may face problems in implementing these actions [AI1]. Similarly, municipalities have their rights and duties – additional duties can only be assigned, if additional financial resources are provided adequately [AI1]. So far, the responsibility of municipalities and other WFD addresses was not assigned by law (voluntariness principle), and, the basic interviews showed that merely neither WFD addressees nor state authorities felt officially responsible for realising measures.

Although the federal structures cause that the actors need to arrange with each other regularly ('*sich regelmäßig zusammenraufen müssen'*) [AI1], assigning responsibilities does not mean here changing the overall centrality or decentrality of the given federal structures: The implementation would live from the decentral structure [AI1]. Nobody should be relieved from the obligation by concentrating tasks because actors need to identify themselves with measures [AI3]. Powerful offices of the river basin communities could take over tasks, but establishing authorities for each river basin community is hampered by Germany's federal structure [AI3]. Doing so would require changing the German constitution [AI3]. However, it is also doubted that doing so would significantly change the implementation situation: France has central agencies and decisions take very long [AI3]. Furthermore, ceasing the voluntariness principle would not bring change to the situation of resources [AI3] of which much more is needed [AI3, AI4].

While it is possible to derive a theoretical ideal from the identified implementation barriers, identifying a **practical ideal** of specific governance structures is much more difficult, if not impossible. The same

[19] The money follows the task [AI3].
[20] It was left open who would be appealed.

institutional setting has different effects on different individuals as found in this study. Even a project that worked once in a region, was not repeatable [AI4]. Further, there are no two systems in the world that look alike because all context and fortuity factors meet one another [AI2] including other policies, which also change over time[21]. Hence, a system would rarely meet perfect conditions for all relevant actors at all times. Trying to cover numerous local conditions would require tremendous knowledge, as well as capacities to cast this in an institution, or, to make use of such institutions. Neither the knowledge about the systems functioning nor the actors' capacities are so extensive.

Considering the variances of how the given implementation arrangements are used by individuals in making use of their independence – their discretion in the given institutional setting, I need to conclude that a practical ideal does not exist [AI3] and that systems can only be optimised as best possible.

The analysis showed which of the identified patterns were caused by design and what could be designed by whom. Further, it was stated how difficult it is to explain to citizens that THE state is not acting in concert [AI4]. Similarly, factors had been identified but nothing changed because of staying the second winner [AI2]. These statements also reflect the limit of design [AI4]. They question also who would have the authority to act on a suggestion and who would develop ideas [AI4]. Change, further, depends on the power situation [AI2]. In contrast, the example of a water protection advisory service was mentioned, which the ministry centrally designed and bureaus implement by counselling farmers regarding fertilisation management [AI1]. Similar programs were criticised to paint agricultural activities green just because counsellors were established [AI2]. This counselling includes much fewer actor-types, institutions and potential interest conflicts than for realising hydromorphology measures. The decision for or against a measure, here a different fertilisation management, though, similarly depends on the local actor, here the farmer. The decision depends only to a small extent on central design and some more on the persuasive power of the individual counsellor who is also independent in his counselling strategy.

The analysis as well as these statements reveal the limits of designing a whole system centrally – limits which are caused by a necessity for task distribution (not only for realising measures but also for creating rules and instruments) and more or less independence of each actor in making use of the institutional setting. Hence, also if we knew our practical ideal governance structure, the multiplicity and independence of actors in polycentric systems would make it difficult to adjust governance structures based on a single idea or a central actor.

5.3.3 A cyclical approach to governance

Systems change over time through changes in the policy implementation in focus, other policies, changed interests and new findings (the continuous detection of new factors [AI2]). In such dynamic systems, also, any kind of ideal and perceived necessities for change are snapshots which can, and do [AI3], change over time. Capacities and knowledge as well as central power are limited. Multiple actors use their discretion in applying rules (independence of actors). These issues also make clear that designing a system with a multiplicity of independent actors centrally, based on whatever idea (central or orchestrated design), is more than difficult. Hence, repeated incremental changes by multiple actors seem to be necessary for optimising institutional arrangements in order to diminish implementation deficits at their best. In other words, the whole system needs to continuously learn and adapt. Ideally,

[21] Polycentric systems can never be expected to settle upon a single policy or approach (Carlisle and Gruby, 2017).

the optimisation attempts by multiple actors would be concerted or coordinated (design towards a joint aim) instead of being only cumulative (design with a rather random sum effect).

Some of the suggestions, visions, challenges and actions of the LAWA and the National Water Strategy not only point out the necessity for particular adjustments of governance structures but also reflect the necessity for continuous learning and adaptation. They, however, are to varying degrees tangible (own accentuations set bold):

- Suggestion: Fostering **mutual exchange** - Best-practices-examples are to be communicated transparently and offensively **beyond** the existing **water sector**-related structures of the LAWA and the river basin communities. Experience exchange with other functional areas and sectors (e.g., agriculture) is to be organised and fostered. (LAWA, 2018b: own translation)
- Vision: "Integrated work methods have been adapted to the changed overall conditions and requirements. There is also **intensive dialogue** among the federal states on appropriate governance structures in joint working groups; this **enables mutual learning**." (Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and BMUV, 2023: 58)
- Challenge: "Due to increasing demands on and complexity within the water sector, it is likely that the legally defined **participatory processes** will **no longer be adequate** or will **start too late** to serve the stakeholders and the general public. All interest groups must be included early on and as actively as possible in policymaking, planning and project decisions and must be able to support project implementation." (Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and BMUV, 2023: 57)
- Action: "The existing **organisational and regulatory frameworks**, including financing instruments such as the GAK, will be evaluated to determine their **future viability** in order to ensure that the necessary duties can be carried out in all areas of the water sector." (Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and BMUV, 2023: 60)
- Action: "The federal, federal state and municipal levels conduct **ongoing reviews** of the compatibility and the need for adaptation of existing structures in their areas of responsibility. An **independent peer review** of the responsibility, cooperation and decision-making structures in the water sector is also advisable to serve as a **guide for the transformation process** in this sector. It could take the form of a **research project** jointly commissioned by the federal government and federal states." (Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and BMUV, 2023)

The vast variations of governance structures and implementation approaches found in this study result from the federal system and the independence of multiple actors. They already provide a basis for comparisons and learning from each other's experiences. This basis is complemented by a few explicit pilot projects (see 5.1.1 System components perspective, sections on steering instruments and competencies) and showcasing projects (see Schröder (2014)). The attempts of experimenting, exchanging and learning were, however, so far not very focused on governance, rather not cross-local/ state. Hence, these attempts were less supportive for learning from each other than they could. Also, the vast variations of structures have so far not extensively and systematically been used as a basis for learning and adjusting governance systems.

Multiple incremental adjustments may, in the long-run, lead to an optimisation of systems. Elections and lobbying may raise political awareness. The resulting change also contributes to optimising

systems. However, often the environment cannot wait for us – especially if points of no return are passed, such as the extinction of species. Therefore, the question is how to make systematic use of the basis for learning provided by polycentric systems and, so far, rather random experiments, or how to foster, accelerate and tailor incremental adjustments to achieve an optimum earlier.

Morrison et al. (2019) stated that every policy is an experiment. Going beyond that, I argue that every change of implementation arrangements is an experiment of policy implementation, because of the limits to fully forecasting a system's reaction. Hence, policy implementation should also be approached as an experiment. This means that a cyclical approach is not only needed for the ecological assessments and the determination of measures. A cyclical approach is also needed for assessing and adjusting governance structures – incremental by multiple levels, but as systematic as possible. An experiment tests various settings, documents and evaluates the results and, in a cyclical approach, adjusts settings, evaluates the results again and compares the settings and their results.

The following describes a suggestion of how the basis for learning on governance could be improved by understanding governance as a continuous experiment. This suggestion (see Figure 12) assumes that learning can be improved by generating knowledge about implementation arrangements more systematically and encompassing, through intensive exchange on implementation arrangements - perpetuated communication within levels and across levels and sectors - and through cyclical reassessments.

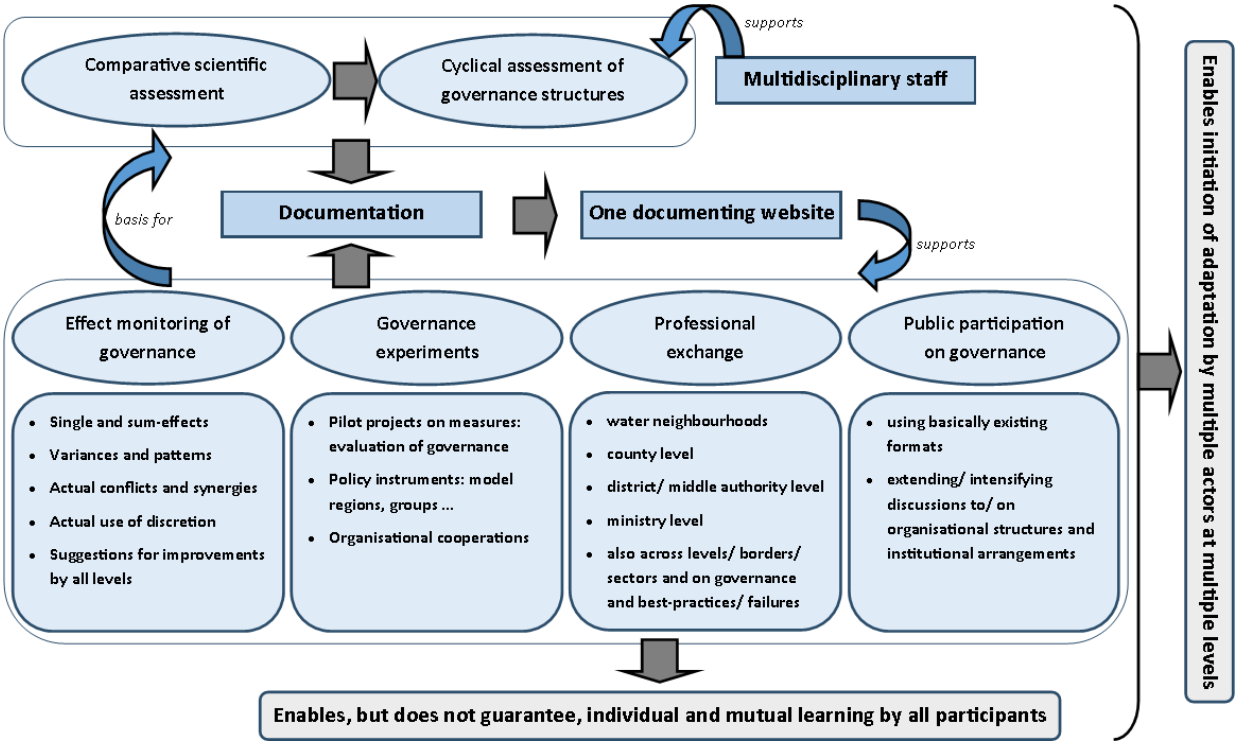


Figure 12 Suggestion to improve the basis for learning on implementation arrangements (own depiction)

The knowledge can be generated through **monitoring** characteristics and effects of implementation arrangements distinguishing the multiple differences: What are single effects of particular institutions and what are sum effects of institutional arrangements? Which - actual not theoretical - conflicts and synergies can be found most often? How is discretion most often used? Not only patterns in the sense of what happens most often are to be monitored, but also exemptions which may hint at improvement

options. Options for improvements in form of suggestions by all levels should also be gathered – not necessarily in the form of determined hearings, but in the form of a continuously open suggestion box.

Tailored **governance experiments** provide further approaches. They extend the existing attempts and add to the variances resulting from Germany's federal structure. The approaches can be assessed regarding their suitability to improve implementation. The experiments might, for example, test the effects of particular cooperations at the measure level, instruments in certain regions or for defined groups of actors, but not only with those who volunteer[22], or test the adjustment of organisational structures.

The **exchange among professionals** can be extended as such, as well as regarding governance issues. Hence, water neighbourhoods should be established everywhere and participation should not be an issue of membership payments (see section 5.1.1). Different levels have different aspects to exchange about (e.g. county-level regulations and instruments by ministries) and exchange across levels especially allows for discussing the interaction of institutions launched by various levels. The scope of exchange formats needs to consider functional aspects (e.g. within or across catchments) and the multiplicity of actors (a size which allows effective communication, a design which supports multiplication (see Multiplication paper)) equally. This may include nested (sub-groups during an event) and interconnected formats (delegating participants to other events).

The existing **participatory processes** already cover various levels but could intensify discussions on governance questions. Thus, these formats also allow the exchange between the water sector and other sectors on interactions, experiences with other policies and the mutual need for adjustment. Furthermore, participants in higher-level participatory processes (mainly representatives from interest associations) might better contribute to discussions and decisions on governance questions than ecological or technical questions.

All these different processes enable various actors at various levels to learn by generating a knowledge base about implementation arrangements and their effects. Especially the initial **system adjustments** when higher levels introduce a new policy, but also those following later should consider the multiplicity and independence of actors by observing the system and questioning:

- Which actors are interested in the implementation of a policy (and why?) and are up to become active themselves?
- Which actors are equipped with resources, know-how and/ or networks for implementation (or parts of it)?
- Those actors who are willing to become active might not be equipped with the necessary resources and so on: Which aspect is easier to be compensated for a majority of actors through policy instruments?
- Where is low discretion necessary and where is more discretion supportive for implementation?

Due to the systems' complexity, likely, answers to these questions are found during the implementation process rather than beforehand.

To save insights for later, cross-level and cross-state discussions and comparisons as well as discussions at other places, the **documentation** of the described processes through monitoring reports, project

[22] Conducting the experiments only with volunteers would be biased. Effects on actors which are not particularly engaged/ incentivised or on those which are rather opposing the central goal could not be estimated.

reports and meeting minutes are important. The documentation should encompass best practices but also failures and reasons for launching particular institutions and avoiding others. Essential is that all these documents are saved and accessible on **one website/ open database**. One instead of multiple (e.g., one by the federal government or a non-profit organisation instead of multiple by the federal states or small-scale actors) would make it easier for all actors to find it and to use it to compare implementation arrangements. Here, also suggestions for change can be published and sorted by topic.

The knowledge and ideas generated through the described processes can be used to **cyclically assess the governance**: organisational structures, instruments as well as goal conflicts of/ in policy implementation and processes. The multiple actors of a system may be understood as the investigators, who investigate governance, assess and discuss arrangements individually and in exchange formats (evaluation), and, adjust structures and settle conflicts within their scope. Adjustments are the starting point for the next experimental cycle.

Learning enables actors to initiate changes but also to recognise keys to adjust other parts of the system which lie outside of their area of influence. Especially the states and the federal government, but also lower-level actors, should use the assessments to develop and initiate adjustments within their competencies (when indicated also beyond their direct responsibilities). **Science** might amend and support assessments by directing the focus to particular aspects, by questioning assumptions and supporting openness in talking about success and failure. Additionally, teams with **multidisciplinary staff**[23] can be established (probably not only for one department but a whole ministry, middle authority/ district government or county) to support assessments, governance experiments and the development of new instruments and legal acts. Multidisciplinary means that, for example, staff with a background in administration science, governance studies and psychology can jointly support ecologists in predicting the effects of planned institutional changes to optimise them before launching them. Routines need to be established so that this staff is consulted by the various departments for establishing successful implementation arrangements.

Who learns, who is consulted and who attempts to change a system determines what knowledge is considered for system adaptation. So far many, especially higher-level, interviewees were reluctant to communicate failures and critique and failure stories were rarely published or presented at WFD events. However, it needs success as well as failure stories and (self-)critical assessments of advantages as well as disadvantages of arrangements for systematic and accelerated learning (we should question from top to bottom whether we operate adequately [AI3] and every state would need to invest money to reassess its own structures [AI3]) – it needs mistake tolerance ('*Fehleroffenheit*') [AI4]. The **culture of failure** needs to change. In order to do so, databases could be established which also record conflicts and failures, e.g. during measure realisation and adjusting micro-structures. Incentives should be set so that actors record such examples. This could help to quantify implementation barriers.

Additionally, an **external critical view** can be generated through exchange across administrative borders, across sectors and with science. So far there would be a deep gap between research and implementation [AI4]. Actors would not have been trained in governance questions, such as 'how to convince actors' [AI4]. Actors would have rather resorted to research of their own scientific background, research which could be directly used and tried [AI3]. Governance research, in contrast,

[23] This multidisciplinary staff may also facilitate sharing and using scientific results in practice, which can be limited through sharing practices which differ among horizontally and vertically related actors (Koontz, 2021).

would act from an ivory tower [AI2]. Trying a new participatory format with own staff worked well in one state but many research projects would disappear in drawers, and even much written in the National Water strategy would be escapist [AI3]. Partially, implementation would be accompanied by assigned research and also the LAWA has a research programme [AI2]. Stewards ('*Kümmerer*'), external experts or consultants might support making use of (not assigned) research beyond actors' own scientific background and expertise but the administrative effort (fair competition by EU laws, numerous forms, plain language) to get them on board even (or especially) for small contracts would be very high [AI4]. When even the expertise is missing to write an open competitive bidding for such contracts, an actor would tend to follow rather plain common sense [AI4]. Establishing multidisciplinary staff may help to overcome problems with reverting to external experts and advisors, may help to bridge science and praxis and might bring continuity in learning on policy implementation across sectors: This may be management support units above speciality departments, or working groups or round tables external to ministries [AI4]; water experts need to be resourced with implementation experts, e.g. psychologists and sociologists - non-water experts need to be involved in convincing to consider psychological and sociological conditions [AI4]. Alternatively (or complementary), interest associations, such as the DWA[24], might be appropriate to initiate change and to infiltrate thoughts [AI4] through its professional members' network. A DWA section might work on governance questions [AI4].

Beyond the culture of failure and including multiple views in assessing and changing structures, the extra effort for the suggested cyclical approach to governance, the choice for a cycle length and the result of cumulative design are practical challenges to this suggestion in polycentric governance systems.

The **effort** needed to conduct or participate in any **exchange process** is a challenge similar to participatory processes. More exchange needs more time [AI3]. The actors cannot attend more processes [AI3, AI4], even not regarding higher-level coordination [AI3], because the time (days) needed is then missing for realising measures [AI4]. The financial and staff resources are already a critical factor for WFD implementation [AI3]. Already existing exchange formats, such as the LAWA, states' fora and interest associations, like the DWA, were pointed out [AI3, AI1]. By highlighting that states' attempts did not solve the issues with WFD addressees' motivation [AI3] and that the actors are not trained for experimenting and learning [AI4], the worth of having additional exchange formats was doubted ('*Austauschkränzchen*' - exchange tea parties [AI3]). At least, before 2027 the actors would be too much pressed for time to experiment and learn, not until all measures are taken by 2027 would be time to reflect on what went wrong and to act on suggestions [AI4]. Hence, not all actors will voluntarily engage in contributing to the suggested formats: While monitoring and assessments might be commanded to some extent, experiment and exchange formats might be initiated, supported or incentivised.

Time is equally important when defining cycles or assessing systems continuously. For new policies governance re-assessments should be considered from the beginning on, at least any change to the governance systems could start a new **assessment cycle**. Governance-related learning is perceived to be a task in society as a whole [AI3] and necessary because continuous adaptation is necessary due to continuous changes to the system [AI3, AI2]. However, actors also need time to settle down in new governance structures, to accommodate their decision-making behaviour to the system (similar to

[24] The DGL (The German Society for Limnology) was mentioned as too scientific [AI4].

business operators calculating their long-term investments), for establishing their working routines (business-as-usual-mode) by optimisation. This fits the perception that WFD actors rather learned by doing during the first and second WFD cycles what turned into "more doing" during the third WFD cycle [AI3]. Decisions would need to be taken faster nowadays, while the degrees of freedom in decision-making strongly increased (the capacities of individuals would be overburdened by the systems' complexity) [AI4]. Hence, the necessity for continuous adaptation conflicts with the necessity for establishing working routines which help that effort for implementing a policy is perceived as normal and not an extra burden or strenuous effort. Furthermore, it is argued that shorter experimenting and learning cycles should be avoided because systems need to be observed longer and ephemerality should not be exacerbated [AI2]. Cycles could not be shortened to accelerate learning and adaptation because every actor needs to go learning alone [AI3]. The WFD cycles would be functional, but overall more time (more cycles) would be needed. For changes to governance systems, the power situation would be decisive [AI2]. A lack of knowledge would be less of an issue than staff and financial resources [AI3].

Learning, as well as adjustments to the system, can only be supported but hardly forced for whole polycentric systems (see section 5.2.2). The independence of actors applies to choosing and contributing to process formats, learning and adjusting governance structures comparably. Learning is supported or hampered by motivation or impetus, personality (the ambition to achieve goals and awareness [AI3]) and administrative traditions; learning is possibly a matter of generation [AI3]. Independent actors are free to draw their conclusions from what they have learned and free to engage in adjusting implementation arrangements – either through changes in the scope of their responsibility or through attempting to influence other decision-makers in the system.

No matter how learning and adjustments are fostered (e.g. obligatory participation in exchange formats or funding advantages for adjusting structures), the question remain whether **cumulative design** – design at micro- and macro-scales independently by multiple actors – leads to governance structures which can be considered advantageous for a system (and not only for individual actors), when an optimum would be achieved, or whether parallel individual adjustments continuously lead to new non-optimal governance structures. Hence, it needs to be asked how systems can be designed in a concerted/ coordinated fashion. A concerted design faces similar obstacles to policy implementation in polycentric governance systems in general.

Overall, exchange and learning from each other should not be misunderstood as attempts to standardise processes ('a 100% harmonisation could even not be achieved within Germany' [AI3]). Different approaches are realisable to varying extents and differently quick regarding the institutional settings and psychological aspects. Thus, implementation and adaptation are dynamic processes, which can (only) be nudged at one or the other point, but which are on the way [AI3] (like a 'tanker' [AI3]; 'either the EU changes the WFD or the reality overrules ("*überregelt*") the WFD' [AI3]; 'we have no time to realise suggestions from research projects' [AI3]). Nevertheless, without making systematic use of the basis for learning in polycentric systems, the advantages of polycentric systems are wasted and the chances for achieving optimum structures earlier are diminished.

6 Conclusions, implications and further questions

It is very much doubted that Germany can achieve the aims of the Water Framework Directive by the target date of 2027. Governance structures are one reason for this situation as they strongly influence implementation efforts at the local level. Governance arrangements have, nevertheless, remained a somewhat neglected topic in public debates regarding water. However, governance has recently received more attention as part of Germany's National Water Strategy.

The scientific community is concerned with questioning whether monocentric or polycentric systems achieve better results regarding implementing environmental policies. The question of whether WFD implementation would not show such a large deficit if duties and responsibilities were prescribed rather than the voluntariness principle being applied is important for German practitioners. These debates are not dissimilar to each other. However, the latter presupposes that a decentralised approach is necessary to implement the WFD (task division is simply necessary due to the size and complexity of the target systems). Though, also decentralised arrangements often seem to struggle with establishing duties in accordance with centrally defined goals – namely the good status of waters. Thus, throughout the years, implementation arrangements have developed and persisted in the German federal states which are, to varying degrees, polycentric in terms of differing multiplicities of actors and their in- and interdependencies. These implementation arrangements not only show differences but also reveal some important commonalities among states, structures, processes and institutions.

In this study, micro-level patterns were found with regard to implementation barriers, instruments, implementation approaches, the use of discretion and organisational structures. These macro-level patterns coalesce to define the systems as a whole which show macro-level patterns. The analysed polycentric governance systems showed a mix of central and decentral approaches leading to, overall, weak effects of instruments, a lack of influence among levels and sectors, and misfits in the approaches taken at the steering level in parallel to the local level. This delayed the overall implementation progress so far. Nevertheless, despite the implementation barriers, the polycentricity of the systems, the independence of decision-makers in particular, also allowed 'lighthouse' or pathfinder projects to successfully develop.

In addition, the chosen incentive systems did not provide an adequate basis for an encompassing WFD measure realisation and, hence, goal achievement. Further, the barriers, which have been found across the states, point to the unfavourable power relationships which the WFD implementation process faces. The power relationships also cause barriers to the adjustment of implementation arrangements.

None of the implementation arrangements among the analysed states, in terms of their organisational structures or their institutional settings, appeared to outperform the others at the macro-level. Implementation progress and goal achievement were similarly low across the states. Nevertheless, there are variances at the micro-level: Some organisational structures were found to better cope with implementation barriers and institutional interplay, such as instrumental and goal conflicts among different policies and interests. Yet, those arrangements only handled a small number of the barriers noticeably better than any of the others. Thus, good practices in terms of governance structures and processes across contexts are difficult to be named for the WFD implementation in Germany concerning hydromorphology and connectivity measures.

Nevertheless, the multiple implementation approaches and experiences, which have been found through this study, provide a strong basis for learning and adjusting systems at all levels. Regarding

governance questions, though, the analysed systems did not appear to incorporate learning consistently from across the states in general or from lighthouse projects in particular.

The identified patterns were found to be partially influenced by design, but partially also due to fortuity (e.g. the background or experience of the individual decision-maker). Design influenced the general conditions for decision-making by local-level actors more than the decisions themselves. Institutions and organisational structures, however, have been designed at different levels and times – partially due to the WFD, but mainly as path-dependent structures developed prior to the WFD. I distinguish here among 'positioning', 'relating' and 'directing' institutions. Due to the WFD, new goals were postulated (directing institutions) and, through new instruments, steering-level actors attempted to change the resource endowments of existing actors regarding WFD measures (positioning institutions). However, the actors remained bound to their pre-existing governance structures.

Noticeable is that relating institutions remained largely unchanged, meaning that the WFD goals were not strengthened within the given power relationships. As such, political decisions have been moved from higher levels down to the local level of measure realisation and plan-approval procedures: There are technically unsolvable interest conflicts. Win-win solutions are unlikely to be found everywhere or at any time. If conflicts could not be solved through careful planning, interests needed to be weighed up against each other. The political decisions involved determining which deficit to minimise or which goals to prioritise. Due to the lack of any higher-level prioritisations, this choice was left to the local actors. The prioritised interests did not necessarily have been those of the WFD. This could rarely if ever be influenced by higher-level decision-makers. The prioritised interests might be considered to be superordinate societal aims which justify lowering the goals regarding the water status, although the opposite might be the case. No matter what, these processes were not considered by higher-level actors for justifying implementation deficits.

In summary, it can be asserted that the independence of the various actors significantly influenced the functioning of the analysed governance systems in a variety of ways:

- In combination with the multiplicity of actors, independence added to the complexity and plurality of the systems. Independence allowed spatial differentiation due to the active exercise of autonomy, enabling adjustment of activities to reflect local interests.
- In contrast and in combination with fortuity factors, such as physical proximity among some actors, a lack of independence fostered collaboration among particular types of actors.
- Due to their independence, every actor among a multiplicity of independent decision-makers could only influence parts of a governance system. Therefore, systems changed continuously due to adjustments of single elements (the cumulative effect of (re-)designing rules, processes and structures) while satisfying multiple purposes. However, attempts to deliberately change such systems centrally by design were constrained by power, knowledge and capacities. The motivation to (re-)design systems towards a central idea (concerted design) remains similarly difficult as the motivation for realising WFD measures.
- Independence causes an unavoidable implementation gap because multiple actors cannot be expected to follow a central idea entirely if they are able to exercise their autonomy. Thus, when any degree of independence is preserved, large implementation gaps can only be minimised through optimising implementation arrangements. Even largely optimised systems will face at least small implementation gaps.

- Independence in combination with multiplicity also created both advantages and disadvantages for implementation, as indicated by the literature on polycentricity. What makes polycentric systems, in theory, advantageous compared to monocentric systems is that multiple actors are able to adjust their actions to local needs, while learning from a multiplicity of varying approaches can contribute to the optimisation of the overall system. The plurality of approaches provides a plurality of experiences to learn interdependently. Nevertheless, other possible advantages, such as coordination, taking over tasks and actual learning, were only found when there were incentives. Overall, however, incentives seemed to be insufficient to realise the advantages.

It is difficult to identify an ideal implementation system practically. Nevertheless, the implementation arrangements can be improved. Although varying in detail and disregarding the actual feasibility, numerous ideas to improve the WFD implementation arrangements were suggested by the interviewees and participants of the observed processes. Implementation arrangements could be optimised at the micro-level, e.g., regarding internal organisational structures and cooperation, at the macro-level, e.g., regarding who is forced and who is allowed to act, as well as in terms of the institutional setting at various levels. The results suggest that optimising the implementation arrangements is, to varying degrees, feasible depending on power relationships (e.g., majority voting for changing rules) and designability (e.g., rules vs. networks).

From the theoretical point of view, the implementation of hydromorphology and connectivity measures via these polycentric governance systems can be improved by optimising the kind and degree of independence of the actors and by improving the basis of learning processes. A high degree of independence in systems with centrally-set goals permits limited compliance. If the incentives for complying are not very high and the barriers not very low, resulting implementation gaps need to be accepted. Alternatively, the degree of independence needs to be reduced by adjusting the implementation arrangements. This would equate to some form of centralisation. However, centralisation needs to be thought of differently to establishing a monocentric system which would equal a centralisation of decision-making and action.

Here, centralisation in setting priorities (redefining the so far unchanged relating institutions) would support reducing the implementation deficit regarding WFD goals. WFD measures would especially profit from a stronger position and priority in accessing land (e.g. established through land use rights, rights of pre-emption, spatial planning instruments, expropriation and so on) because the power relationships were shown to be most unfavourable. Instrumental conflicts should be resolved and, for goal conflicts, priorities or prioritisation procedures might be set by higher-level actors. Any central or local prioritisation, though, may come at the cost of the implementation success of other policies.

The incentive structures for WFD implementation in Germany also need to be improved. Improving the water status and receiving the funding was often no sufficient incentive to realise hydromorphology and connectivity measures, it needed an additional incentive. In contrast to other implementation barriers, the will to realise measures can only be established centrally while not reducing the multiplicity of actors if duties are set and effectively enforced.

Every new policy strikes or collides with existing structures and institutions, thus making implementation progress to a certain degree path-dependent. Hence, every policy is in effect a large experiment (Morrison et al., 2019). Experiments function and evolve due to continual learning and adjusting in order to improve performance. Experiences with different approaches are produced

everywhere, but the nature of polycentric governance systems makes it difficult to share knowledge comprehensively due to the complexity of the systems. Hence, centralising knowledge access can improve the basis for learning in these polycentric governance systems, which in turn can accelerate and perpetuate the access to and use of knowledge. Therefore, this study has suggested a cyclical approach to governance which involves repeated assessments to take account of continuous change. A central provision of data generated by multiple systems and multiple decision-makers as well as other actors can, further, simplify data access and thus encourage learning across and within states.

So that science can support the optimisation of governance systems, future environmental governance research should particularly expand our knowledge regarding spatial differentiation, path-dependency, the scope of discretion and the integration of different policy goals. Key questions for future research include:

- How to systematise knowledge regarding spatial differentiation among and within Member States and its effects on policy performance? How to identify commonalities and best practices which allow specific and context-sensitive suggestions for improving governance?
- How can path-dependency be accounted for and considered in policy design?
- How to keep the flexibility of a policy such as the WFD to allow the local 'fitting' in ways that allow individuals to use their discretion positively, while at the same time reducing the dependence of implementation progress on individuals? Could other research fields such as psychology and the use of behaviourally-informed instruments (such as nudges) help to achieve a balance in flexibility and to overcome motivational barriers?
- The integration of different policy goals, not only for water, at and among different levels is necessary, yet is highly ambiguous in reality. What exactly should we try to integrate - policies or their implementation, whole sectors or which issues? Further, who decides on priorities among conflicting policy goals within the integrating process? Similarly, it should be further questioned how and under what conditions participatory instruments can occur effectively from a system perspective: Is there an optimal spatial scale for participatory instruments?
- What favourable inter-organisational collaborations already exist which might be supportive and useful in other water-related contexts? How have these collaborations been established and how could establishing them be supported by designing implementation arrangements?
- How could our environmental governance systems become more adaptive in terms of shorter cycles of steering, testing, evaluating and adjusting despite long-term law-making processes?

Overall, this research has shown how solutions to the WFD implementation gap are incremental and political in their nature. Establishing duties and responsibilities without changing unfavourable power relationships and institutions or without prioritisation, cannot close the implementation gap. Further, monocentric arrangements are not feasible in large-scale and complex resource systems. The question should be less about whether a policy is better implemented in a monocentric or a polycentric system, but whether the incentive structures of a system suit a polycentric implementation. Furthermore, how can central goal-setting as an activity through democratic institutions accommodate and cope with polycentricity in governance systems? We need to continually ask and explore how implementation arrangements can be designed so that the degree of independence and multiplicity in a system attunes to an appropriate decentral implementation of centrally set goals.

With an increasing number of equally important and interplaying policies, we seem to expect our governance systems to suit all purposes all of the time, which is not possible. However, considering the precarious state of our water environment, should we not strive to get our implementation arrangements as close to the ideal as possible and accelerate our efforts towards restoring, protecting and improving the water environment?

7 Glossary

Cooperation, coordination and collaboration	Cooperation can take various forms. Cooperation includes here all forms of coordination and collaboration. "Collaboration involves multiple parties working together to pursue a goal that none could achieve alone" (Koontz, 2019: 115). Collaboration involves sharing resources and instruments. Coordination means that actors consider the interests and goals of other actors in their decision-making to avoid or reduce negative external effects. The achievement of synergies as positive external effects is subordinate to coordination mechanisms. (Tetsch, 2015) Coordination may help to reduce the negative effects of institutional interplay, while collaboration may support making the positive effects of institutional interplay actively available.
Governance	Governance "is an effort to craft order, thereby to mitigate conflict and realize mutual gains" (Williamson, 2000: 599). Governance refers to all kinds of patterns of handling interdependencies among states, state actors and societal actors. It contrasts the term government which is a form of hierarchy and as such one pattern amongst others describing the governance of a system (Benz et al., 2007: 13). "Governance aspects are related to how society (or groups within it including government, business and civil society organisations) organises to make decisions or implement them. The important distinguishing features (…) include, 1) who has a voice in making decisions, 2) how decisions are made, and 3) who is accountable." (Zingraff-Hamed et al., 2020: 460)
Governance structures	Governance structures are solution alternatives. Governance functions can be fulfilled by different structures. Each generic governance structure (market, cooperation contract, hierarchy) is characterised by a syndrome of attributes which support each other, namely by structural specifics and distinctive strengths and weaknesses regarding organisational competence, transaction costs, incentive intensity and flexibility. In addition to the generic governance structures, there are also mixed and derived governance structures. (Monsees, 2008: 113)
Implementation	"Implementation is usually interpreted to mean taking a vision, promise, or statement of intent and translating it into specific activity. In resource and environmental management, a challenge is to move from normative planning (what should be done) to operational planning (what will be done)." (Mitchell, 2018: 268)

Institution & Organisation	"Conceptually, institutions are highly abstract and frequently invisible elements of the policy environment. (…) We define an institution as a widely understood rule, norm, or strategy that creates incentives for behavior in repetitive situations (Crawford and Ostrom 1995). Institutions may be formally described in the form of a law, policy, or procedure, or they may emerge informally as norms, standard operating practices, or habits. Alone or in a set of related arrangements, they are mechanisms for adjusting behavior in a situation that requires coordination among two or more individuals or groups of individuals (Hurwicz 1994). (…) Sometimes the terms "institution" and "organization" are used interchangeably. It is useful to draw a distinction between these two concepts. An organization can be thought of as a set of institutional arrangements and participants who have a common set of goals and purposes, and who must interact across multiple action situations at different levels of activity. Like institutions, organizations may be formally or informally constructed." (Polski and Ostrom, 2017: 14) In short, institutions are the rules of the game, while organisations are the players of the game (Monsees, 2008: 122).
Institutional interplay	Institutional interplay is a "phenomenon where one institution intentionally or unintentionally affects another" p.3 (Young, 2002: 3; Young et al., 2010). Institutional interplay may lead to synergising as well as contradicting goals and instruments and to an additional complexity regarding actors and interests to be considered in decision-making.
Management	Resources management is defined as "the activities of analyzing and monitoring, developing and implementing measures to keep the state of a resource within desirable bounds" (Pahl-Wostl, 2009: 355).
Water governance	Water governance is defined as "[…] the social function that regulates development and management of water resources and provisions of water services at different levels of society" (Pahl-Wostl, 2015: 26).

8 References

Albiac, J.; Calvo, E.; Kahil, T. and Esteban, E. 2020. The Challenge of Irrigation Water Pricing in the Water Framework Directive. *Water Alternatives* 13(13): 674–690.

Albrecht, J. 2013. The Europeanization of water law by the Water Framework Directive: A second chance for water planning in Germany. *Land Use Policy* 30(1): 381–391.

Aligică, P.D. and Tarko, V. 2012. Polycentricity: From Polanyi to Ostrom, and beyond. *Governance* 25(2): 237–262.

Andersson, K.P. and Ostrom, E. 2008. Analyzing decentralized resource regimes from a polycentric perspective. *Policy Sciences* 41(1): 71–93.

Baldwin, E.; Thiel, A.; McGinnis, M. and Kellner, E. 2023. Empirical research on polycentric governance: Critical gaps and a framework for studying long-term change. *Policy Studies Journal* 79(2): 54.

Bathe, F. 2010. Die Umsetzung der EG-Wasserrahmenrichtlinie in Deutschland – eine vergleichende Analyse der Entwürfe der Bewirtschaftungspläne. Diplomarbeit. Rheinischen Friedrich-Wilhelms-Universität Bonn, Bonn.

Benz, A.; Lütz, S.; Schimank, U. and Simonis, G. 2007. *Handbuch Governance*. s.l.: VS Verlag für Sozialwissenschaften (GWV).

Berbel, J. and Expósito, A. 2020. The Theory and Practice of Water Pricing and Cost Recovery in the Water Framework Directive. *Water Alternatives* 13(3): 659–673.

Beunen, R.; van der Knaap, W.G.M. and Biesbroek, G.R. 2009. Implementation and integration of EU environmental directives. Experiences from The Netherlands. *Environmental Policy and Governance* 19(1): 57–69.

Blackstock, K.; Dunglinson, J.; Dilley, R.; Matthews, K.; Futter, M. and Marshall, K. 2009. Climate proofing Scottish river basin planning – a future challenge. *Environmental Policy and Governance* 19(6): 374–387.

Blackstock, K.L. 2009. Between a rock and a hard place: Incompatible objectives at the heart of river basin planning? *Water science and technology: a journal of the International Association on Water Pollution Research* 59(3): 425–431.

Blomquist, W.A. and Schröder, N.J.S. 2019. Seeing Polycentrically: Examining Governance Situations Using a Polycentricity Lens. In Thiel, A.; Blomquist, W.A. and Garrick, D. (Eds), *Governing complexity: Analyzing and applying polycentricity*, pp. 45–64. Cambridge University Press.

BMU (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit). 2004. *Die Wasserrahmenrichtlinie - Neues Fundament für den Gewässerschutz in Europa: Langfassung*. Berlin.

BMU (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit). 2010. *Die Wasserrahmenrichtlinie. Auf dem Weg zu guten Gewässern.*

BMUV/ UBA. 2022. *Die Wasserrahmenrichtlinie - Gewässer in Deutschland 2021. Fortschritte und Herausforderungen.* Bonn, Dessau.

BMUV (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz). 2023a. *Nationale Wasserstrategie: Kabinettsbeschluss vom 15. März 2023*.

BMUV (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz). 2023b. Wasserdialog. https://www.bmuv.de/themen/wasser-und-binnengewaesser/nationale-wasserstrategie/nationaler-wasserdialog (accessed on 6 December 2023)

Boer, C. de; Vinke-de Kruijf, J.; Özerol, G. and Bressers, H. 2016. Collaborative Water Resource Management. What makes up a supportive governance system? *Environmental Policy and Governance* 26(4): 229–241.

Boeuf, B. and Fritsch, O. 2016. Studying the implementation of the Water Framework Directive in Europe. A meta-analysis of 89 journal articles. *Ecology and Society* 21(2).

Boeuf, B.; Fritsch, O. and Martin-Ortega, J. 2016. Undermining European Environmental Policy Goals? The EU Water Framework Directive and the Politics of Exemptions. *Water* 8(9): 388.

Bogumil, J. and Jann, W. 2009. *Verwaltung und Verwaltungswissenschaft in Deutschland: Einführung in die Verwaltungswissenschaft; [Lehrbuch]*. Wiesbaden: VS Verl. für Sozialwiss.

Bolinches, A.; Paredes-Arquiola, J.; Garrido, A. and Stefano, L. de. 2020. A comparative analysis of the application of water quality exemptions in the European Union: The case of nitrogen. *The Science of the total environment* 739: 139891.

Carlisle, K. and Gruby, R.L. 2017. Polycentric Systems of Governance: A Theoretical Model for the Commons. *Policy Studies Journal* 47(4): 927–952.

Carvalho, L.; Mackay, E.B.; Cardoso, A.C.; Baattrup-Pedersen, A.; Birk, S.; Blackstock, K.L.; Borics, G.; Borja, A.; Feld, C.K.; Ferreira, M.T.; Globevnik, L.; Grizzetti, B.; Hendry, S.; Hering, D.; Kelly, M.; Langaas, S.; Meissner, K.; Panagopoulos, Y.; Penning, E.; Rouillard, J.; Sabater, S.; Schmedtje, U.; Spears, B.M.; Venohr, M.; van de Bund, W. and Solheim, A.L. 2019. Protecting and restoring Europe's waters. An analysis of the future development needs of the Water Framework Directive. *The Science of the total environment* 658: 1228–1238.

Cox, M.; Arnold, G. and Villamayor Tomás, S. 2010. A Review of Design Principles for Community-based Natural Resource Management. *Ecology and Society* 15(4): 38.

Daly, D.; Archbold, M. and Deakin, J. 2016. Progress and challenges in managing our catchments effectively. *Biology and Environment: Proceedings of the Royal Irish Academy* 116B(3): 157–166.

Domorenok, E. 2017. Traps of multi-level governance. Lessons from the implementation of the Water Framework Directive in Italy. *Journal of European Integration* 39(6): 657–671.

European Commission. 2015. *Commission staff working document: Report on the progress in implementation of the Water Framework Directive Programmes of Measures: Accompanying the document: Communication from the commission to the European Parliament and the Council. The Water Framework Directive and the Floods Directive: Actions towards the 'good status' of EU water and to reduce flood risks.* Brussels.

European Commission. 2017. *Evaluation Roadmap: Fitness check of the Water Framework Directive and the Floods Directive*. Brussels.

European Commission. 2019a. *Commission staff working document. European Overview - River Basin Management Plans: Accompanying the document: Report from the Commission to the European Parliament and the Council. Implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC), Second River Basin Management Plans, First Flood Risk Management Plans*. Brussels.

European Commission. 2019b. *Commission Staff Working Document. Executive Summary of the Fitness Check of the Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive*. Brussels.

European Commission. 2019c. *Fitness Check of the Water Framework Directive and the Floods Directive*. Brussels.

European Commission. 2021. *Report from the Commission to the Council and the European Parliament on the implementation of the Water Framework Directive (2000/60/EC), the Environmental Quality Standards Directive (2008/105/EC amended by Directive 2013/39/EU) and the Floods Directive (2007/60/EC): Implementation of planned Programmes of Measures, New Priority Substances, Preliminary Flood Risk Assessments and Areas of Potential Significant Flood Risk*. Brussels.

European Environment Agency. 2018a. Ecological status of surface water bodies. Dashboard (Tableau). https://www.eea.europa.eu/themes/water/european-waters/water-quality-and-water-assessment/water-assessments/ecological-status-of-surface-water-bodies (accessed on 21 January 2023)

European Environment Agency. 2018b. *European waters - assessment of status and pressures 2018*. EEA Report No. 7. Luxembourg.

European Environment Agency. 2021. Percentage of water bodies not in good ecological status or potential, per river basic district: The map presents the proportion of surface water bodies (rivers, lakes, transitional and coastal waters) in less than good ecological status per River Basin District. Figure. https://www.eea.europa.eu/data-and-maps/figures/proportion-of-classified-surface-water-7 (accessed on 30 November 2023)

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and BMUV. 2023. *National Water Strategy: Cabinet decision of 15 March 2023*.

Fichter, H. and Moss, T. 2004. Regionaler Institutionenwandel durch die EU-Wasserrahmenrichtlinie. Ausgewählte Beispiele zum Umgang mit „Problems of fit“ – Ergebnisse aus der raumwissenschaftlichen Institutionenforschung des IRS. In Dombrowsky, I.; Wittmer, H. and Rauschmayer, F. (Eds), *Institutionen in Naturschutz und Ressourcenmanagement – Beiträge der Neuen Institutionenökonomik: Ergebnisse eines Workshops am 26. und 27. Juni 2003 am UFZ-Umweltforschungszentrum Leipzig-Halle GmbH, Leipzig*, pp. 72–80.

Giakoumis, T. and Voulvoulis, N. 2019. Water Framework Directive programmes of measures: Lessons from the 1st planning cycle of a catchment in England. *The Science of the total environment* 668: 903–916.

Gofen, A.; Sella, S. and Gassner, D. 2019. Levels of analysis in street-level bureaucracy research. In Hupe, P. (Ed), *Research Handbook on Street-Level Bureaucracy. The Ground Floor of Government in Context*. Edward Elgar Publishing.

Hüesker, F. and Moss, T. 2015. The politics of multi-scalar action in river basin management: Implementing the EU Water Framework Directive (WFD). *Land Use Policy* 42: 38–47.

Huitema, D.; Mostert, E.; Egas, W.; Moellenkamp, S.; Pahl-Wostl, C. and Yalcin, R. 2009. Adaptive Water Governance: Assessing the Institutional Prescriptions of Adaptive (Co-)Management from a Governance Perspective and Defining a Research Agenda. *Ecology and Society* 14(1).

Huntjens, P.; Pahl-Wostl, C.; Rihoux, B.; Schlüter, M.; Flachner, Z.; Neto, S.; Koskova, R.; Dickens, C. and Nabide Kiti, I. 2011. Adaptive Water Management and Policy Learning in a Changing Climate: A Formal Comparative Analysis of Eight Water Management Regimes in Europe, Africa and Asia. *Environmental Policy and Governance* 21(3): 145–163.

Ignar, S. and Grygoruk, M. (Eds). 2015. *Wetlands and Water Framework Directive: Protection, management and climate change*. Cham: Springer International Publishing.

Indset, M. and Stokke, K.B. 2015. Layering, Administrative Change and National Paths to Europeanization: The Case of the Water Framework Directive. *European Planning Studies* 23(5): 979–998.

Jager, N.; Challies, E.; Kochskämper, E.; Newig, J.; Benson, D.; Blackstock, K.; Collins, K.; Ernst, A.; Evers, M.; Feichtinger, J.; Fritsch, O.; Gooch, G.; Grund, W.; Hedelin, B.; Hernández-Mora, N.; Hüesker, F.; Huitema, D.; Irvine, K.; Klinke, A.; Lange, L.; Loupsans, D.; Lubell, M.; Maganda, C.; Matczak, P.; Parés, M.; Saarikoski, H.; Slavíková, L.; van der Arend, S. and Korff, Y. von. 2016. Transforming European water governance?: Participation and river basin management under the EU Water Framework Directive in 13 member states. *Water* 8(4): 156.

Jordan, A.; Huitema, D.; van Asselt, H. and Forster, J. (Eds). 2018. *Governing climate change: Polycentricity in action?* Cambridge, New York, Port Melbourne, New Delhi, Singapore: Cambridge University Press.

Ker Rault, P.A. and Jeffrey, P.J. 2008. Deconstructing public participation in the Water Framework Directive: Implementation and compliance with the letter or with the spirit of the law? *Water and Environment Journal* 22(4): 241–249.

Keskitalo, E.C.H. and Pettersson, M. 2012. Implementing Multi-level Governance? The Legal Basis and Implementation of the EU Water Framework Directive for Forestry in Sweden. *Environmental Policy and Governance* 22(2): 90–103.

Khalid, R.M.; Mokhtar, M.B.; Jalil, F.; Rahman, S.A. and Spray, C. 2018. Legal framing for achieving 'good ecological status' for Malaysian rivers: Are there lessons to be learned from the EU Water Framework Directive? *Ecosystem Services* 29(14): 251–259.

Kiser, L.L. and Ostrom, E. 2000. The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches. In McGinnis, M. (Ed), *Polycentric Games and Institutions*, pp. 56–88. Ann Arbor, MI: University of Michigan Press.

Koontz, T.M. 2019. Cooperation in Polycentric Governance Systems: from Part II - Interactions and Performance in Polycentric Governance. In Thiel, A.; Blomquist, W.A. and Garrick, D. (Eds), *Governing complexity: Analyzing and applying polycentricity*, pp. 115–132. Cambridge University Press.

Koontz, T.M. 2021. Science and scale mismatch: Horizontal and vertical information sharing in the puget sound polycentric governance system. *Journal of environmental management* 290: 112600.

Koontz, T.M. and Newig, J. 2014. From Planning to Implementation: Top-Down and Bottom-Up Approaches for Collaborative Watershed Management. *Policy Studies Journal* 42(3): 416–442.

Larsen, S.V. 2011. Risk as a challenge in practice: Investigating climate change in water management. *Regional Environmental Change* 11(1): 111–122.

LAWA (Bund/Länder-Arbeitsgemeinschaft Wasser). 2018a. *Umsetzungsstand der Maßnahmen nach Wasserrahmenrichtlinie: Zwischenbilanz 2018*.

LAWA (Bund/Länder-Arbeitsgemeinschaft Wasser). 2018b. *Weitere Vorschläge an die UMK zur Erreichung der Ziele der WRRL: beschlossen auf der LAWA-Sondersitzung am 17.10.2018 in Berlin*.

Liefferink, D.; Wiering, M. and Uitenboogaart, Y. 2011. The EU Water Framework Directive: A multi-dimensional analysis of implementation and domestic impact. *Land Use Policy* 28(4): 712–722.

Lundqvist, L. 2004. Integrating Swedish water resource management: A multi-level governance trilemma. *Local Environment* 9(5): 413–424.

Macháč, J.; Brabec, J. and Vojáček, O. 2020. Development and Implementation of the Concept of Disproportionate Costs in Water Management in Central Europe in the Light of the EU WFD. *Water Alternatives* 13(3): 618–633.

McGinnis, M.D. (Ed). 1999. *Polycentricity and local public economies: Readings from the workshop in political theory and policy analysis*. Ann Arbor: Univ. of Michigan Press.

MUNLV (Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz) des Landes Nordrhein-Westfalen. 2018. *Leitfaden zur Erstellung von Übersichten gem. § 74 LWG*.

Mitchell, B. 2018. *Resource and environmental management*. New York, NY: Oxford University Press.

Monsees, J. 2008. *Governancestrukturen für Fließgewässer: Eine vergleichende Institutionenanalyse gewässerunterhaltender Verbände und Behörden*. Baden-Baden: Nomos.

Morrison, T.H.; Adger, W.N.; Brown, K.; Lemos, M.C.; Huitema, D.; Phelps, J.; Evans, L.; Cohen, P.; Song, A.M.; Turner, R.; Quinn, T. and Hughes, T.P. 2019. The black box of power in polycentric environmental governance. *Global Environmental Change* 57(3).

Morrison, T.H.; Bodin, Ö.; Cumming, G.S.; Lubell, M.; Seppelt, R.; Seppelt, T. and Weible, C.M. 2023. Building blocks of polycentric governance. *Policy Studies Journal* 275(6): 109769.

Moss, T. 2004. The governance of land use in river basins: Prospects for overcoming problems of institutional interplay with the EU Water Framework Directive. *Land Use Policy* 21(1): 85–94.

Moss, T. 2012. Spatial fit, from panacea to practice: Implementing the EU Water Framework Directive. *Ecology and Society* 17(3).

Moss, T.; Bouleau, G.; Albiac, J. and Slavíkova, L. 2020. The EU Water Framework Directive Twenty Years on: Introducing the Special Issue. *Water Alternatives* 13(3): 446–457.

Newig, J. and Fritsch, O. 2009. Environmental governance: Participatory, multi-level - and effective? *Environmental Policy and Governance* 19(3): 197–214.

Newig, J.; Schulz, D. and Jager, N.W. 2016. Disentangling puzzles of spatial scales and participation in environmental governance-the case of governance re-scaling through the European Water Framework Directive. *Environmental management* 58(6): 998–1014.

Nielsen, H.Ø.; Frederiksen, P.; Saarikoski, H.; Rytkönen, A.-M. and Pedersen, A.B. 2013. How different institutional arrangements promote integrated river basin management. Evidence from the Baltic sea region. *Land Use Policy* 30(1): 437–445.

NLWKN (Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz). 2012. *Pilotprojekt Maßnahmenakquise und Teilprojekte NLWKN: Abschlussbericht*.

Ostrom, E. 1999. *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge Univ. Press.

Ostrom, E. and Parks, R.B. 1999. Neither Gargantua nor the land of Lilliputs: Conjectures on mixed systems of metropolitan organization. In McGinnis, M.D. (Ed), *Polycentricity and local public economies: Readings from the workshop in political theory and policy analysis*, pp. 284–305. Ann Arbor: Univ. of Michigan Press.

Ostrom, V. 1972. Polycentricity. Prepared for delivery at the 1972 Annual Meeting of the American Political Science Association, Washington, D.C., September 5-9.

Ostrom, V.; Tiebout, C.M. and Warren, R. 1961. The organization of government in metropolitan areas: A theoretical inquiry. *The American Political Science Review* 55(4): 831–842.

Özerol, G.; Vinke-de Kruijf, J.; Brisbois, M.C.; Casiano Flores, C.; Deekshit, P.; Girard, C.; Knieper, C.; Mirnezami, S.J.; Ortega-Reig, M.; Ranjan, P.; Schröder, N.J.S. and Schröter, B. 2018. Comparative studies of water governance: A systematic review. *Ecology and Society* 23(4).

Pahl-Wostl, C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change* 19(3): 354–365.

Pahl-Wostl, C. 2015. *Water governance in the face of global change: From understanding to transformation*. Cham: Springer.

Pahl-Wostl, C. and Knieper, C. 2014. The capacity of water governance to deal with the climate change adaptation challenge: Using fuzzy set Qualitative Comparative Analysis to distinguish between polycentric, fragmented and centralized regimes. *Global Environmental Change* 29: 139–154.

Pahl-Wostl, C.; Lebel, L.; Knieper, C. and Nikitina, E. 2012. From applying panaceas to mastering complexity: Toward adaptive water governance in river basins. *Environmental Science & Policy* 23: 24–34.

Polski, M.M. and Ostrom, E. 2017. An institutional framework for policy analysis and design. In Cole, D.H. and McGinnis, M.D. (Eds), *A framework for policy analysis*, pp. 13–47. Lanham, Boulder, New York, Toronto, Plymouth UK: Lexington Books.

Reese, M.; Bedtke, N.; Gawel, E.; Klauer, B.; Köck, W. and Möckel, S. 2018. *Wasserrahmenrichtlinie - Wege aus der Umsetzungskrise: Rechtliche, organisatorische und fiskalische Wege zu einer richtlinienkonformen Gewässerentwicklung am Beispiel Niedersachsens*. Baden-Baden: Nomos Verlagsgesellschaft.

Rimmert, M.; Baudoin, L.; Cotta, B.; Kochskämper, E. and Newig, J. 2020. Participation in River Basin Planning Under the Water Framework Directive – Has it Benefitted Good Water Status? *Water Alternatives* 13(3): 484–512.

Sager, F. and Gofen, A. 2022. The polity of implementation: Organizational and institutional arrangements in policy implementation. *Governance* 35(2): 347–364.

Schlüter, M.; Hirsch, D. and Pahl-Wostl, C. 2010. Coping with change: Responses of the Uzbek water management regime to socio-economic transition and global change. *Environmental Science & Policy* 13(7): 620–636.

Schröder, N.J.S. 2014. Die Umsetzung der Wasserrahmenrichtlinie in Berlin und Hamburg. MSc Thesis. Humboldt-Universität zu Berlin, Berlin.

Schröder, N.J.S. 2019. *Überprüfung der Wasserrahmenrichtlinie. Reader. https://ver-und-entsorgung.verdi.de/themen/wasser-ist-menschenrecht/++co++54c33b4a-43fc-11e9-9e6b-52540066e5a9 (accessed on 30 November 2023)*

Schröder, N.J.S. 2020a. Umsetzungsprozesse der EU-Wasserrahmenrichtlinie in Deutschland: Teil 1 - WRRL-Zielerreichung zwischen Plan und Machbarkeit. *Korrespondenz Wasserwirtschaft* 13(9): 490–497.

Schröder, N.J.S. 2020b. Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 2 – WRRL-Zielerreichung zwischen Freiwilligkeit und Pflicht. *Korrespondenz Wasserwirtschaft* 13(12): 687–694.

Schröder, N.J.S. 2022. Umsetzungsprozess der EU-Wasserrahmenrichtlinie in Deutschland: Teil 3 - WRRL-Zielerreichung zwischen fachlichem Anspruch und Beteiligung. *Korrespondenz Wasserwirtschaft* 15(1): 21–30.

Schröder, N.J.S. and Chaudhary, N. 2020. *Trapped between barriers OR Flowing despite barriers?* THESys Discussion Papers 2020-1. Berlin: Humboldt-Universität zu Berlin.

Sevä, M. and Sandström, A. 2016. Decisions at street level: Assessing and explaining the implementation of the European Water Framework Directive in Sweden. *Environmental Policy and Governance* 27(1): 74-89.

Steinebach, Y. 2022. Instrument choice, implementation structures, and the effectiveness of environmental policies: A cross-national analysis. *Regulation & Governance* 16(1): 225–242.

Tetsch, F. 2015. Koordinierung in der regionalen Strukturpolitik – Erfahrungen aus der Praxis. In Karl, H. (Ed), *Koordination raumwirksamer Politik: Mehr Effizienz und Wirksamkeit von Politik durch abgestimmte Arbeitsteilung*, pp. 50–66. Hannover: Akad. für Raumforschung und Landesplanung.

Thiel, A.; Blomquist, W.A. and Garrick, D. (Eds). 2019. *Governing complexity: Analyzing and applying polycentricity*. Cambridge University Press.

UFZ (Helmholtz-Zentrum für Umweltforschung); Ecologic and Universität Leipzig. 2007. *Verhältnismäßigkeit der Maßnahmenkosten im Sinne der EG-Wasserrahmenrichtlinie - komplementäre Kriterien zur Kosten-Nutzen-Analyse: F+E Vorhaben im Auftrag der Bund/Länderarbeitsgemeinschaft Wasser, Projekt Nr. AR 1.05*. Leipzig.

van Zeben, J. and Bobić, A. 2019. *Polycentricity in the European Union*. Cambridge University Press.

Voulvoulis, N.; Arpon, K.D. and Giakoumis, T. 2017. The EU Water Framework Directive: From great expectations to problems with implementation. *The Science of the total environment* 575: 358–366.

Waylen, K.; Blackstock, K.; Tindale, S. and Juárez-Bourke, A. 2019. Governing Integration: Insights from Integrating Implementation of European Water Policies. *Water* 11(3): 598.

Weyand, M. 2020. Flussgebietsmanagement im Zeichen aktueller Megatrends. 20. Workshop Flussgebietsmanagement als Gemeinschaftsveranstaltung von DWA, ZWU, EWA und BWK (NRW) in Kooperation mit dem IFWW am 27./28. November 2019 in Essen. *Korrespondenz Wasserwirtschaft* 13(9): 458–465.

Weyand, M. 2022. Wasserwirtschaft zwischen Zuständigkeiten, Zielverfehlungen und fachlichen Herausforderungen. 22. Workshop Flussgebietsmanagement als Gemeinschaftsveranstaltung von DWA, ZWU, EWA und BWK (NRW) in Kooperation mit dem IFWW am 10. November 2021. *Korrespondenz Wasserwirtschaft* 15(9): 514–517.

Williamson, O.E. 2000. The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature* 38: 595–613.

Wright, S.A.L. and Fritsch, O. 2011. Operationalising active involvement in the EU Water Framework Directive: Why, when and how? *Ecological Economics* 70(12): 2268–2274.

Wuijts, S.; van Rijswick, H.F.; Driessen, P.P. and Runhaar, H.A. 2023. Moving forward to achieve the ambitions of the European Water Framework Directive: Lessons learned from the Netherlands. *Journal of environmental management* 333: 117424.

Young, O.R. 2002. *The institutional dimensions of environmental change: Fit, interplay, and scale*. Cambridge, Massachusetts, London, England: The MIT Press.

Young, O.R.; Chambers, W.B.; Kim, J.A. and Have, C. ten (Eds). 2010. *Institutional interplay: Biosafety and trade*. Tokyo, Japan: United Nations University.

Zingraff-Hamed, A.; Schröter, B.; Schaub, S.; Lebenies, R.; Stein, U.; Hüesker, F.; Meyer, C.; Schleyer, C.; Schmeier, S. and Pusch, M.T. 2020. Perception of Bottlenecks in the Implementation of the European Water Framework Directive. *Water Alternatives* 13(3): 458–483.

9 Annexe I

9.1 Interviews and Observations

The following tables show the actors interviewed and processes observed for analysing each German federal state. They are numbered for referencing in the text. The time frame for interviews is indicated.

Interviews:

Saxony-Anhalt: January 2017, March-June/ August 2018

No.	Organisation
I1	Landesverwaltungsamt: water
I2	City Magdeburg, lower water authority
I3	Unterhaltungsverband Ehle-Ihle a
I4	Unterhaltungsverband Ehle-Ihle b
I5	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology a
I6	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology b
I7	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology c
I8	Wasserstraßen- und Schifffahrtsamt Magdeburg - Burg
I9	BUND Saxony-Anhalt (friends of the earth Germany)
I10	Ministry for Environment, Agriculture and Energy of the state Saxony-Anhalt: wastewater treatment, facilities for handling water-polluting substances, water provision, water protection, water framework directive
I11	NABU Saxony-Anhalt (Nature and Biodiversity Conservation Union) + County Börde lower nature conservation authority

Saxony: January/ April/ May 2017, December 2018, January 2019

No.	Organisation
I12	City Dresden: environment
I13	Landesdirektion Sachsen - Dresden a
I14	Landesdirektion Sachsen - Dresden b
I15	Wasser- und Schifffahrtsverwaltung des Bundes, WSA Dresden
I16	City Dresden, lower water authority
I17	Community Dresden: water and soil maintenance
I18	Landestalsperrenverwaltung: EU directives, nature conservation
I19	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie (technical authority): surface waters, water framework directive
I20	Landschaftspflegeverband Sächsische Schweiz-Osterzgebirge e.V.: landscape development, flood protection WFD public relations project
I21	County Meißen, lower water authority

Hesse: September, November 2018

No.	Organisation
I22	Hessisches Landesamt für Naturschutz, Umwelt und Geologie (HLNUG): water ecology
I23	Regierungspräsidium Darmstadt placed in Wiesbaden: surface waters
I24	Hesse Ministry for environment, climate protection, agriculture and consumer protection: surface water protection/ water ecology
I25	Hesse Ministry for environment, climate protection, agriculture and consumer protection: questions of principle, state-crossing and international cooperation, coordination of Water Framework Directive, public relations a
I26	Hesse Ministry for environment, climate protection, agriculture and consumer protection: questions of principle, state-crossing and international cooperation, coordination of Water Framework Directive, public relations b
I27	City Wiesbaden: protection and management of waters, water maintenance/ lower water authority for non-WFD issues
I28	Rheingau-Taunus-County, lower water authority
I29	Main-Taunus-County, lower water authority
I30	Gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung GmbH (organises water neighborhoods for the exchange of experiences)
I31	NABU Hesse (Nature and Biodiversity Conservation Union)
I32	Abwasserverband Main-Taunus: water maintenance
I33	City Taunusstein: city development, technical environmental protection, nature conservation, water protection

North Rhine Westphalia (NRW): October-December 2018, February 2019

No.	Organisation
I34	Water network NRW (by nature conservation associations)
I35	Bezirksregierung Arnsberg: water management including facility-related environmental protection, water advisor
I36	County Soest, water maintenance
I37	Kommunalagentur NRW (community agency): water advisor
I38	Lippeverband: river area development, central department EU directives, nature conservation
I39	City Hamm, lower water authority
I40	agw – Arbeitsgemeinschaft der Wasserwirtschaftsverbände in Nordrhein-Westfalen (umbrella organisation of special water law associations)
I41	Ministry for environment, agriculture, nature and consumer protection of the state North Rhine-Westphalia: river area management, water ecology, flood protection
I42	Bezirksregierung Arnsberg: funding approvals, conceptual work
I43	County Coesfeld lower water authority
I44	Bezirksregierung Arnsberg: building authority, water maintenance

Thuringia: January – March 2019

No.	Organisation
I45	City Erfurt, lower water authority: surface waters
I46	Thüringer Landesamt für Umwelt, Bergbau und Naturschutz: river area management
I47	Thüringer Aufbaubank: agricultural advancement, infrastructure, environment, regional water advisor
I48	City Erfurt: garden and graveyard authority, water maintenance
I49	City Blankenhain, building authority
I50	Landschaftspflegeverband "Thüringer Grabfeld" e.V.: landscape development, water maintenance
I51	Thüringer Landgesellschaft: water construction
I52	NATURA2000-Station
I53	City Gera, lower water authority: water maintenance
I54	Flussbüro Erfurt (engineering office), representative of nature conservation associations in the Thuringian water advisory council
I55	Thuringian Ministry for environment, energy and nature conservation: water protection, flood protection
I56	GUV "Harzvorland": water maintenance
I57	Thüringer Gemeinde und Städtebund: department rural area, nature protection, agriculture, forestry and water law

Lower Saxony: January, June, July 2017, September 2019

No.	Organisation
I58	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Verden: river basin management
I59	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Braunschweig: river basin management & biological monitoring
I60	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Lüneburg
I61	River Basin Community Weser
I62	Lower Saxon Ministry for Environment, Energy, Construction and Climate Protection: surface and coastal waters, marine protection
I63	City Braunschweig, lower water authority
I64	Kommunale Umwelt-Aktion UAN (Municipal Environmental Campaign)
I65	BUND Lower Saxony (friends of the earth Germany)
I66	City Braunschweig, lower nature conservation authority
I67	Unterhaltungsverband Oker: water maintenance
I68	Aller-Ohre-Verband: water alliance
I69	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Hannover: nature conservation
I70	Wasserverband mittlere Oker + Stadtentwässerung Braunschweig: water maintenance

Additional interviews: November, December 2022

No.	Organisation
AI1 - AI4	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection: department for collaboration in international river basins, agreements, international law of water protection
	River Basin Community Rhine
	Ministry for Energy Transition, Climate Protection, Environment and Nature of Schleswig-Holstein: department for water management, soil and coastal protection
	Bavarian State Ministry for Environment and Consumer Protection: department for water management and geology

Participatory observation:

No.	time	process
Saxony-Anhalt		
O1	June 2018	2nd project accompanying working group for the water development concept of the river Aller
O2	October 2018	Water advisory council
O3	November 2019	Water Forum North (Elbe-Havel-Weser)
Saxony		
O4	April 2017	Regional working group for the river Elbe
O5	May 2019	Water forum
Hesse		
O6	September 2018	Water advisory council
O7	November 2018	Water forum
NRW		
O8	September 2018	WFD symposium
O9	December 2018	Information of WFD addressees with maintenance and construction duties on measure overviews to be compiled
Thuringia		
O10	February 2019	Discussion forum for WFD addressees to establish water maintenance associations in whole Thuringia by 2020
O11	March 2019	Water workshop to determine measures for the water body Middle of Unstrut
Lower Saxony		
O12	June 2017	Area Cooperation for the river Oker

9.2 Questionnaire guideline for basic semi-structured interviews

The questions of the following questionnaire were not necessarily posed in the presented sequence but according to the flow of the talk. The questionnaire was rather a guideline to cover all relevant topics. Questions have been added. These were specific to the formats and processes of a federal state, to the position of the interviewee, or, specific to anything that seemed to be important or unclear from the document analysis or previous interviews.

Fragebogen

Manche Fragen mögen sich durch die Art der konkreten Umsetzung in (*Bundesland*) doppeln. Ich freue mich ebenso über Hinweise auf geeignete Ansprechpartner bei Fragen, die Sie nicht (sicher) beantworten können.

Was sind Ihre konkreten Aufgaben bei der Umsetzung der WRRL und im Prozess der Maßnahmenausarbeitung?
Prozessschritte der Maßnahmenausarbeitung
Wie würden Sie den generellen Prozess zur WRRL-Maßnahmenausarbeitung in (*Bundesland*) beschreiben? (oder auch verschiedene Prozesstypen)
Welche Stellen sind bei der Planung/ Umsetzung der Maßnahmen für die WRRL für was zuständig? (detailliert für den Planungsprozess) Detaillierter als Gewässer 1./2. Ordnung
Werden in (*Bundesland*) Gewässerentwicklungskonzepte (oder eine Vorplanung) oder ähnliches erarbeitet? Wenn ja wie, in welchem Umfang und von wem?
Zusammenarbeit/ Beteiligung
Welche Art der Zusammenarbeit gibt es mit Gewässerunterhaltung, Naturschutzbehörden, Landwirtschaft, Fischerei, Wasserver- und Entsorgern etc. (bitte gerne ergänzen)? Auf welchen Ebenen ist diese angesiedelt? Wie schätzen Sie die Zusammenarbeit zur WRRL-Zielerreichung ein?
Aus welchen Gründen wurden bestimmte Beteiligungsformen ins Leben gerufen?/ Welche Erwartungen haben Sie an die jeweiligen Beteiligungsformen? Werden sie den Erwartungen gerecht? An welchen Beteiligungsformen waren Sie beteiligt?
Wie wurden die Zuständigkeiten mit den angrenzenden Bundesländern/ dem Ausland in Einzugsgebieten geklärt? Wie sind die rechtlichen Grundlagen (welche Vorteile/ Nachteile hat das gegenüber alternativen rechtlichen Vereinbarungen)?
Wie verläuft die Abstimmung mit den angrenzenden Bundesländern (un-/regelmäßige Treffen? Wer mit wem? Welche Schwierigkeiten traten auf?
Wo sehen Sie Konflikte? Wo sehen Sie die Ursachen der Konflikte?
Entscheidung(en) über die Herangehensweise
Welchen Einfluss hatten (eventuell, eine zeitlang) ungeklärte Zuständigkeiten auf den Maßnahmenplanungsprozess?
Wer hat prioritäre Maßnahmen/ prioritäre Gewässer festgelegt? Wer war beteiligt? Wie war das Verfahren?
Fokus bei der WRRL-Umsetzung
Gibt es Problemfelder die verstärkt angegangen werden und andere die noch nicht im Fokus liegen? (Nährstoffe, hydromorphologische Maßnahmen, Durchgängigkeit, Regenwassermanagement in Städten etc.) Wenn ja, warum?
Weitere Prozesse
Gab es (nicht öffentlich, oder öffentliche) Infoveranstaltungen/ Seminare/ Schulungen für Mitarbeiter zur WRRL? Wann fanden sie statt? Welche Themen wurden dabei abgedeckt? Wer hat das Wissen vermittelt? Wer durfte oder war verpflichtet teilzunehmen? (für Namen der

Organisation/Abteilung etc.) Wie haben Sie diese Veranstaltungen wahrgenommen (welche Rolle hatten sie)?
Gibt es eine nicht-/regelmäßige Veranstaltung/ Regel etc. zur Auswertung der grundsätzlichen Prozesse wie die Art der Maßnahmenausarbeitung? Wurden Änderungen vorgenommen?
Gab es Reformen, die Einfluss auf die WRRL-Umsetzung hatten?
Individuelle Akteure in der WRRL-Umsetzung
Welche Aufgaben haben die mit der WRRL befassten Mitarbeiter insgesamt? (also auch Aufgaben, die nichts mit der WRRL direkt zu tun haben?) Wer war vor der WRRL schon da? Und welche Aufgaben hatten die betreffenden vor der Bearbeitung der WRRL?
Welche Aufgaben hat Ihre Abteilung und wo ist sie bei der WRRL-Umsetzung und bei der Maßnahmenausarbeitung einzuordnen?
Wie viele Mitarbeiter hat Ihre Abteilung und wie viel Arbeitszeit wird in etwa auf die WRRL verwendet?
Welchen Hintergrund/ welche (Aus)Bildung haben Sie und die mit der WRRL befassten Mitarbeiter in Ihrer Abteilung?
Wissen
Was wissen Sie über die Prozesse in den angrenzenden Bundesländern (bei denen (*Bundesland*) Gewässer nicht direkt beeinflusst werden)? Hat das Ihr Vorgehen beeinflusst? Bzw. Sind Ihnen Einflüsse auf anderer Ebene bekannt?
Zufriedenheit
Wie zufrieden sind Sie mit den bisherigen Ergebnissen/ Abläufen?
Welche Modifikationen sollten bei Maßnahmenplanung vorgenommen werden? Ist das in Planung? Wenn nein, warum nicht?
Haben Sie eine Änderung der Einstellung zur Umsetzung der WRRL bei den an der Planung beteiligten Personen wahrgenommen? Oder bei Abteilungen/ Stellen/ wichtigen Personen, deren Beteiligung zur Umsetzung nötig war? Welcher Art und bei wem?
Welche Finanzierungsmöglichkeiten gibt es in (*Bundesland*) für die Maßnahmen im Rahmen der WRRL? Unter welchen Bedingungen sind sie verfügbar?
Wie wird mit Problemen bei Eigentumsverhältnissen umgegangen?
Gibt es Renaturierungsaktivitäten oder ähnliches von Naturschutzverbänden? Wenn ja, wo bzw. von relevanter Größe? In welchem rechtlichen Rahmen könnten Naturschutzverbände hier aktiv werden?
Können Sie etwas zur zeitlichen Entwicklung der WRRL-Umsetzung in (*Bundesland*) sagen?

9.3 Material provided for additional interviews (in German)

Teil 1: Vorbereitungstext und Interviewfragen

Ausgangssituation

Über unterschiedliche Politikfelder hinweg treten immer wieder ähnliche Implementierungsprobleme auf, wie knappe Ressourcen, mangelnde Umsetzungsbereitschaft und Steuerungsschwierigkeiten. Ein Teil dieser Probleme wird über die Zeit hinweg durch Versuch und Irrtum bzw. das Sammeln von Erfahrung je Politikbereich ausgeräumt, so dass sich über Jahrzehnte eine gewisse Funktionsfähigkeit einspielt (je nach Politikfeld näher am oder weiter entfernt vom gesetzten Ziel – so scheint beispielsweise die Erarbeitung und Umsetzung von Kompensationsmaßnahmen für Eingriffe in Natur und Landschaft eingespielter als das Nachhalten der langfristigen Pflege dieser Maßnahmen).

Gleichzeitig nimmt die Komplexität unserer gesellschaftlichen Strukturen zu: Gesellschaftliche Ziele (wie zum Beispiel im Umweltschutz) wie auch private Ziele werden vielfältiger, notwendigerweise wird die Aufgabenteilung immer ausdifferenzierter (z.B. von Umweltschutz im Allgemeinen hin zu verschiedenen Zuständigkeiten für Bodenschutz, Klimaschutz, Naturschutz, Gewässerschutz usw.).

Damit kann jedes neue Politikziel bzw. Politikinstrument mit immer mehr Zielen und Instrumenten wechselwirken – positiv oder negativ. Gesellschaften brauchen aber gesamtgesellschaftliche Ziele und Instrumente, damit diese Ziele nicht im Wettbewerbsdruck zwischen Akteuren, Gemeinden und Regionen auf der Strecke bleiben, und es hat selten Jahrzehnte Zeit bis Systeme den Zielen zuträgliche institutionelle Rahmenbedingungen und organisatorische Strukturen (zusammen im Folgenden ‚Umsetzungsregime') geschaffen haben. Klimaschutz und Klimawandelanpassung wie auch Pandemien zeigen dies eindrücklich.

Übergreifende Erkenntnisse meiner Doktorarbeit

Kernerkenntnisse meiner Doktorarbeit zur Umsetzung der Wasserrahmenrichtlinie in Deutschland sind, A) dass es kontextabhängig schwierig ist ein ideales Umsetzungsregime zu identifizieren, da durch die Vielzahl der Akteure viele unbekannte Faktoren bleiben – die Kombination der Instrumente und Strukturen muss zusammenpassen. B) Streng genommen kann es kein ideales System (im Sinne von 100 % Zielerreichung) geben, da Individuen, als verantwortliche Akteure, in denselben Strukturen unterschiedlich reagieren (z.B. wegen unterschiedlicher Hintergründe und persönlicher Interessen) bzw. da Strukturen nie zu hundert Prozent identisch sind und der Kontext variiert. C) Selbst wenn ein ideales System identifiziert wäre, wäre es schwierig dies umzusetzen, da die Zuständigkeiten für Teile des Systems auf unterschiedlichste Akteure und Ebenen verteilt sind, die unabhängig voneinander und dem Gesetzgeber ihren Einflussbereich, mehr oder weniger, nach ihren eigenen Überzeugungen gestalten. Streng genommen sieht DAS Ideal auch in vielen Köpfen nicht gleich aus, so dass nicht alle an einem Strang ziehen. Dadurch entstehen Instrumente und Strukturen, die in ihrer Wirkrichtung nicht zusammenpassen.

Ideale für die Umsetzung hydromorphologischer Maßnahmen in Deutschland?

1) Akteure, die sich für die Umsetzung der Maßnahmen verantwortlich fühlen und diese realisieren
2) Ausreichend finanzielle Ressourcen für jeden dieser Akteure, um notwendige Maßnahmen zu ergreifen
3) Wissen darüber, was notwendige Maßnahmen sind und wie diese richtig anzugehen sind
4) Zugang zu Land Ressourcen in notwendigem Umfang
5) Geeignete Beteiligungsprozesse, um Interessenkonflikte weitestgehend aufzulösen und für Synergien zu nutzen
6) Priorität im Falle von unlösbaren Interessenkonflikten, soweit wie die WRRL keine Ausnahmen zulässt

Viele Möglichkeiten, aber vermeidbare und unvermeidbare Implementierungslücken!

Ist auch nur einer dieser idealen Punkte nicht erfüllt, ist eine Implementierungslücke zu erwarten. Keines der in dieser Doktorarbeit untersuchten Bundesländer erfüllt auch nur einen der genannten Punkte vollständig. Es werden unterschiedliche Strategien und Kombinationen von Strategien verfolgt (siehe unten ‚Varianzen aber kein Optimum für die Umsetzung'). Alle haben sie Vor- und Nachteile und keine sticht als insgesamt besonders vorteilhaft hervor. Solange wir nicht einem Politikziel absoluten Vorrang einräumen wollen – auch dafür gibt es gute Gründe – verbleiben immer unlösbare Interessenkonflikte (dies schließt die Landnutzung ein), die unweigerlich eine Implementierungslücke nach sich ziehen. In diesem Falle bleibt nur ein Umsetzungsregime durch Optimierung weg von einer (großen) vermeidbaren Implementierungslücke hin zur (kleineren) unvermeidbaren Implementierungslücke entwickeln.

Lösung?

- Bewusste Berücksichtigung der Vielzahl und Unabhängigkeit der Akteure (basierend auf Beobachtungen des Systems) bei Regime-Gestaltung: Wo ist ein engerer Rahmen (weniger Handlungsspielräume) nötig und wo ein weiterer förderlich?
    - Welche Akteure sind an der Umsetzung interessiert (bereit selbst aktiv zu werden)?
    - Welche Akteure haben Ressourcen, Know-How und/oder Netzwerke für die Umsetzung?
    - Da beides nicht zusammenfallen muss, welcher Aspekt lässt sich bei einer Mehrheit der Akteure leichter durch Politik-Instrumente ausgleichen?
    - Je größer die Zahl der Akteure, desto mehr Aufwand braucht es geeignete Austauschformate zu finden: Wie kann Multiplikation bewerkstelligt werden?
- kürzere Experimentier- und Lernzyklen statt/ zusätzlich zu längeren Lobby- und Wahlinduzierten Anpassungszyklen für die Ausgestaltung von Strukturen, Instrumenten und Zielen, da aufgrund der System-Komplexität Antworten auf die obigen Fragen oft erst während der Umsetzung gefunden werden können
- verschiedene Austauschebenen und -zyklen: induziert, verpflichtend oder freiwillig
- offener und ehrlicher Austausch über (Varianzen und Mehrheiten (ähnliches Vorgehen vieler Akteure)) → ‚Monitoring' der Governance-Prozesse:
    - Einzeleffekte von Strukturen und Instrumenten
    - Summeneffekte von Strukturen und Instrumenten
    - Real auftretende Konflikte und Synergien
    - Reale Nutzung der Handlungsspielräume
    - Verbesserungsvorschläge aller Ebenen
- teilweise Begleitung durch die Forschung, um Blicke zu lenken, Annahmen zu hinterfragen sowie Offenheit und Ehrlichkeit (Fehlerkultur) bezüglich der gewählten Ansätze zu fördern: Ein Ökologe mag den Blick für ökosystemare Zusammenhänge haben, aber nicht für Governance-Strukturen. Ein Verwaltungswissenschaftler mag sich mit Verwaltungsabläufen auskennen, aber nicht mit Psychologie (z.B. Motivation des Einzelnen). Für die Etablierung eines erfolgreichen Umsetzungsregimes braucht es viele Blickwinkel!

Interviewfragen

1) Würden Sie den genannten Idealen widersprechen oder diese ergänzen wollen?

2) Welche der genannten Lösungsansätze sehen Sie aktuell als erfüllt an - auf welcher Ebene?

3) Wo würden Sie ansetzen, um das Umsetzungsregime im oben genannten Sinne adaptiver zu gestalten? Wie können wir mehr ins Experimentieren und voneinander Lernen kommen? Welche Voraussetzungen müssten dafür erfüllt sein? Was halten Sie für nicht umsetzbar?

4) Denken Sie, wir kommen über Mechanismen des Experimentierens und Lernens weiter? Was würden Sie ändern (wollen), um Umsetzungslücken vorzubeugen bzw. diese schneller zu verkleinern oder zu schließen? (Damit ist nicht gemeint, beispielsweise, dass aktuelle Förderprogramme aufgestockt werden sollten oder andere Akteure zur Umsetzung bewegt werden sollen, sondern was grundsätzlicher dazu beiträgt schneller geeignete Finanzierungsregimes bzw. geeignete Akteure und die Balance zwischen Freiwilligkeit und Pflicht zu finden.)

Teil 2: Hintergrundmaterial zum Abschnitt ‚Übergreifende Erkenntnisse meiner Doktorarbeit'

Varianzen aber kein Optimum für die Umsetzung

Die Bundesländer (im Zusammenspiel verschiedener Akteursebenen) verfolgen verschiedene Ansätze, wie die Doktorarbeit gezeigt hat, geeignete Rahmenbedingungen für die WRRL-Umsetzung zu schaffen, ein gegenüber den anderen erfolgreicheres Umsetzungsregime konnte dabei jedoch nicht identifiziert werden. Alle haben ihre Vor- und Nachteile:

1) Teilweise werden Aufgaben von Landesbetrieben oder auf Bezirksebene übernommen. Mehrheitlich findet sich die Erwartung, dass bestimmte Akteurstypen (Unterhaltung) Maßnahmen freiwillig tragen. Zusätzlich finden sich einige wenige echt freiwillige Maßnahmenträger und etliche lokale Lösungen (Zusammenschluss, Übertragen von Aufgaben etc.). Insgesamt ergeben sich damit Akteurssysteme zwischen 29 und mehreren Hundert (potenziellen) Umsetzern, aber keines, welches durch besonders intensive Umsetzungsaktivitäten oder gute Voraussetzungen hervorsticht.

2) Die ‚passendsten' finanziellen Ressourcen scheinen Landesbetriebe oder die Bezirksebene (durch offizielle Zuweisung der Aufgabe) zu haben. Die Förderprogramme für die freiwillige Umsetzung bewegen sich im Spannungsfeld zwischen teilweiser und vollständiger Finanzierung von Maßnahmen, mehr oder weniger Aufwand zum Erhalten der Finanzierung, abschreckenden Sanktionen bei Verfahrensfehlern, Offenheit für verschiedene Akteurstypen (weniger passgenau) oder Zuschnitt auf einen Akteurstyp (kein potenzial für echt freiwillige Akteure), dem Nicht-Ausschöpfen der Programme und dem zu geringen Programm-Umfang, wenn Förderanträge im ökologisch notwendigen Maße gestellt werden würden. Eine nur teilweise Finanzierung motiviert einige Akteure explizit nach Synergien mit anderen Akteuren zu suchen, andere Finanzierungsmöglichkeiten (öffentlich und privat) zu finden und Kooperationen einzugehen, die es sonst vielleicht nicht gegeben hätte. Aber für sehr viele Akteure stellen Eigenanteile (oder Regeln diesbezüglich) auch ein unüberwindbares Umsetzungshindernis oder zumindest Motivationshemmnis dar.

3) Grundsätzlich haben unsere Kenntnisse über unsere Gewässer durch die Monitoring-Programme zugenommen. Dieses Wissen findet aber nicht immer (rechtzeitig) seinen Weg zu den Umsetzern. Oder ist nur bedingt hilfreich für sehr kleine Maßnahmen, in deren Nähe es keine Untersuchungen gibt. Lokalere Akteure haben, wie gemäß der Literatur zu erwarten, lokaleres Wissen und lokale Netzwerke, häufig aber auch weniger ‚WRRL-spezifisches' Fachwissen als höhere Ebenen. Mangelnde Null-Aufnahmen vor Maßnahmen (oder deren Nicht-Finanzierung) erschweren auch lokal zu lernen, ob man das ökologisch richtig angegangen ist. Sozial gibt es so viele Möglichkeiten von Synergien und Konflikten, dass sich einzelne Akteure immer nur mit einem Teil der anderen Akteure und ihrer potenziellen Interessen auskennen können. Kooperationen hängen hier von Zufall, vorhandenen Strukturen und dem persönlichen Hintergrund des Planers ab.

4) An Flächen mangelt es überall. Manche Akteure versuchen sich im gezielten Flächenerwerb (teils sehr langwierig), andere werden nur aktiv, wenn sie an Flächen kommen (durch Zufall oder durch vorsorglichen Flächenerwerb). Teilweise kann der Flächenzugriff über die Umsetzung als Hochwasserschutzmaßnahme ermöglicht werden oder als Kompensationsmaßnahme gemäß Naturschutzrecht. Letztlich bedarf es aber immer individueller Lösungen.

5) Beteiligungsprozesse gibt es auf den unterschiedlichsten Ebenen in unterschiedlichsten Formaten. Teilweise passen die Ideen dahinter in Kombination der Ebenen nicht zusammen. Im Kern liegt dies daran, dass keine Entscheidungen in den Prozessen getroffen werden (auf höheren Ebenen) oder/ bzw. die Prozesse die Beteiligten nicht an Entscheidungen beteiligen, die die Organisatoren selbst zu verantworten haben. Darüber hinaus ist eine Beeinflussung der Akteure (z.B. Information und Motivation) über Beteiligungsprozesse sehr schwierig, in Systemen mit sehr vielen Akteuren, die nicht direkt sondern über Repräsentanten beteiligt sind. Multiplikationsprozesse gestalten sich übergreifend schwierig.

6) Durch zahlreiche Gesetze existieren zurzeit (und zunehmend) zahlreiche Zielstellungen parallel, die lokal miteinander in Einklang gebracht werden müssen, was nicht leicht ist. Wenn Synergien nicht gefunden werden (sie werden nicht für alle Ziele gesucht, da es zu viele parallele Ziele gibt), werden Ziele gegeneinander abgewogen. Dies umfasst auch private Ziele, das Abwägen von Kosten und Nutzen sowie die Berücksichtigung von Sanktionsmechanismen, die üblicherweise nur für einen Teil der Ziele Gewicht haben, und politischen Druck durch lokale Bewegungen oder Akteure. Damit werden erst einmal rein fachliche Entscheidungen (wo und welcher Art sollte ein Renaturierungsprojekt umgesetzt werden) lokal politisiert (welchen Zielen geben wir lokal Vorrang im Gegensatz zu welchen Zielen sollten wir regional oder gesamtgesellschaftlich Vorrang geben). Die Verlagerung politischer Entscheidungen über den Vorrang einzelner Ziele auf die lokale Ebene führt damit lokal zu einer Überlagerung fachlicher Entscheidungen durch pragmatische Entscheidungen (welche anderen Ziele unterstützt ein Projekt, welchen steht es entgegen und welche anderen Akteure können es wie verhindern usw.). Da Abwägungsprozesse quasi nie immer zugunsten einer Zielstellung ausfallen, sind Implementierungslücken unvermeidbar – für manche Zielstellungen fallen sie kleiner aus und für andere größer. Im Falle von Maßnahmen zur Verbesserung von Hydromorphologie und Durchgängigkeit fallen Abwägungsprozesse noch mehrheitlich zu Ungunsten der umfassenden Maßnahmen aus. In Ermangelung von Anreizen werden diese Abwägungsprozesse nicht einmal mehrheitlich initiiert, sodass sie zur Begründung in der WRRL-Berichterstattung herangezogen werden könnten.

Ein Beispiel für das Zusammenpassen von Instrumenten

Die Lösungsansätze für die einzelnen Aspekte passen nicht immer zusammen. Beispielsweise führt der flusseinzugsgebietsbezogene Ansatz zu Bewirtschaftungsplänen und Maßnahmenprogrammen, die Informationen so stark aggregieren, dass lokal eine Orientierung an ihnen zur konkreten Maßnahmenumsetzung schwer möglich ist. Gleichzeitig erschwert die lokal unabhängige Umsetzung das Messen eines Umsetzungsfortschrittes (vor der eigentlichen Zielerreichung) basierend auf Bewirtschaftungsplänen und Maßnahmenprogrammen (wie ist der Umsetzungsfortschritt zu bewerten, wenn Maßnahmen umgesetzt werden, die nicht oder anders vorgesehen waren?). Darüber hinaus ist eine Öffentlichkeitsbeteiligung zu hinterfragen, die nur bedingt Einfluss auf Bewirtschaftungspläne und Maßnahmenprogramme hat, und aufgrund der Aggregationsebene fachlich nur bedingt einen Beitrag leisten kann, gerade wenn diese Pläne lokal nur wenig zur Konkretisierung der Maßnahmenumsetzung beitragen. Der Beitrag der Öffentlichkeit zu umsetzungsstrategischen Fragen könnte deutlich größer sein. Aktuell werden Ansätze einer zentralen und einer dezentraleren Umsetzung ineffektiv miteinander verwoben.

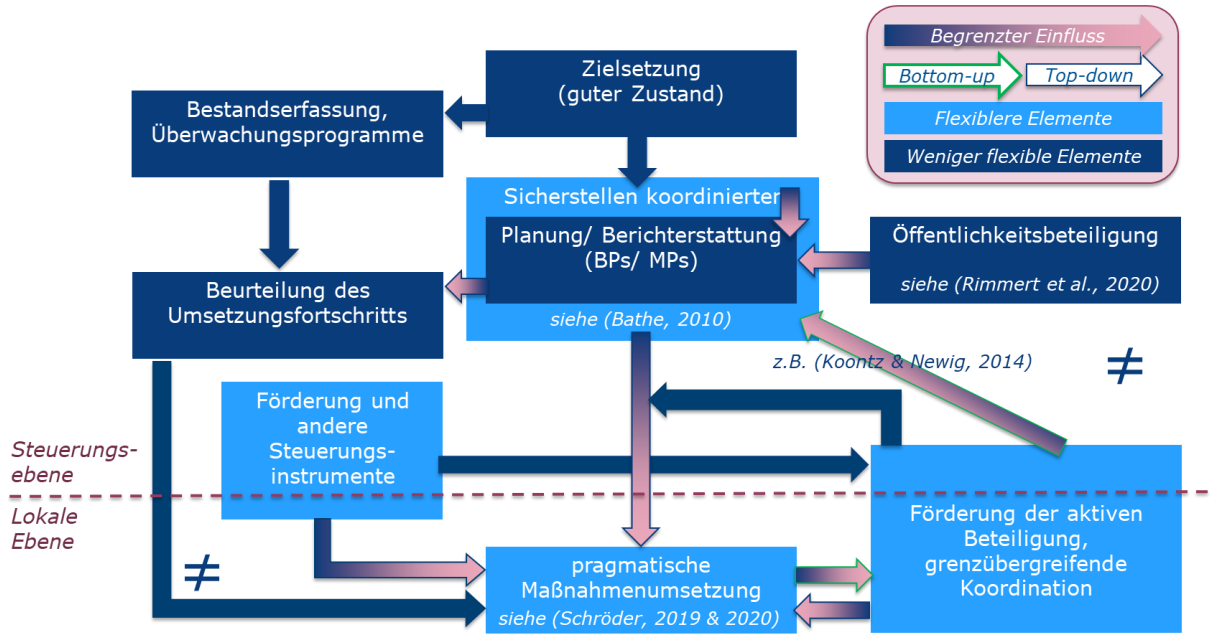


Abbildung 1 Aktuelle Umsetzung

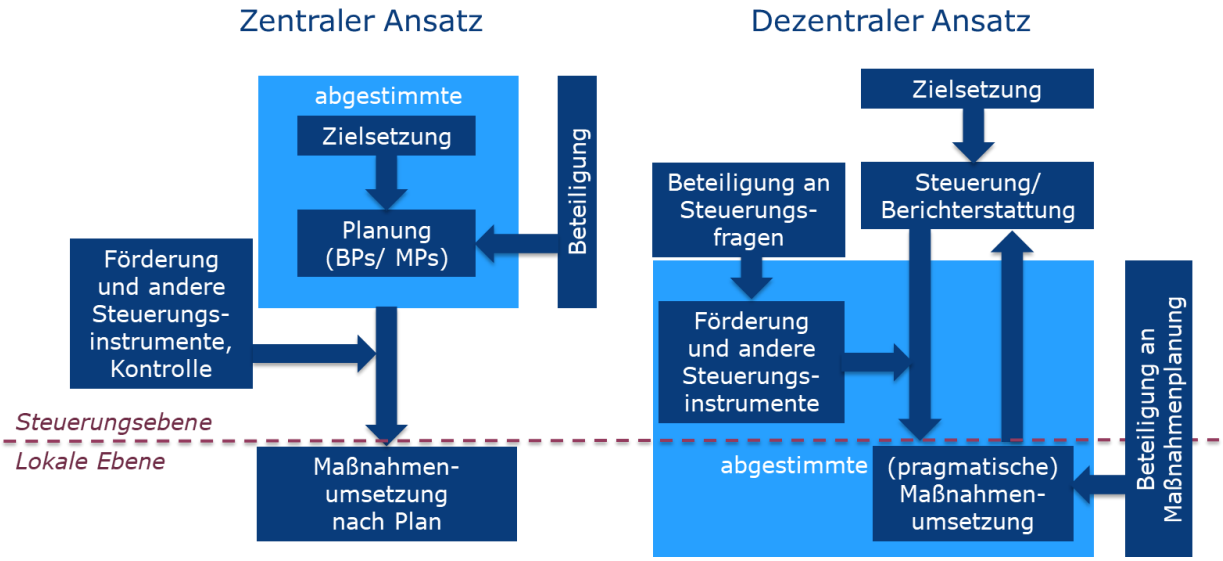


Abbildung 2 Zusammenwirken der Instrumente nach zentraler/ dezentraler Umsetzungslogik

Ein zentralerer Ansatz würde eine Beteiligung auf Ebene der Erstellung von Bewirtschaftungsplänen und Maßnahmenprogrammen vorsehen, die hinreichend konkret und verbindlich wären, dass lokal nur noch sehr begrenzt Handlungsspielräume bei der Umsetzung bestünden. Dies würde eine ausreichende Ressourcenausstattung und Vorrangstellung für WRRL-Ziele (oder zentrale Prioritätensetzung) voraussetzen, die eine rein ausführende Umsetzung erlauben. Lokales Wissen und Besonderheiten würden mit diesem Ansatz vernachlässigt, aber der Umsetzungsfortschritt könnte anhand der zentralen Vorgaben gemessen werden.

Ein dezentraler Ansatz würde die Integration mit anderen Zielen und Beteiligung auf der Ebene konkreter Maßnahmen vorsehen, Beteiligung an der Ausgestaltung von Steuerungsinstrumenten ist ebenfalls denkbar. Lokales Wissen würde auf Kosten der überlokalen (regionalen, nationalen …) Sichtweisen Berücksichtigung finden. Von der Steuerungsebene würden keine Vorgaben zum Umsetzungsumfang ausgehen, die zur Messung des Umsetzungsfortschrittes geeignet sind (das

ökologische Wirksamwerden von Maßnahmen müsste abgewartet werden). Ein Umsetzungsfortschritt ist nur soweit zu erwarten, wie er lokalen Interessen entspricht bzw. mit diesen zu vereinbaren ist.

Die Doktorarbeit hat gezeigt, dass die Interpretations- und Handlungsspielräume grundsätzlich sehr groß sind, so dass der Motivation von Individuen auf allen Ebenen eine große Bedeutung für den Umsetzungsfortschritt zukommt. Dementsprechend kommt ein dezentraler Ansatz dem real möglichen näher (eine Aufgabenteilung ist aufgrund der Systemgröße unvermeidbar). Die Beeinflussung der Anreizsysteme für einen Umsetzungserfolg ist allerdings ungleich schwieriger und kann nur iterativ und in begrenztem Umfang erfolgreich sein, da das Funktionieren des gesamten Umsetzungsregimes nur schwer prognostiziert werden kann.

9.4 PhD related conference presentations as a step to develop publications

Topic	Conference: "Presentation title" [translation if applicable]	Publication
Polycentricity as a lens and a phenomenon	Workshop Thinking Polycentrically 12/2015 Bloomington: "Identifying polycentric systems, Distinguishing them from fragmented systems: Approaches for an Operationalization, Examples from Water Governance"	
	IASC (International Association on the Study of the Commons) Conference 'Practicing the Commons. Self-Governance, Cooperation and Institutional Change' 07/2017 Utrecht: Presentation of book plan by editors	
Actor types and administrative/ hydrological boundary settings	IASC Conference 'Practicing the Commons. Self-Governance, Cooperation and Institutional Change' 07/2017 Utrecht: "Drivers, obstacles - triggers for cooperation in local polycentric governance systems?"	
Cross-sectoral cooperation	NESS (Nordic Environmental Social Science Conference) 'Social Science in Our Time' 06/2019 Luleå: "Bright spots for local WFD implementation through collaboration with nature conservation authorities?"	
WFD implementation in practice/ barriers	Workshop Rethinking European Water Protection *(self-organised)* 01/2019: "EU Water Framework Directive in Germany: Processes of success and failure in polycentric governance systems"	
	WRRL-Review-Tagung 03/2019 Berlin (*for practitioners*): „Lokale Hürden und 'Umgehungswege' in den Governance-Strukturen zur WRRL-Umsetzung in Deutschland" [WFD-review-meeting: „Local barriers and 'ways for bypassing' in the governance structures of WFD implementation in Germany"]	
	Gewässerschutzforum der Umweltverbände 11/2019 Dessau (*for practitioners*): Poster presentation of comic [Water protection forum of the nature conservation associations]	
	Erfurter Gespräche zur Wasserrahmenrichtlinie 01/2020 Erfurt (*for practitioners*): „Umsetzungshürden im Alltag: Ursachen, Folgen, Abhilfen?" [Erfurt talks on the WFD: "Implementation barriers in workaday life: Reasons, consequences, remedies?"]	
Influence of organisational structures on implementation processes	Online-Fachgespräch Governance und Finanzierungsfragen in der Wasserwirtschaft (als Teil des Nationalen Wasserdialoges) 11/2020 (*for practitioners*): „Wasser-Governance in Deutschland: Funktional für aktuelle und zukünftige Ansprüche? Beispiele aus der lokalen WRRL-Umsetzung" [Online expert-talk on Governance and Funding questions in the water management sector as part of the National Water Dialogue: "Water-Governance in Germany: Functional for actual and future demands? Examples from local WFD implementation"]	 

	ECPR (The European Consortium for Political Research) Virtual General Conference 08/2020: "The implementation logic of the EU WFD and the role of independent decision-making in polycentric governance systems"	
Effects of participatory processes on implementation	WOW6 (Workshop on the Ostrom Workshop) 'Governance: Past, Present, and Future' 06/2019 Bloomington: "Limitations to effects of participatory governance in polycentric arrangements illustrated through examples from water governance"	
	IASC Conferences 'In Defense of the Commons: Challenges, Innovation, and Action' 07/2019 Lima: "Assessing multiplication limitations of participatory governance in polycentric water governance systems"	
	ICPP5 (International Conference on Public Policy) Hybrid Conference 07/2021: "Assessing participatory process-system relationships in polycentric water governance: Insights from WFD implementation in Germany"	
Instances for advantages associated with polycentricity	IASC Virtual Polycentricity Conference 05/2021: "Order with(out) design: The role of independent decision-making for performance characteristics attributed to polycentric governance systems"	
Influence of structures on implementation processes – categorisation of structures – scope for system design	IWPP3 (International Workshops on Public Policy) Hybrid Workshop 06/2022: "Order with(out) design in polycentric governance systems: The role of independence in decision-making for WFD implementation performance and redesign"	
	WINIR (World Interdisciplinary Network for Institutional Research) Virtual Conference 'Polycentric governance & the challenges of the 21st century' 09/2022: "Order with(out) design in polycentric governance systems?"	
Approaches to (re)design policy instruments	IASC Virtual Water Commons Conference 05/2021: "Applying Ostrom's design principles to design policy instruments for water protection: Insights from a thought experiment on the EU Water Framework Directive"	
Explorative research design	ICPP5 Hybrid Conference 07/2021: "An Explorative Approach to Comparative Water Governance: Seeing and analysing local implementation polycentrically"	

10 Annexe II: PhD-related publications

The bibliographic information of the PhD-related publications is provided in Table 1 (p. 27-28). The following list shows how the papers can be accessed: Papers are attached here or can be found on the publishers' website or in a repository.

1) Comparative studies of water governance: a systematic review.: **attached,** https://doi.org/10.5751/ES-10548-230443 (open access)

2) The Lens of Polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance.: **attached,** https://doi.org/10.1002/eet.1812

3) Seeing Polycentrically. Examining Governance Situations Using a Polycentricity Lens.: https://doi.org/10.1017/9781108325721 , self-archived version (open access): https://edoc.hu-berlin.de/handle/18452/22628

4) Trapped between barriers OR Flowing despite barriers?: **attached,** https://edoc.hu-berlin.de/handle/18452/22111 (open access)

5) IWRM through WFD Implementation? Drivers for Integration in Polycentric Water Governance Systems.: **attached,** https://doi.org/10.3390/w11051063 (open access)

6) Bright spots for local WFD implementation through collaboration with nature conservation authorities?: **attached,** https://www.water-alternatives.org/index.php/alldoc/articles/vol13/v13issue3/601-a13-3-19 (open access)

7) Assessing participatory process-system linkages in polycentric water governance systems: Insights from WFD implementation in Germany.: **attached (including supplementary material),** https://doi.org/10.1111/ropr.12588 (open access)

8) Assessing the multiplication capacity of participatory processes in polycentric water governance systems.: **not published yet** (under revision)

9) WRRL-Umsetzungshürden: Unpassierbar oder durchgängig für Maßnahmenträger?: **attached** https://edoc.hu-berlin.de/handle/18452/22110 (open access)

10) Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 1 - WRRL-Zielerreichung zwischen Plan und Machbarkeit.: **attached** (The journal is published in print. Only DWA members can access archived papers online.)

11) Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 2 – WRRL-Zielerreichung zwischen Freiwilligkeit und Pflicht.: **attached** (The journal is published in print. Only DWA members can access archived papers online.)

12) Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 3 – WRRL-Zielerreichung zwischen fachlichem Anspruch und Beteiligung.: **attached** (The journal is published in print. Only DWA members can access archived papers online.)

Özerol, G., J. Vinke-de Kruijf, M. C. Brisbois, C. Casiano Flores, P. Deekshit, C. Girard, C. Knieper, S. J. Mirnezami, M. Ortega-Reig, P. Ranjan, N. J. S. Schröder, and B. Schröter. 2018. Comparative studies of water governance: a systematic review. *Ecology and Society* 23(4):43. https://doi.org/10.5751/ES-10548-230443

Synthesis

Comparative studies of water governance: a systematic review

Gül Özerol [1], Joanne Vinke-de Kruijf [2], Marie Claire Brisbois [3,4], Cesar Casiano Flores [5], Pranjal Deekshit [6], Corentin Girard [7], Christian Knieper [8], S. Jalal Mirnezami [9], Mar Ortega-Reig [10,11], Pranay Ranjan [12], Nadine J. S. Schröder [13] and Barbara Schröter [14]

ABSTRACT. Governance is key to tackling water challenges and transforming water management under the increasing pressures of competing water uses and climate change. Diverse water governance regimes have evolved in different countries and regions to regulate the development and management of water resources and the provision of water services. Scholars and policy analysts have been comparing these water governance regimes to analyze elements and processes, to assess performance, or to draw lessons. Although the number of such studies has increased since the 1980s, no comprehensive synthesis exists. We present such a synthesis by conducting a systematic review of the emerging field of comparative water governance studies, and we critically reflect on how water governance is defined, conceptualized, and assessed in different contexts. Based on the resultant insights, we identify four areas for future research: (1) improving the balance between small-, medium-, and large-*N* studies that are used in comparative studies of water governance; (2) conducting longitudinal comparisons of water governance to identify temporal governance trends and patterns; (3) expanding the geographical coverage of the comparisons to include underrepresented countries and regions, focusing more broadly on the global South; and (4) addressing the issues of justice, equity, and power, which are becoming increasingly important in tackling the water governance challenges that are exacerbated by the effects of climate change, industrialization, and urbanization.

Key Words: *comparative analysis; comparative studies; systematic review; water governance; water management; water policy*

INTRODUCTION

Water resources are under increasing pressure from competing uses and climate change (Rockström et al. 2009, IPCC 2014). Governance is acknowledged and investigated as a key challenge in achieving the long-term sustainability of this important resource (Rogers and Hall 2003, Bakker et al. 2008, OECD 2015, Pahl-Wostl 2017). Around the globe, diverse water governance regimes have evolved to regulate the development and management of water resources and the provision of water services (Hussey and Dovers 2007, Van De Meene and Brown 2009, OECD 2011). Scholars and policy analysts have responded by producing a broad body of literature comparing these water governance regimes to draw out diverse lessons (e.g., Benson and Jordan 2010, Pahl-Wostl et al. 2010, Herrala et al. 2012, Araral and Wu 2016). Here, we assess the state of scholarship on comparative water governance and its main characteristics. We identify trends, gaps, and ongoing issues to be resolved as the field progresses.

Varying perspectives exist on what defines water governance (de Loë and Kreutzwiser 2007, Woodhouse and Muller 2017). For our purposes, water governance is defined as "[…] the social function that regulates development and management of water resources and provisions of water services at different levels of society and guides the resource towards a desirable state and away from an undesirable state" (Pahl-Wostl 2015:25). This definition allows for the participation of nonstate actors but also encompasses situations in which actions and decisions are taken solely by state actors. Governance differs from the more functional exercise of water management. Water management is defined as "the activities of analyzing and monitoring, developing and implementing measures to keep the state of a [water] resource within desirable bounds" (Pahl-Wostl 2009:355).

Comparisons of water governance serve several purposes. These include identifying the ways in which water governance is shaped across varied settings, assessing performance, and drawing out lessons on what works in which context and why (Wescoat 2009, Araral and Wu 2016). Comparisons often focus on certain elements of governance. These elements include, among others, laws and policies (e.g., Gemmer et al. 2011), performance (e.g., Scott 2015), intersectoral cooperation (e.g., Jager 2016), and public participation (e.g., Wehn et al. 2015). They also include related concepts such as integrated water resources management (e.g., Brown et al. 2003) and the water–energy–food nexus (e.g., Lawford et al. 2013). Diverse definitions and methods build the basis for comparing water governance concepts and regimes across cities, river basins, countries, sectors, and regions, as well as across political, institutional, and economic contexts.

Although the number of comparative studies in water governance is increasing, there has not yet been a synthesis of these studies. Moreover, little reflection has been conducted on the different governance elements, the methods that are chosen for comparison, and the implications of those comparative choices for different water problems (excepting Wescoat 2009). To bridge these knowledge gaps, we present a systematic review of the emerging field of comparative water governance studies. We critically reflect on how water governance is defined,

[1]University of Twente, The Netherlands, [2]Department of Civil Engineering, University of Twente, The Netherlands, [3]Copernicus Institute of Sustainable Development, Utrecht University, [4]Science Policy Research Unit, University of Sussex, [5]Public Governance Institute, KU Leuven, Belgium, [6]Tata Institute of Social Sciences, India, [7]Foundation Valencia Climate and Energy of the City of Valencia, Spain, [8]Institute of Environmental Systems Research, Osnabrück University, Germany, [9]Research Institute of Science, Technology and Industry Policy, Sharif University of Technology, [10]Centro Valenciano de Estudios sobre el Riego, Universitat Politècnica de València, Spain, [11]Institut de Desenvolupament Local, Universitat de València, Spain, [12]Department of Forestry and Natural Resources, Purdue University, USA, [13]Research Group Governance, Participation and Sustainability, Leuphana University, Germany, [14]Leibniz Centre for Agricultural Landscape Research, Germany

Table 1. Overview of search strings used and resulting numbers of publications. Total $N = 214$ publications.

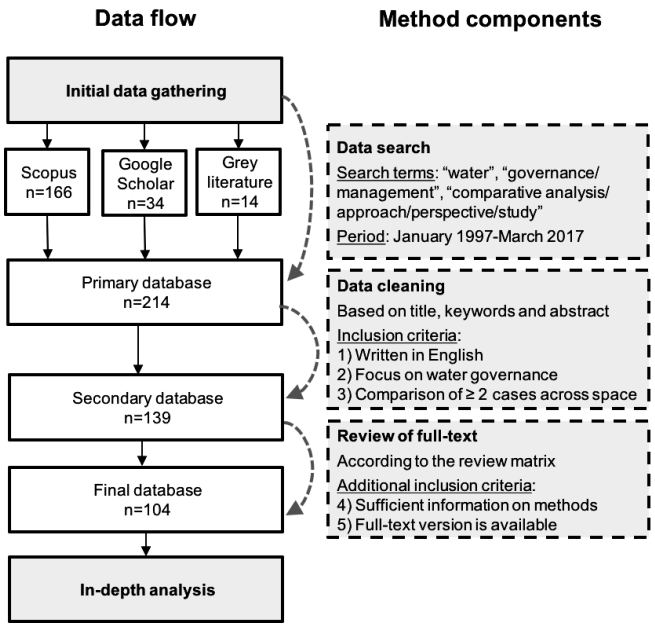
Search string	Number of publications from Scopus search engine	Number of additional publications from Google Scholar and knowledge repositories
1. "water" AND "governance" AND "comparative analysis"	80	11
2. "water" AND "management" AND "comparative analysis"	25	6
3. "water" AND "governance" AND "comparative approach*" OR "comparative perspective*" OR "comparative stud*" OR "comparison*"	61	31
Total	166	48

conceptualized, and assessed in diverse contexts, paying specific attention to the governance elements and methodologies used for comparative analyses. In doing so, we aim to provide researchers and practitioners with clear direction on how to advance the practice of comparative analysis in water governance.

REVIEW METHOD

To obtain a comprehensive overview of comparative studies of water governance, we conducted a social science systematic review (Petticrew and Roberts 2008). Systematic reviews are useful for synthesizing trends and abstracting findings from large bodies of information. The review approach and process were collaboratively designed and executed by a team of 12 international water governance scholars. All authors participated in regular online meetings to discuss the data gathering, review, and writing process. The review stages are detailed in Fig. 1 and described further below.

Fig. 1. Schematic representation of the systematic review process.



Data gathering and screening

The review focuses on publications that compare empirical cases for which data were collected by the authors of the publications or by other researchers. A "case" refers here to a delimited phenomenon, or a unit, observed at a single point in time or over some period of time (adapted from Gerring 2007:19). During the initial screening process, three inclusion criteria were applied:

1. The publication is written in English;
2. The publication contains a comparison of at least two empirical cases across geographical space;
3. The publication focuses on the governance of water resources or services (as defined earlier). Publications that compared cases from both water governance and other relevant topics such as environmental protection were included in the review (e.g., Newig and Fritsch 2009, Mahalingam et al. 2011).

During the data gathering stage, these criteria were translated into a search string that was designed to capture publications that address water governance and apply comparative approaches (Table 1). Both academic literature and professional publications were targeted. To identify peer-reviewed literature (i.e., scientific journals, books, book chapters, and conference proceedings), the search string was used to search the Scopus database. This search returned 166 publications that met the first three inclusion criteria. The search was limited to the period from January 1997 to March 2017. Scopus was selected because of its broad coverage of social sciences. We ran a parallel search in Google Scholar, focusing on the first 200 results. The Google search added 34 new publications to our database. To capture professional publications ("grey" literature), we searched the Organisation for Economic Co-operation and Development (http://www.oecd-ilibrary.org) and United Nations (http://www.un-ilibrary.org) repositories. These searches added 14 publications to the review process. After removing duplicates, bibliographic data from 214 publications were compiled in an online spreadsheet for analysis.

The abstract, title, and keywords of each publication were screened by two members of the review team (authors of publications were not allowed to review their own publications). If these three areas provided insufficient information to make a decision on inclusion, the full text of the publication was examined. After screening the 214 publications, 139 publications were retained for inclusion in the in-depth review. We are aware of several potentially relevant publications that were not captured

by the database scans. However, the final database is the result of the strict application of selection criteria and provides sufficient coverage of publications on comparative water governance to develop comprehensive insights.

In-depth review process

During the in-depth review process, two more inclusion criteria were applied in addition to the first three criteria:

1. The publication provides sufficient information to conduct an in-depth review of the parameters used for the comparison, data sources, data collection, and analysis methods;
2. The publication's full-text version is available to the review team.

One publication was excluded because the review team could not access the full text. Another 34 publications were excluded because they were conceptual rather than empirical (N = 11) or they did not focus on water governance or provide sufficient information to conduct an in-depth review (N = 23). The results presented here are based on the analysis of the final dataset of 104 publications (see Appendix 1 for the list of publications included in the in-depth review).

The review process was guided by a review matrix that contained entries for thematic and geographic scope, definition of water governance, comparative framework, governance elements that are being compared, unit of analysis, case selection rationale, case delineation, data collection and analysis methods, and comparative methods. An initial version of the matrix was developed based on existing reviews of water governance and management (e.g., Cook and Bakker 2012, González Tánago et al. 2016, Varady et al. 2016). This matrix was tested by the review team using the same four publications to ensure that all team members had a common understanding of the review categories. The matrix was refined based on feedback from team members. The refined matrix (Appendix 2) was then used to review the 104 full-text publications. Each publication was reviewed by two members of the review team. Each team member reviewed approximately 11 publications as first reviewer, and another 11 publications as second reviewer. Differences in interpretation were resolved through discussions between the two reviewers and, where necessary, with the larger review team.

Limitations

The final database of reviewed publications does not contain any professional studies, despite the initial aim to capture that literature. The selection criteria required sufficient information on the comparative framework and methods used to conduct an in-depth review using the review matrix. None of the professional publications returned in the searches provided sufficient information. Book chapters and introductions or conclusions to journal special issues were often excluded for the same reason. As well, given our interest in elements and methods of comparison, only publications that compared at least two empirical cases were included in the review. As a result, conceptual papers, which did not compare empirical cases, were excluded. Finally, review is a subjective process that involves many decisions regarding how to classify publications. We attempted to limit subjectivity through the review process described above. However, some variation in interpretation is inevitable.

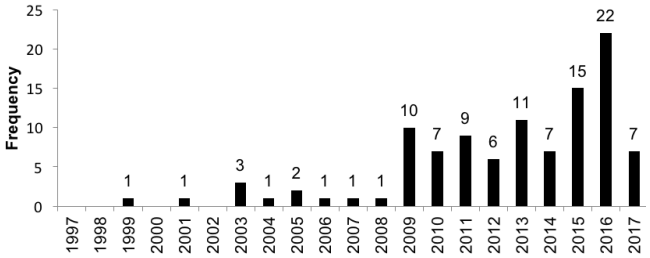
EMERGENCE AND CONCEPTUAL BASIS OF COMPARATIVE WATER GOVERNANCE STUDIES

Here, we provide a descriptive overview of the evolution of the comparative water governance field based on an analysis of the reviewed publications. We focus on how attention to comparative studies is evolving, how water governance is defined, what governance elements are compared, and which frameworks are used.

Comparative studies of water governance in the academic literature

To obtain a comprehensive overview of the scholarly literature on comparative water governance, we analyzed the number of publications over time and in different journals, the publications that were most widely cited, and the major issues on which the reviewed publications focused. Examining the number of publications over the past two decades (1997–2017) showed a gradual increase since 2009 (Fig. 2). Because the publications were selected through a systematic process, this is an indication that scholarly attention to comparing water governance across two or more case studies is growing.

Fig. 2. Number of publications each year meeting the search criteria (January 1997–March 2017).



Although the comparative studies on water governance are published in diverse outlets, the most popular journals were *Environmental Policy and Governance* (nine publications), *Ecology and Society* (seven publications), *Water Policy* and *Environmental Science and Policy* (six publications each), and *Regional Environmental Change* and *Water International* (four publications each). Further analysis of the most widely cited comparative water governance publications in Scopus (Table 2) shows that most of these publications were published in water- or environment-oriented journals in the period between 2009 and 2012. The number of cases compared as well as the methods used for comparison vary significantly. There is no correlation between a high number of citations and a specific journal or method, or a high or low number of cases. The first publication (Newig and Fritsch 2009), which stands out in terms of number of citations, is a meta-analysis of 47 cases on environmental governance, including cases on water governance.

Comparative water governance studies focus on a wide range of water-related issues (Table 3). The greatest proportion of the reviewed publications (N = 25) focuses on river basin management. Other issues that were frequently examined include agriculture (N = 14) and urban water services (N = 13). The majority of the agriculture-oriented publications are centered on

Table 2. Overview of the most-cited articles, receiving > 50 citations in Scopus until March 2017.

Times cited	Authors	Year	Title	Journal	Number of cases compared	Comparative method
256	Newig and Fritsch	2009	Environmental governance: participatory, multi-level and effective?	*Environmental Policy and Governance*	47	Statistical
76	Pahl-Wostl et al.	2012	From applying panaceas to mastering complexity: toward adaptive water governance in river basins	*Environmental Science and Policy*	29	Mixed: statistical and qualitative
71	Mukherji and Shah	2005	Groundwater socio-ecology and governance: a review of institutions and policies in selected countries	*Hydrogeology Journal*	4	Qualitative
56	Huntjens et al.	2010	Climate change adaptation in European river basins	*Regional Environmental Change*	4	Mixed: qualitative and formal comparative analysis
56	Srinivasan et al.	2012	The nature and causes of the global water crisis: syndromes from a meta-analysis of coupled human-water studies	*Water Resources Research*	22	Set-theoretic
55	Huntjens et al.	2011	Adaptive water management and policy learning in a changing climate: a formal comparative analysis of eight water management regimes in Europe, Africa and Asia	*Environmental Policy and Governance*	8	Mixed: statistical and set-theoretic
53	Meijerink and Huitema	2010	Policy entrepreneurs and change strategies: lessons from sixteen case studies of water transitions around the globe	*Ecology and Society*	16	Qualitative
52	Harris and Alatout	2010	Negotiating hydro-scales, forging states: comparison of the upper Tigris/Euphrates and Jordan River basins	*Political Geography*	2	Qualitative
51	Garrick et al.	2009	Water markets and freshwater ecosystem services: policy reform and implementation in the Columbia and Murray-Darling basins	*Ecological Economics*	2	Qualitative

irrigation (13 of 14). Six of these irrigation-centered publications investigate institutions or institutional reforms, and three investigate the functioning of water user associations. Within the category of urban water services, water supply (N = 4), water utilities (N = 3), and wastewater (N = 3) are the three main subissues examined. The remaining categories all contain between four and seven publications. Our selection includes 27 publications that did not fall within one of the predefined categories. These publications focus on diverse issues such as coastal recreational water quality, water quality in urban and rural areas, and comparison of user- vs. agency- vs. market-based governance.

Definition of water governance

For the selected publications, we analyzed whether and how water governance was defined. Of the 104 publications, 31 do not provide a definition of water governance or of a specific aspect or form of governance. Almost half of the reviewed publications (N = 51) provide a definition of a specific aspect or form of water governance, rather than a generic definition. The aspects that were most commonly defined are public participation or participatory governance (N = 6) and adaptive capacity or governance (N = 5). In addition, definitions of the following aspects or forms of governance were provided in three publications each: groundwater governance, multilevel governance, collaboration or collaborative governance, and integrated water (resources) management. The remaining publications in this category (N = 28) provide definitions for a wide range of governance aspects and forms.

Table 3. Categorization of the main governance issue compared across cases.

Main issue	Number of publications
River basin management	25
Agriculture	14
Urban water services	13
Flood risk governance	7
Groundwater governance	5
Transboundary water management	5
Environmental protection	4
Watershed management	4
Other	27
Total	104

Only two publications propose their own definition of water governance. First, Pahl-Wostl et al. (2012:25) define water governance as a system with "structural features and transient processes at both rule making and operational levels," that "takes into account the different actors and networks that help formulate and implement water policy." Araral and Yu (2013:5307) define water governance in terms of "various dimensions of water law, policies, and administration that have been commonly regarded in the literature as determinants of performance. These include water rights, pricing, decentralization, accountability, integration, private sector participation, user group participation, and organizational basis of water management, among others."

From the reviewed publications, fewer than one-quarter of them (N = 20) refer to an existing definition of water governance. Only

one existing definition of water governance, which is the definition by the United Nations Development Programme (UNDP 1997), is cited in two publications. All other existing definitions (18 in total) are cited only once. In eight publications, two different references are cited when providing a definition of water governance. This result implies that there is no common approach to defining water governance within studies of comparative water governance. However, this situation may be partially explained by the emphasis of comparative studies on varying aspects or forms of governance, rather than a broad, encompassing definition of water governance.

Governance elements being compared

To understand what is being compared, we identified eight different categories of water governance elements (Table 4). These governance elements are based on Rogers and Hall (2003), one of the most-cited publications that elaborates on the principles and conditions of water governance. Rogers and Hall (2003) acknowledge the integrated nature of the principles and conditions for operationalizing normative or performance-oriented governance concepts such as "good" and "effective" water governance. We used these concepts as the basis for categorizing the multiple elements of water governance; however, we did not apply them to evaluate the governance systems. While scrutinizing the governance elements compared in the reviewed publications, we observed that most publications considered two or more governance elements (N = 66). The most common governance element is "legislation, instruments, and policies" (N = 52). For example, Lopez-Gunn (2003) compares the types of rules developed by different regional water authorities in Spain. Likewise, Erickson (2015) compares state-level water management and funding policies in USA.

Table 4. Theoretical concepts or governance elements that were assessed and compared in the publications.

Concept or element	Number of publications
Legislation, instruments, and policies	52
Participation and stakeholder involvement	41
Water or environmental management and outcomes	37
Cooperation and coordination	36
Governance qualities	35
Governance levels	29
Resources	28
Knowledge or expertise	17
Other	20

"Participation and stakeholder involvement" is often interpreted as a key component of water governance, as reflected in the high number of publications (N = 41) focusing on it. However, the issues investigated in relation to participation vary significantly. For example, Wehn et al. (2015) compare participation in flood risk management in the UK, Netherlands, and Italy. Benson et al. (2013) specifically compare the nature and quality of participation in their examination of the collaborative turn in water management across Europe, USA, and Australia. Publications focusing on "water or environmental management and outcomes" (N = 37) often look at the efficacy of water governance. For example, Scott (2015) systematically compares physical water quality indicators to determine whether collaborative governance processes actually produce the improved environmental outcomes that they are assumed to create. The next most common category (N = 36) specifically compares "cooperation and coordination." To illustrate, Pahl-Wostl et al. (2012) compare regimes varying in coordination and power distribution and determine that those with distributed power but effective coordination perform better than those without such characteristics. Other common categories were "governance qualities" such as transparency, inclusion, coherence, equity, accountability, efficiency, and adaptiveness (N = 35); "governance levels" (N = 29); "resources" such as power and finance (N = 28); and "knowledge or expertise" (N = 17). The publications in which the compared governance elements were not sufficiently captured by the eight predefined categories were assigned to the ninth category: "other" (N = 20).

Frameworks used to perform comparative analysis

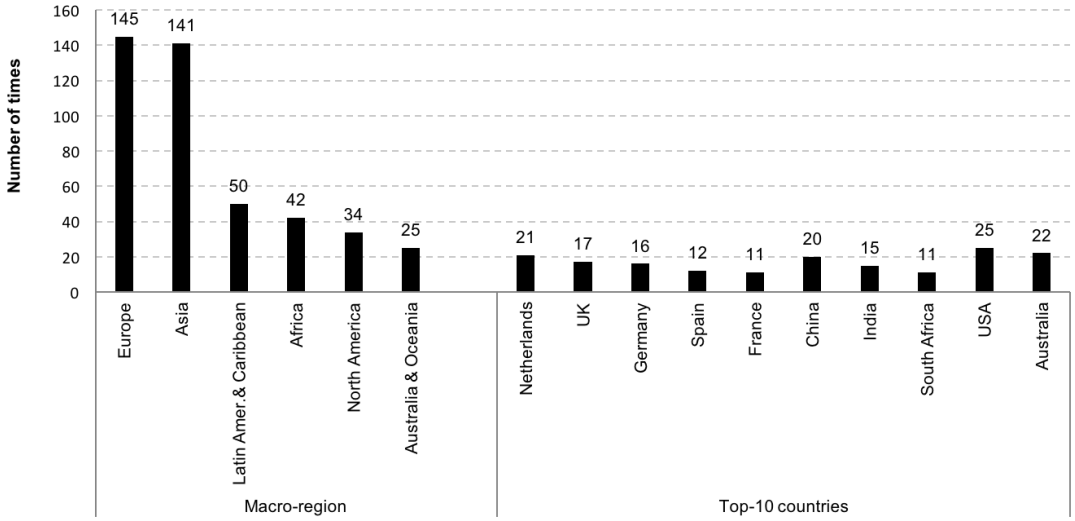
We expected frameworks to play an important role in comparative studies. Following Ostrom (1990:192), we define a framework as a "set of variables and the types of relationships among variables that need to be examined in conducting any theoretical or empirical study of a particular type of phenomenon." The frameworks for performing comparative analysis fall into one of four categories: (1) application of an existing framework for the comparison of cases; (2) development of a new framework based on theory, which is then used for the comparison of cases; (3) inductive development of a new framework out of the comparison of cases; and (4) no or unclear framework.

Almost half of the publications (N = 54) develop their own framework from existing theory and then use it to compare cases. Of these, 32 publications created "original" frameworks that used diverse theory to construct a new framework for comparison. For example, Van Buuren et al. (2016) use theory on policy processes, power, and framing to develop a comparative framework that examines processes of "puzzling, powering, and framing." The remainder of articles in this category (N = 22) create a new framework by building on a specific existing framework or approach.

About one-fifth of the publications (N = 19) use existing frameworks for comparison without making major modifications. Ostrom´s institutional analysis and design (IAD) and social-ecological system (SES) frameworks, both based on institutional design principles, are used most frequently (N = 4 each). Dinar and Saleth's (2005) framework on water policies, laws, and administrations, and Bressers et al.'s (2013) water governance assessment tool are both applied twice. Other existing frameworks that were identified are all used just once. No single framework emerged that is widely used for comparative analyses of water governance in its original form.

There was significant diversity in the frameworks used after modifications or adaptations. Two frameworks were most often modified or adapted to build new frameworks, namely, Ostrom's design principles (N = 4), and Pahl-Wostl's framework for analyzing regime characteristics (N = 3). For example, Huntjens et al. (2010) integrate Pahl-Wostl's (2007) framework with the river basin assessment framework of Raadgever et al. (2008) to develop a new framework for comparison.

Fig. 3. Number of cases located in a specific macroregion and country.



In seven publications, authors construct new frameworks through an inductive approach. In these cases, the comparative framework is developed as a result of the comparative analysis instead of using a predefined framework to guide comparisons. For example, Lebel et al. (2005) follow an inductive process to develop and test measures of "fit" relative to water governance regimes. These fit measures are then compared across geographical settings.

Upon in-depth examination, we found that almost one-quarter of the studies (N = 24) that made it through the first two rounds of screening do not clearly articulate their comparative framework, i.e., they did not explicitly show which specific governance elements they compared. These articles contained enough information for the review team to conduct a review, but required close reading of the study results to determine what authors were comparing. For example, Brown et al. (2006) summarize findings across three cases and provide lessons on impediments to the implementation of sustainable urban water management. However, they do so without clearly describing the elements they compared.

A cross-sectional analysis of the frameworks and the compared governance elements shows that when existing frameworks are used (N = 19), comparisons mainly focus on multilevel governance systems and institutions (N = 3 each). For papers that develop their own frameworks from existing theory (N = 54), comparisons focus mainly on actors, institutions, multilevel governance, and adaptive capacity.

CASES, DATA, AND METHODS USED FOR COMPARING WATER GOVERNANCE

Here, we focus on the empirical cases that are compared in the reviewed publications. We examine why the cases are selected, where they are located, what boundaries are used to delineate cases, and what data and methods are used.

Case selection rationale

During the review process, we collected qualitative information about the rationale behind the selection of empirical cases for comparison. Four general, partly overlapping categories emerged as we refined the review matrix. The most frequent rationale (N = 42) is the selection of cases that are similar (in terms of key characteristics) or most similar (cases are very similar and only differ in the dependent variable). For publications in this category, the authors' main goal is to examine and understand a specific issue in multiple, similar cases. For example, Brisbois and de Loë (2017) studied the actions, roles, and motivations of the natural resource industries involved in collaborative water governance in two case studies that involve active participation of both provincial government representatives and major natural resource industry actors. Silveira et al. (2016) selected cases from two river basins that are similar (industrialized, densely populated, and intense trade-offs) and thus likely to necessitate cross-sectoral collaboration. They compare two cases that are very similar (two sub-basins of the same river basin) as well as two sub-basins that are similar but differ in terms of physical and governance characteristics (European vs. Chinese catchments).

Another popular rationale (N = 20) is to study specific issues or to extract some critical findings by comparing diverse cases. For example, Mosello (2015) examine adaptive capacity across developed and developing country cases. Meijerink and Huitema (2010) compared 16 diverse cases to extract the change strategies of policy entrepreneurs in water transitions.

Data availability is also a frequent rationale for case selection (N = 14). For example, Lebel et al. (2013) and Knieper and Pahl-Wostl (2016) both use the data set that was created during the European Twin2Go project. However, most of studies that cite data availability as a case selection rationale also indicate other rationales. For example, Newig and Fritsch (2009) explain that, although completeness of information was their main selection criterion, they used a diversity of cases in terms of political issues, scales, and societal contexts as other criteria.

Lastly, almost one-quarter of publications (N = 28) do not provide a clear rationale for case selection. They refer to similarities and differences at the same time (N = 8) or simply focus on a specific

geographical area (N = 20). For example, Yu et al. (2016) studied two villages in the Shiyang River basin to explore whether water user associations can improve water governance in China. The reasoning for selecting these cases is not explained in the publication.

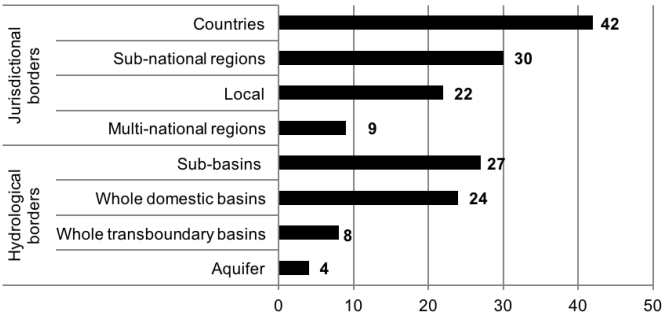
Locations and boundaries of cases

For all reviewed publications, we identified the locations of the compared cases in terms of their macroregions and countries (Fig. 3). From this analysis, it can be discerned that Europe (145 cases) and Asia (141 cases) are by far the most represented macroregions. In contrast, USA and Australia are the most-studied countries, with 25 and 22 cases, respectively, although they are both in other macroregions. The Netherlands is the most-studied country in Europe (21 cases), whereas China is the most-studied country in Asia (20 cases).

It is also worth noting that, in some publications, the European Union (EU) is treated as a single unit of analysis to compare it with federal political systems such as in USA and Australia (e.g., Benson and Jordan 2010, Benson et al. 2012, 2013). Also of interest is that the single states of the USA are sometimes compared with other countries. This means that there are some cases where the jurisdictional comparison is not between similar administrative units but, for example, between a subnational unit and a national unit, or a national unit and a multinational unit.

Publications were also analyzed with regard to the jurisdictional and hydrological boundaries applied to delineate cases. We found that 85 publications use jurisdictional boundaries, 18 publications use hydrological boundaries, and 31 publications use both hydrological and jurisdictional boundaries to delineate cases (Fig. 4). For example, Pahl-Wostl et al. (2013) delineate their cases by a combination of jurisdictional and hydrological boundaries (i.e., Hungarian Tisza basin, German Rhine basin, Dutch Rhine basin). In one publication (Edelenbos et al. 2015), it is unclear from the case descriptions whether the names of the selected cases represent hydrological or jurisdictional boundaries.

Fig. 4. Number of cases using different types of jurisdictional and hydrological boundaries.



From the publications that apply jurisdictional boundaries (either exclusively or in combination with hydrological boundaries), countries are used to define case boundaries in 42 of these publications. Subnational (N = 30) and local (N = 22) boundaries are also used. Multinational boundaries (9 publications) are the least common. In the set of publications using hydrological boundaries, the type used most often are sub-basins of transboundary or domestic basins (N = 27) followed by whole domestic basins (N = 24; Fig. 4).

Case study data and methods

The number of cases compared varies widely, ranging between 2 and 233. Most publications include two (N = 41) or three (N = 20) case studies in their comparisons. More than 50 cases are compared in only three publications (Heikkila 2004, Scott 2015, Zingraff-Hamed et al. 2017).

We categorized the publications with regard to the use of primary and secondary data. Primary data implies that original data are collected directly by the researchers involved, e.g., through interviews, questionnaires, observations, or document analysis, to meet a specific research goal (Hox and Boeije 2005). Secondary data are gathered on the basis of previous studies; these data can include sources such as censuses, government reports, and previous projects that did not involve the authors (Ghauri and Grønhaug 2005). Many of the reviewed publications (N = 59) are based on primary data. For these publications, data were collected mainly using qualitative methods such as interviews and document analysis. In addition, a few publications are based on large-N surveys (e.g., Lebel et al. 2013, Kadirbeyoglu and Özertan 2015, Harris et al. 2017, Zingraff-Hamed et al. 2017). We also identified one publication for which the authors conducted field experiments (Ibele et al. 2017). Only seven publications are based exclusively on secondary data. These data were sometimes obtained for research purposes by other authors (Doorn 2017) or by the authors themselves (Pahl-Wostl and Knieper 2014, de Boer et al. 2016) within the context of previous research. In several publications, the authors use data that were collected by others for organizational purposes (Herrala et al. 2012) or within the context of cyclical reporting (Jager 2016). Finally, 24 publications used both primary and secondary data, whereas 15 publications did not provide detailed information about how data, most notably documents, were collected and analyzed.

To obtain an improved understanding of the methods that are used in comparative water governance analysis, we made a distinction among three broad categories of methods: (1) qualitative methods, (2) quantitative methods, and (3) set-theoretic methods (Table 5). Set-theoretic methods are studied as a separate category because they focus on membership scores of elements in sets. These methods are particularly useful when comparison aims to draw attention to complex causal patterns. One of the most well-known set-theoretic methods applied in water governance research is qualitative comparative analysis. It is often applied to the analysis of a mid-sized number of cases, but can also be used to analyze a large number of cases (Schneider and Wagemann 2012).

A majority of the analyzed publications (N = 76) compares cases using qualitative methods only. Most of these qualitative studies (N = 56) compare only two or three cases. In 17 publications, four to six cases are compared. Three publications compare a mid-sized number of cases (11–16). Three-quarters of the exclusively qualitative studies (N = 56) compare cases on the basis of descriptive information only. To allow for a more systemic approach or comparison, authors sometimes use systematic coding of data (e.g., Brisbois and de Loë 2016) or present their results in tables (e.g., Vink et al. 2015) or visuals (Pahl-Wostl et

al. 2013). In addition, comparisons are sometimes made using categories to rank the cases systematically (e.g., absence or presence; measurement scales; low, medium, or high; none, little, or strong).

Table 5. Number of publications using qualitative, quantitative (statistical), or set-theoretic methods as a single analysis method or in combination with another method.

Method	Used as a single method	Used with another method
Qualitative	76	12
Quantitative	7	15
Set-theoretic	6	3
Total	89	15†

†In mixed-method approaches, quantitative methods are used together with qualitative or set-theoretic methods. Therefore, quantitative methods are counted twice, and the total number sums to 15.

Quantitative methods are used to compare cases in 22 publications, but only a minority ($N = 7$) of these studies solely applies quantitative methods. The quantitative methods that are applied include descriptive statistics (e.g., weighted mean, standard deviation), statistical analysis (e.g., regression or correlation analysis, measures of fit), and other quantitative methods such as economic models or data envelopment analysis (a programming methodology to measure the efficiency of multiple decision-making units). For example, Chai and Schoon (2016) use data envelopment analysis to measure the efficiency of government spending, and use qualitative comparative analysis to compare data for 20 counties in south China.

In 12 publications, both quantitative and qualitative methods are used. For example, Huntjens et al. (2010) combine formal comparative analysis with qualitative information to compare cases. Pahl-Wostl et al. (2012) combine linear regression analysis with case-sensitive analysis and clustering. Zingraff-Hamed et al. (2017) compare cases using methods for statistical analysis and qualitative textual analysis. We also identified three publications that combine quantitative methods with methods for qualitative comparative analysis. Publications that rely on statistical methods alone are relatively uncommon ($N = 5$).

In five publications, quantitative methods are used to compare a large number of cases (> 40). For example, Scott (2015) uses hierarchical linear regression modeling to compare 233 collaborative watershed groups. Dinar and Saleth (2005) use descriptive statistics to compare water institutions across 43 countries. Newig and Fritsch (2009) present a meta-analysis of 47 participatory governance cases. In seven publications, quantitative methods are also used when authors compare a very small number of cases. For example, Araral and Ratra (2016) compare water governance in India and China, and Harris et al. (2017) compare urban settlements in Ghana and South Africa with respect to gender issues. In both publications, data were collected using a survey questionnaire and were analyzed using statistical methods. The two countries were then compared on the basis of the resulting quantitative figures. Thus, the actual comparison was not done using statistical analysis.

DISCUSSION

Our review reveals a number of findings that help characterize the field of comparative water governance, and illuminates directions for improvement and future research. We highlight three important issues.

Emergence of comparative water governance studies as a new field

The analysis of reviewed publications shows several general trends in the practice of comparative water governance. In particular, the comparative study of water governance is a relatively recent phenomenon. Most comparative studies of water governance have been published since 2009. This finding is likely reflective of the fact that water governance itself is a fairly young field (Pahl-Wostl 2015). Discussions of "governance," as opposed to "government," arose in the 1980s amid increasing political and institutional reforms that introduced market-focused as well as participatory mechanisms. Private companies and civil society organizations were increasingly seen to have a role in making and executing decisions that had formerly been the sole purview of governments (Rhodes 1996, Peters 2001). Studies that examine water governance have proliferated since the late 1980s (Woodhouse and Muller 2017). As the literature has expanded, it is logical that scholars have begun to focus on what generalizable findings can be gleaned by comparing across multiple cases. We expect that there will be more emphasis on comparing water governance across different settings in the coming years.

Conceptual basis of comparative water governance studies

Definitions of water governance are very distinct or diffuse, and there is no agreement on a common definition. Similarly, there is no single framework that is widely used for comparative analyses of water governance. More than half of researchers substantially modified existing frameworks, or developed their own framework from existing theory, and then used this to compare cases (e.g., Heikilla 2004, Erickson 2015). Nevertheless, digging more deeply into the frameworks that are used as base material to create modified frameworks, the influence of Elinor Ostrom on the field of comparative water governance becomes clear. Ostrom's own work (e.g., Ostrom 1990) is directly cited only eight times across publications that either made use of her framework directly or modified it. However, many of the other frameworks that are cited draw upon Ostrom's design principles or the IAD framework. For example, the management and transition framework of Pahl-Wostl et al. (2010) builds upon the "action situation" concept in the IAD framework (Ostrom 2005), and the water governance assessment tool of Bressers et al. (2013, 2016) references Ostrom's design principles and ideas.

More generally, there appear to be three distinct substreams within the research community. In the first substream, researchers focus on building databases and abstracting findings based on comparisons that use broad frameworks in a systematic manner to make more defensible claims (e.g., Knieper and Pahl-Wostl 2016). This idea can be traced back to the SES framework (Ostrom 2007), which allows sophisticated analyses and comparisons of SESs to overcome the promotion of panaceas in resources management. Publications using the management and transition framework provide another example of this substream (e.g., Knieper et al. 2010, Pahl-Wostl et al. 2013). The second substream builds upon existing theory to fill gaps in the understanding of

water governance dynamics, even if it is only through small-*N* studies. This group appears to be interested in pushing the conceptual boundaries as they try to account for the complexity of water governance by using different ideas, concepts, and frameworks drawn from diverse disciplines and experiences (e.g., Gemmer et al. 2011, Clarvis and Engle 2015). Unlike the first substream, these studies do not abstract from case studies, but instead try to make profound descriptions of specific governance concepts. For instance, Kadirbeyoglu and Özertan (2015) elaborate on the role of power in irrigation management decentralization in Turkey by linking their assessment to the IAD framework. Finally, the third substream focuses on understanding case- or place-based problems. These studies may not always contribute substantially to theory building but provide valuable observations and insights on the situations under study. For example, Mahalingam et al. (2011) studied three coordination agencies that were involved in water and sanitation projects in India and observed their performance through five parameters that were not linked to any specific theoretical framework. Findings from the second and third substreams, if sufficiently established, are often taken up by the first, and more rigorously established through systematic analysis. For example, as McGinnis and Ostrom (2014) argue, the IAD framework was mainly shaped based on multiple case studies analyzed by the Indiana University Bloomington Workshop in Political Theory and Policy Analysis.

The wide range of conceptual approaches used in designing and adapting analytical frameworks indicates that water governance is a topic of broad relevance that cuts across disciplinary boundaries. Approaches that use new or modified frameworks to fill gaps in the understanding of water governance are extremely important. For example, Clement's (2010) use of power theory to modify the IAD framework (Ostrom 1990, 1999, 2005) provides a valuable, refined tool that helps to account for the ways that power shapes governance processes and defines outcomes. Likewise, large-*N* studies have the ability to test theoretical propositions and generate findings that can be applied across contexts. For example, Knieper and Pahl-Wostl (2016) show that good environmental status in river basins seems to depend primarily on the overall level of pressure from human use rather than the quality of water management. Just as small-*N* studies are unable to claim broad generalizability, large-*N* studies often paint with a very broad brush that needs to be contextualized to be applicable to local contexts. However, together, the two approaches appear to be contributing to a robust system of knowledge generation.

Our analysis of the frameworks also revealed that almost one-quarter of the reviewed publications did not establish a clear comparative framework. This finding means that they did not scrutinize the relationships among the different variables that they used for comparing the multiple cases and, thus, lacked the theoretical or empirical foundation for making sound comparisons. The high prevalence of such publications indicates that there is significant room for improvement for researchers, journal editors, and reviewers in producing strong, clearly defined results from comparative research.

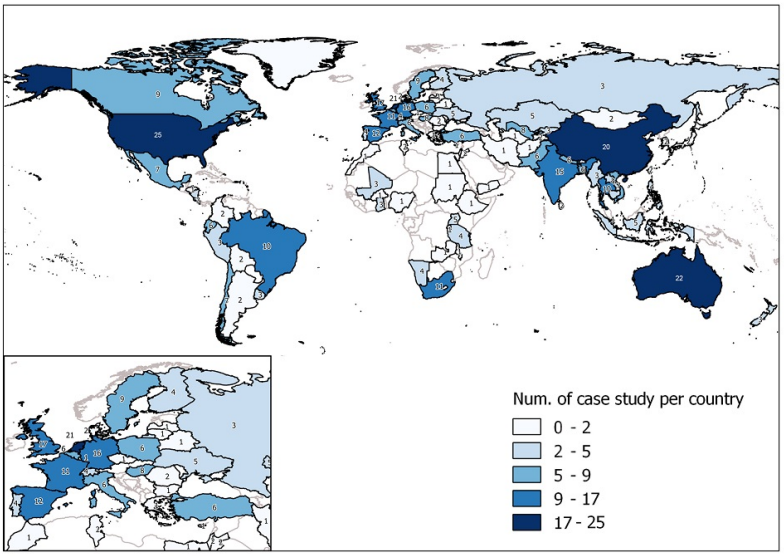
Empirical basis of comparative water governance studies

Despite the expansion of comparative studies, the number of cases compared remains fairly low. Studies that compared more than five cases were relatively infrequent ($N = 28$). This result likely reflects the largely qualitative approach that has been taken in studies of water governance ($N = 76$). Examining large-*N* studies using qualitative methods can be extremely time and resource consuming. For this reason, it is logical that large-*N* qualitative studies are rare. However, publication rates of studies based on large-*N* studies have been increasing in recent years. This trend may lead to a new class of generalizable findings that can contribute to the understanding of water governance. For example, Zingraff-Hamed et al. (2017) analyzed 75 urban river restoration projects and found that the role of macrolevel governance is often limited. Instead, factors such as the relationships between nature, people, and the river, which are expressed through microlevel governance, are often more important in shaping governance outcomes. Using these methods, such findings can be more reliably applied to other contexts.

The compared cases are unevenly distributed across the globe (Fig. 5). This pattern reflects the uneven distribution of global resources, including within the research community (Salager-Meyer 2008). High concentrations of studies in Europe and Asia, and particularly, in USA, Australia, the Netherlands, and China, reflect a bias in the distribution of global wealth, combined with those countries that have particularly pressing water issues such as sea-level rise in the heavily dyked Netherlands and water supply and distribution in drought-prone Australia. Although the overrepresentation of USA, China, and Australia can also be explained by their size, the Netherlands constitutes an exception, given its relatively small area. Scholars publishing on water issues in developing countries may also be more likely to frame their research according to development challenges, rather than using water governance terminology. Such publications would not be captured by our review's search criteria.

The majority of reviewed publications uses jurisdictional boundaries for case delineation. Since the late 1990s, there has been a strong push to use hydrological boundaries as management and governance units (e.g., Rogers and Hall 2003). This trend is reflected in national and international water governance strategies such as the Canadian *Water for Life* policy (i.e., watershed-based protection and advisory committees), the Australian *Catchment and Land Protection Act* (i.e., catchment management authorities), and the EU *Water Framework Directive* (i.e., river basin districts). However, our findings indicate that it is often more relevant to examine water governance initiatives according to the boundaries within which relevant laws and regulations are enacted, or using a combination of administrative and watershed boundaries. De Loë and Patterson (2017) argue that the focus on watersheds has the potential to limit the uptake and utility of water research by framing out many of the issues that fundamentally shape governance processes and outcomes. In this regard, Mollinga et al. (2007) also use the term "problemshed," instead of watershed, to emphasize the importance of inherent political characteristics and the plurality of actors, institutions, and objectives in water governance. The importance of jurisdictions is also reflected in the focus of the reviewed publications on "legislation, instruments, and policies," the most commonly compared category of governance elements. This finding is consistent with recent arguments that, despite the purported "retreat of the state," governments and their formal policies and legislation are still very much integral to the practice of water governance (Newig and Koontz 2014). Related to this,

Fig. 5. Number of case studies located in each country.



the second most common governance element examined is "participation and stakeholder involvement." The prevalence of publications in our review that study participation is likely linked to the enactment of the EU Water Framework Directive in 2000. The Water Framework Directive contains significant and challenging requirements for public participation. This characteristic made it one of the most popular themes for researchers that examined the implementation of the Directive (Boeuf and Fritsch 2016).

Regarding the use of primary vs. secondary data, we observe that most of the reviewed publications are based on primary data collected by the researchers themselves. This means that there is significant room to exploit these primary data and synthesize insights from studies in diverse contexts. At present, there are very few large-*N* studies that compare across cases. However, it should be acknowledged that the diversity of governance frameworks used is challenging when attempting to use existing data to populate large-*N* comparative studies. Established frameworks such as the IAD framework (Ostrom 2005) and the SES framework (McGinnis and Ostrom 2014) might be helpful in preparing a base for a rigorous combination of the outputs from available small-*N* studies into large-*N* studies.

CONCLUSIONS

The overarching finding of our systematic review is that there is incredible variability in the field of comparative water governance studies. This variability may simply be a characteristic of a relatively young field that has yet to consolidate. To integrate the insights from our review into recommendations for future research, we first briefly sketch out a picture of the field of comparative water governance, and then identify four research areas to develop the field in a manner that maximizes its academic and practical potential.

Our review reveals that, consistent with the larger body of work on water governance, the definition of the concept of water governance used in comparative studies is contested. Various definitions of the concept, as well as its specific aspects and forms, are adopted in comparisons. Furthermore, water governance is often studied through subelements of governance such as legislation and public participation, which are given relatively high importance for the implementation of water policies. The emphasis on specific subelements is an indication of the policy relevance of comparative water governance studies, which often examine contemporary changes in water policies that address certain elements. Many scholars use analytical frameworks that are rooted in the work of Elinor Ostrom. Beyond this, there is little consistency in the frameworks applied, which can also be explained by the diversity of disciplinary backgrounds of the researchers that conduct comparative studies of water governance. Compared to the definitions, elements, and frameworks, there is relatively more consistency in the methods and approaches used. Comparative studies are often qualitative and small-*N,* although there is an increasing number of quantitative and large-*N* studies that aim to synthesize findings across different settings. The number of comparisons that apply multiple research methods is limited; studies mostly rely on qualitative methods. Comparisons are also largely based on cases defined according to jurisdictional boundaries or according to both jurisdictional and hydrological boundaries. In terms of the data types, most of the reviewed publications rely on primary data for comparisons.

We identify four future research areas to improve the theoretical and empirical foundations of comparative water governance studies. First, the field would benefit from a better balance of small-, medium-, and large-*N* studies. Although small-*N* studies are useful for explorative purposes and are able to capture the complexity of water governance regimes, they seldom allow the derivation of more general insights or patterns. In contrast, large-*N* studies run the risk of resulting in simplistic blueprints or panaceas because they fail to do justice to the contextual

specificity and complexity of water governance regimes. Diagnostic approaches that consider context and problem characteristics are therefore particularly promising (Ostrom 2007, Pahl-Wostl and Kranz 2010, Ingram 2011). Our review includes several studies in which authors systemically compare a moderate number of cases (e.g., Huntjens et al. 2010, Pahl-Wostl et al. 2012). To allow for the systemic comparison of carefully selected cases, the consistency in methods and elements analyzed should be improved to build data sets with secondary data that can be used in comparative analysis.

Second, our review was restricted to comparisons across geographical space. It would also be interesting to examine longitudinal studies that compare across time while holding geographical space constant. Longitudinal comparative studies can enable the identification of temporal governance trends and patterns by observing water governance phenomena over long periods. Such large-scale, longitudinal studies can be supported by small-scale studies that are conducted for shorter times, using consistent frameworks and case delineations. However, similar to large-*N* studies, the financial and technical challenges of conducting longitudinal studies should be taken into account.

Third, the geographical distribution of comparative studies should be expanded significantly to include countries from the global South. Whereas geographic bias is often a consequence of funder requirements, data availability, and language barriers, the geographic coverage of comparative studies should be improved by concentrating efforts to improve the range of comparisons where possible. Such efforts could include holding conferences and funding governance-related research in the global South, and promoting water governance research networks with the global South. Resolving issues of geographic bias will also help to address the relatively limited focus on issues of justice, equity, and power (Lu et al. 2014).

These concepts bring us to the fourth and final future research area. Our review revealed that justice, equity, and power have received limited attention in comparative water governance studies. This finding contradicts with the fact that addressing issues of power, equity, and justice is becoming increasingly important in tackling the water governance challenges that are exacerbated by the effects of climate change, industrialization, and urbanization (Perreault 2014, Perreault et al. 2018, Zwarteveen and Boelens 2014). Moreover, such issues have crucial effects in less democratized countries in the global South (Allan 2007, Zeitoun et al. 2012, Molle et al. 2018). Thus, the third and fourth future research areas are highly interrelated. Widening the comparative studies to represent better the global South is likely to improve knowledge about justice, equity, and power issues in water governance.

Responses to this article can be read online at:
http://www.ecologyandsociety.org/issues/responses.php/10548

Acknowledgments:

We thank Tahmina Yasmin, who contributed to data gathering, and the two anonymous reviewers for their insightful comments. This publication is a follow-up of the Autumn School "Concepts, Frameworks and Methods for the Comparative Analysis of Water Governance," which took place 28 October–6 November 2015 in Jülich, Germany. The Autumn School was attended by 11 authors, except the first author. We are grateful to the German Volkswagen Foundation for funding and to The Integrated Assessment Society and Osnabrück University for organizing the event. We also thank Claudia Pahl-Wostl, who was one of the driving forces behind the organization of the event. All authors actively contributed to various stages of the review and writing process. The first author initiated the review process, and the first and second authors coordinated the overall process. The other authors made equal contributions to various stages of the review and writing process and are therefore listed in alphabetical order.

LITERATURE CITED

Allan, J. A. T. 2007. Rural economic transitions: goundwater use in the Middle East and its environmental consequences. Pages 63-78 *in* M. Giordano and K. G. Villholth, editors. *The agricultural groundwater revolution: opportunities and threats to development.* CABI, Wallingford, UK. http://dx.doi.org/10.1079/9781845931728.0063

Araral, E., and S. Ratra. 2016. Water governance in India and China: comparison of water law, policy and administration. *Water Policy* 18(S1):14-31. http://dx.doi.org/10.2166/wp.2016.102

Araral, E., and X. Wu. 2016. Comparing water resources management in China and India: policy design, institutional structure and governance. *Water Policy* 18(S1):1-13. http://dx.doi.org/10.2166/wp.2016.001

Araral, E., and D. J. Yu. 2013. Comparative water law, policies, and administration in Asia: evidence from 17 countries. *Water Resources Research* 49(9):5307-5316. http://dx.doi.org/10.1002/wrcr.20414

Bakker, K., M. Kooy, N. E. Shofiani, and E.-J. Martijn. 2008. Governance failure: rethinking the institutional dimensions of urban water supply to poor households. *World Development* 36 (10):1891-1915. http://dx.doi.org/10.1016/j.worlddev.2007.09.015

Benson, D., and A. Jordan. 2010. The scaling of water governance tasks: a comparative federal analysis of the European Union and Australia. *Environmental Management* 46(1):7-16. http://dx.doi.org/10.1007/s00267-009-9354-0

Benson, D., A. Jordan, and D. Huitema. 2012. Involving the public in catchment management: an analysis of the scope for learning lessons from abroad. *Environmental Policy and Governance* 22(1):42-54. http://dx.doi.org/10.1002/eet.593

Benson, D., A. Jordan, and L. Smith. 2013. Is environmental management really more collaborative? A comparative analysis of putative 'paradigm shifts' in Europe, Australia, and the United States. *Environment and Planning A* 45(7):1695-1712. http://dx.doi.org/10.1068/a45378

Boeuf, B., and O. Fritsch. 2016. Studying the implementation of the Water Framework Directive in Europe: a meta-analysis of 89 journal articles. *Ecology and Society* 21(2):19. http://dx.doi.org/10.5751/ES-08411-210219

Bressers, H., N. Bressers, S. Kuks, and C. Larrue. 2016. The governance assessment tool and its use. Pages 45-65 *in* H. Bressers,

N. Bressers, and C. Larrue, editors. *Governance for drought resilience: land and water drought management in Europe.* Springer, Cham, Switzerland. http://dx.doi.org/10.1007/978-3-319-29671-5_3

Bressers, H., C. de Boer, M. Lordkipanidze, G. Özerol, J. Vinke-de Kruijf, C. Farusho, I. Lajeunesse, C. Larrue, M.-H. Ramos, E. Kampa, U. Stein, J. Tröltzsch, R. Vidaurre, and A. Browne. 2013. *Water governance assessment tool: with an elaboration for drought resilience.* Report for the DROP Project. University of Twente, Enschede, The Netherlands. [online] URL: https://ris.utwente.nl/ws/portalfiles/portal/5143036/Governance-Assessment-Tool-DROP-final-for-online.pdf

Brisbois, M. C., and R. C. de Loë. 2016. Power in collaborative approaches to governance for water: a systematic review. *Society and Natural Resources* 29(7):775-790. http://dx.doi.org/10.1080/08941920.2015.1080339

Brisbois, M. C., and R. C. de Loë. 2017. Natural resource industry involvement in collaboration for water governance: influence on processes and outcomes in Canada. *Journal of Environmental Planning and Management* 60(5):883-900. http://dx.doi.org/10.1080/09640568.2016.1182899

Brown, C., R. Wright, N. Lowery, and J. L. Castro. 2003. Comparative analysis of transborder water management strategies: case studies on the United States-Mexico border. Pages 279-362 *in* S. Michael, editor. *The US-Mexican border environment: binational water management planning.* San Diego State University Press, San Diego, California, USA.

Brown, R. R., L. Sharp, and R. M. Ashley. 2006. Implementation impediments to institutionalising the practice of sustainable urban water management. *Water Science and Technology* 54 (6-7):415-422. http://dx.doi.org/10.2166/wst.2006.585

Chai, Y., and M. Schoon. 2016. Institutions and government efficiency: decentralized irrigation management in China. *International Journal of the Commons* 10(1):21-44. http://doi.org/10.18352/ijc.555

Clarvis, M. H., and N. L. Engle. 2015. Adaptive capacity of water governance arrangements: a comparative study of barriers and opportunities in Swiss and US states. *Regional Environmental Change* 15(3):517-527. http://dx.doi.org/10.1007/s10113-013-0547-y

Clement, F. 2010. Analysing decentralised natural resource governance: proposition for a "politicised" institutional analysis and development framework. *Policy Sciences* 43(2):129-156. https://doi.org/10.1007/s11077-009-9100-8

Cook, C., and K. Bakker. 2012. Water security: debating an emerging paradigm. *Global Environmental Change* 22(1):94-102. http://dx.doi.org/10.1016/j.gloenvcha.2011.10.011

de Boer, C., J. Vinke-de Kruijf, G. Özerol, and H. Bressers. 2016. Collaborative water resource management: What makes up a supportive governance system? *Environmental Policy and Governance* 26(4):229-241. https://doi.org/10.1002/eet.1714

de Loë, R., and R. Kreutzwiser. 2007. Challenging the status quo: the evolution of water governance in Canada. Pages 85-104 *in* K. Bakker, editor. *Eau Canada: the future of Canada's water.* UBC Press, Vancouver, Canada.

de Loë, R. C., and J. J. Patterson. 2017. Rethinking water governance: moving beyond water-centric perspectives in a connected and changing world. *Natural Resources Journal* 57:75. [online] URL: https://digitalrepository.unm.edu/nrj/vol57/iss1/4/

Dinar, A., and R. M. Saleth. 2005. Can water institutions be cured? A water institutions health index. *Water Science and Technology: Water Supply* 5(6):17-40. http://dx.doi.org/10.2166/ws.2005.0047

Doorn, N. 2017. Allocating responsibility for environmental risks: a comparative analysis of examples from water governance. *Integrated Environmental Assessment and Management* 13 (2):371-375. http://dx.doi.org/10.1002/ieam.1799

Edelenbos, J., V. I. Meerkerk, and C. van Leeuwen. 2015. Vitality of complex water governance systems: condition and evolution. *Journal of Environmental Policy and Planning* 17(2):237-261. http://dx.doi.org/10.1080/1523908X.2014.936584

Erickson, A. 2015. Efficient and resilient governance of social-ecological systems. *Ambio* 44(5):343-352. http://dx.doi.org/10.1007/s13280-014-0607-7

Garrick, D., M. A. Siebentritt, B. Aylward, C. J. Bauer, and A. Purkey. 2009. Water markets and freshwater ecosystem services: policy reform and implementation in the Columbia and Murray-Darling Basins. *Ecological Economics* 69(2):366-379. http://dx.doi.org/10.1016/j.ecolecon.2009.08.004

Gemmer, M., A. Wilkes, and L. M. Vaucel. 2011. Governing climate change adaptation in the EU and China: an analysis of formal institutions. *Advances in Climate Change Research* 2 (1):1-11. http://dx.doi.org/10.3724/SP.J.1248.2011.00001

Gerring, J. 2007. *Case study research: principles and practices.* Cambridge University Press, Cambridge, UK. http://dx.doi.org/10.1017/CBO9780511803123

Ghauri, P., and K. Grønhaug. 2005. *Research methods in business studies: a practical guide.* Pearson Education, London, UK.

González Tánago, I., J. Urquijo, V. Blauhut, F. Villarroya, and L. De Stefano. 2016. Learning from experience: a systematic review of assessments of vulnerability to drought. *Natural Hazards* 80 (2):951-973. http://dx.doi.org/10.1007/s11069-015-2006-1

Harris, L. M., and S. Alatout. 2010. Negotiating hydro-scales, forging states: comparison of the upper Tigris/Euphrates and Jordan River basins. *Political Geography* 29(3):148-156. http://dx.doi.org/10.1016/j.polgeo.2010.02.012

Harris, L., D. Kleiber, J. Goldin, A. Darkwah, and C. Morinville. 2017. Intersections of gender and water: comparative approaches to everyday gendered negotiations of water access in underserved areas of Accra, Ghana and Cape Town, South Africa. *Journal of Gender Studies* 26(5):561-582. http://dx.doi.org/10.1080/09589236.2016.1150819

Heikkila, T. 2004. Institutional boundaries and common-pool resource management: a comparative analysis of water management programs in California. *Journal of Policy Analysis and Management* 23(1):97-117. http://dx.doi.org/10.1002/pam.10181

Herrala, M. E., H. Huotari, and H. J. O. Haapasalo. 2012. Governance of Finnish waterworks – a DEA comparison of selected models. *Utilities Policy* 20(1):64-70. http://dx.doi.org/10.1016/j.jup.2011.11.005

Hox, J. J., and H. R. Boeije. 2005. Data collection: primary versus secondary. Pages 593-599 *in* K. Kempf-Leonard, editor. *Encyclopedia of social measurement. Volume 1 A-G.* Elsevier, Amsterdam, The Netherlands.

Huntjens, P., C. Pahl-Wostl, and J. Grin. 2010. Climate change adaptation in European river basins. *Regional Environmental Change* 10(4):263-284. http://dx.doi.org/10.1007/s10113-009-0108-6

Huntjens, P., C. Pahl-Wostl, B. Rihoux, M. Schlüter, Z. Flachner, S. Neto, R. Koskova, C. Dickens, and I. N. Kiti. 2011. Adaptive water management and policy learning in a changing climate: a formal comparative analysis of eight water management regimes in Europe, Africa and Asia. *Environmental Policy and Governance* 21(3):145-163. http://dx.doi.org/10.1002/eet.571

Hussey, K., and S. Dovers. 2007. International perspectives on water policy and management: emerging principles, common challenges. Pages 141-154 *in* K. Hussey, and S. Dover, editors. *Managing water for Australia: the social and institutional challenges.* CSIRO Publishing, Collingwood, Australia.

Ibele, B., S. Sandri, and D. Zikos. 2017. Endogenous versus exogenous rules in water management: an experimental cross-country comparison. *Mediterranean Politics* 22(4):504-536. http://dx.doi.org/10.1080/13629395.2016.1241612

Ingram, H. 2011. Beyond universal remedies for good water governance: a political and contextual approach. *In* A. Garrido and H. Ingram, editors. *Water for food in a changing world.* Routledge, London, UK. [online] URL: https://www.taylorfrancis.com/books/e/9781136808166/chapters/10.4324%2F9780203828410-23

Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate change 2014: synthesis report.* Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Core Writing Team, R. K. Pachauri, and L. A. Meyer, editors. IPCC, Geneva, Switzerland. [online] URL: http://www.ipcc.ch/report/ar5/syr/

Jager, N. W. 2016. Transboundary cooperation in European water governance – a set-theoretic analysis of international river basins. *Environmental Policy and Governance* 26(4):278-291. http://dx.doi.org/10.1002/eet.1717

Kadirbeyoglu, Z., and G. Özertan. 2015. Power in the governance of common-pool resources: a comparative analysis of irrigation management decentralization in Turkey. *Environmental Policy and Governance* 25(3):157-171. http://dx.doi.org/10.1002/eet.1673

Knieper, C., G. Holtz, B. Kastens, and C. Pahl-Wostl. 2010. Analysing water governance in heterogeneous case studies—experiences with a database approach. *Environmental Science and Policy* 13(7):592-603. http://dx.doi.org/10.1016/j.envsci.2010.09.002

Knieper, C., and C. Pahl-Wostl. 2016. A comparative analysis of water governance, water management, and environmental performance in river basins. *Water Resources Management* 30 (7):2161-2177. http://dx.doi.org/10.1007/s11269-016-1276-z

Lawford, R., J. Bogardi, S. Marx, S. Jain, C. Pahl-Wostl, K. Knüppe, C. Ringler, F. Lansigan, and F. Meza. 2013. Basin perspectives on the water–energy–food security nexus. *Current Opinion in Environmental Sustainability* 5(6):607-616. http://dx.doi.org/10.1016/j.cosust.2013.11.005

Lebel, L., P. Garden, and M. Imamura. 2005. The politics of scale, position, and place in the governance of water resources in the Mekong region. *Ecology and Society* 10(2):18. http://dx.doi.org/10.5751/ES-01543-100218

Lebel, L., E. Nikitina, C. Pahl-Wostl, and C. Knieper. 2013. Institutional fit and river basin governance: a new approach using multiple composite measures. *Ecology and Society* 18(1):1. http://dx.doi.org/10.5751/ES-05097-180101

Lopez-Gunn, E. 2003. The role of collective action in water governance: a comparative study of groundwater user associations in La Mancha aquifers in Spain. *Water International* 28(3):367-378. http://dx.doi.org/10.1080/02508060308691711

Lu, F., C. Ocampo-Raeder, and B. Crow. 2014. Equitable water governance: future directions in the understanding and analysis of water inequities in the global South. *Water International* 39 (2):129-142. http://dx.doi.org/10.1080/02508060.2014.896540

Mahalingam, A., G. A. Devkar, and S. N. Kalidindi. 2011. A comparative analysis of public-private partnership (PPP) coordination agencies in India: what works and what doesn't. *Public Works Management and Policy* 16(4):341-372. http://dx.doi.org/10.1177/1087724X11409215

McGinnis, M. D., and E. Ostrom. 2014. Social-ecological system framework: initial changes and continuing challenges. *Ecology and Society* 19(2):30. http://dx.doi.org/10.5751/ES-06387-190230

Meijerink, S., and D. Huitema. 2010. Policy entrepreneurs and change strategies: lessons from sixteen case studies of water transitions around the globe. *Ecology and Society* 15(2):21. http://dx.doi.org/10.5751/ES-03509-150221

Molle, F., A. Closas, and W. Al-Zubari. 2018. Governing groundwater in the Middle East and North Africa region. Pages 527-553 *in* K. G. Villholth, E. López-Gunn, K. I. Conti, A. Garrido, and J. van der Gun, editors. *Advances in groundwater governance.* CRC Press, Leiden, The Netherlands.

Mollinga, P. P., R. S. Meinzen-Dick, and D. J. Merrey. 2007. Politics, plurality and problemsheds: a strategic approach for reform of agricultural water resources management. *Development Policy Review* 25(6):699-719. http://dx.doi.org/10.1111/j.1467-7679.2007.00393.x

Mosello, B. 2015. *How to deal with climate change? Institutional adaptive capacity as a means to promote sustainable water governance.* Springer, Cham, Switzerland. http://dx.doi.org/10.1007/978-3-319-15389-6

Mukherji, A., and T. Shah. 2005. Groundwater socio-ecology and governance: a review of institutions and policies in selected countries. *Hydrogeology Journal* 13(1):328-345. http://dx.doi.org/10.1007/s10040-005-0434-9

Newig, J., and O. Fritsch. 2009. Environmental governance: participatory, multi-level – and effective? *Environmental Policy and Governance* 19(3):197-214. https://doi.org/10.1002/eet.509

Newig, J., and T. M. Koontz. 2014. Multi-level governance, policy implementation and participation: the EU's mandated participatory planning approach to implementing environmental policy. *Journal of European Public Policy* 21(2):248-267. http://dx.doi.org/10.1080/13501763.2013.834070

Organisation for Economic Co-operation and Development (OECD) 2011. *Water governance in OECD countries: a multi-level approach.* OECD Publishing, Paris, France. [online] URL: https://www.oecd.org/governance/regional-policy/48885867.pdf

Organisation for Economic Co-operation and Development (OECD) 2015. *OECD principles on water governance.* OECD Publishing, Paris, France. [online] URL: https://www.oecd.org/governance/oecd-principles-on-water-governance.htm

Ostrom, E. 1990. *Governing the commons: the evolution of institutions for collective action.* Cambridge University Press, Cambridge, UK.

Ostrom, E. 1999. Institutional rational choice: an assessment of the institutional analysis and development framework. Pages 35-71 *in* P. A. Sabatier, editor. *Theories of the policy process.* Westview Press, Boulder, Colorado, USA.

Ostrom, E. 2005. *Understanding institutional diversity.* Princeton University Press, Princeton, New Jersey, USA.

Ostrom, E. 2007. A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences* 104 (39):15181-15187. http://dx.doi.org/10.1073/pnas.0702288104

Pahl-Wostl, C. 2007. Transitions towards adaptive management of water facing climate and global change. *Water Resources Management* 21(1):49-62. https://doi.org/10.1007/s11269-006-9040-4

Pahl-Wostl, C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change* 19(3):354-365. http://dx.doi.org/10.1016/j.gloenvcha.2009.06.001

Pahl-Wostl, C. 2015. *Water governance in the face of global change: from understanding to transformation.* Sringer, Cham, Switzerland. http://dx.doi.org/10.1007/978-3-319-21855-7

Pahl-Wostl, C. 2017. An evolutionary perspective on water governance: from understanding to transformation. *Water Resources Management* 31(10):2917-2932. http://dx.doi.org/10.1007/s11269-017-1727-1

Pahl-Wostl, C., G. Becker, C. Knieper, and J. Sendzimir. 2013. How multilevel societal learning processes facilitate transformative change: a comparative case study analysis on flood management. *Ecology and Society* 18(4):58. http://dx.doi.org/10.5751/ES-05779-180458

Pahl-Wostl, C., G. Holtz, B. Kastens, and C. Knieper. 2010. Analyzing complex water governance regimes: the management and transition framework. *Environmental Science and Policy* 13 (7):571-581. http://dx.doi.org/10.1016/j.envsci.2010.08.006

Pahl-Wostl, C., and C. Knieper. 2014. The capacity of water governance to deal with the climate change adaptation challenge: using fuzzy set qualitative comparative analysis to distinguish between polycentric, fragmented and centralized regimes. *Global Environmental Change* 29:139-154. http://dx.doi.org/10.1016/j.gloenvcha.2014.09.003

Pahl-Wostl, C., and N. Kranz. 2010. Water governance in times of change. *Environmental Science and Policy* 13(7):567-570. http://dx.doi.org/10.1016/j.envsci.2010.09.004

Pahl-Wostl, C., L. Lebel, C. Knieper, and E. Nikitina. 2012. From applying panaceas to mastering complexity: toward adaptive water governance in river basins. *Environmental Science and Policy* 23:24-34. http://dx.doi.org/10.1016/j.envsci.2012.07.014

Perreault, T. 2014. What kind of governance for what kind of equity? Towards a theorization of justice in water governance. *Water International* 39(2):233-245. http://dx.doi.org/10.1080/02508060.2014.886843

Perreault, T., R. Boelens, and J. Vos. 2018. Conclusions: struggles for justice in a changing water world. Pages 346-360 *in* R. Boelens, T. Perreault, and J. Vos, editors. *Water justice.* Cambridge University Press, Cambridge, UK. http://dx.doi.org/10.1017/9781316831847.023

Peters, B. G. 2001. *The future of governing.* Second edition, revised. University Press of Kansas, Lawrene, Kansas, USA.

Petticrew, M., and H. Roberts. 2008. *Systematic reviews in the social sciences: a practical guide.* Blackwell, Malden, Massachusetts, USA. http://dx.doi.org/10.1002/9780470754887.ch5

Raadgever, G. T., E. Mostert, N. Kranz, E. Interwies, and J. G. Timmerman. 2008. Assessing management regimes in transboundary river basins: Do they support adaptive management? *Ecology and Society* 13(1):14. http://dx.doi.org/10.5751/ES-02385-130114

Rhodes, R. A. W. 1996. The new governance: governing without government. *Political Studies* 44(4):652-667. http://dx.doi.org/10.1111/j.1467-9248.1996.tb01747.x

Rockström, J., W. Steffen, K. Noone, Å. Persson, F. S. Chapin III, E. F. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. J. Schellnhuber, B. Nykvist, C. A. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sörlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. H. Walker, D. Liverman, K. Richardson, P. Crutzen, and J. A. Foley. 2009. A safe operating space for humanity. *Nature* 461:472-475. http://dx.doi.org/10.1038/461472a

Rogers, P., and A. W. Hall. 2003. *Effective water governance.* TEC Background Paper 7. Global Water Partnership, Stockholm, Sweden. [online] URL: https://www.gwp.org/globalassets/global/toolbox/publications/background-papers/07-effective-water-governance-2003-english.pdf

Salager-Meyer, F. 2008. Scientific publishing in developing countries: challenges for the future. *Journal of English for Academic Purposes* 7(2):121-132. http://dx.doi.org/10.1016/j.jeap.2008.03.009

Schneider, C. Q., and C. Wagemann. 2012. *Set-theoretic methods for the social sciences: a guide to qualitative comparative analysis.* Cambridge University Press, Cambridge, UK. http://dx.doi.org/10.1017/CBO9781139004244

Scott, T. 2015. Does collaboration make any difference? Linking collaborative governance to environmental outcomes. *Journal of Policy Analysis and Management* 34(3):537-566. http://dx.doi.org/10.1002/pam.21836

Silveira, A., S. Junier, F. Hüesker, F. Qunfang, and A. Rondorf. 2016. Organizing cross-sectoral collaboration in river basin management: case studies from the Rhine and the Zhujiang (Pearl River) basins. *International Journal of River Basin Management* 14(3):299-315. http://dx.doi.org/10.1080/15715124.2016.1170692

Srinivasan, V., E. F. Lambin, S. M. Gorelick, B. H. Thompson, and S. Rozelle. 2012. The nature and causes of the global water crisis: syndromes from a meta-analysis of coupled human-water studies. *Water Resources Research* 48(10):W10516. http://dx.doi.org/10.1029/2011WR011087

United Nations Development Programme (UNDP). 1997. *Governance for sustainable human development: a UNDP policy document.* UNDP, New York, New York, USA.

Van Buuren, A., M. Vink, and J. Warner. 2016. Constructing authoritative answers to a latent crisis? Strategies of puzzling, powering and framing in Dutch climate adaptation practices compared. *Journal of Comparative Policy Analysis: Research and Practice* 18(1):70-87. http://dx.doi.org/10.1080/13876988.2013.877675

Van de Meene, S. J., and R. R. Brown. 2009. Delving into the "institutional black box": revealing the attributes of sustainable urban water management regimes. *Journal of the American Water Resources Association* 45(6):1448-1464. http://dx.doi.org/10.1111/j.1752-1688.2009.00377.x

Varady, R. G., A. A. Zuniga-Teran, A. K. Gerlak, and S. B. Megdal. 2016. Modes and approaches of groundwater governance: a survey of lessons learned from selected cases across the globe. *Water* 8(10):417. http://dx.doi.org/10.3390/w8100417

Vink, M. J., D. Benson, D. Boezeman, H. Cook, A. Dewulf, and C. Termeer. 2015. Do state traditions matter? Comparing deliberative governance initiatives for climate change adaptation in Dutch corporatism and British pluralism. *Journal of Water and Climate Change* 6(1):71-88. http://dx.doi.org/10.2166/wcc.2014.119

Wehn, U., M. Rusca, J. Evers, and V. Lanfranchi. 2015. Participation in flood risk management and the potential of citizen observatories: a governance analysis. *Environmental Science and Policy* 48:225-236. http://dx.doi.org/10.1016/j.envsci.2014.12.017

Wescoat, J. L. Jr. 2009. Comparative international water research. *Journal of Contemporary Water Research and Education* 142 (1):61-66. http://dx.doi.org/10.1111/j.1936-704X.2009.00055.x

Woodhouse, P., and M. Muller. 2017. Water governance—an historical perspective on current debates. *World Development* 92:225-241. http://dx.doi.org/10.1016/j.worlddev.2016.11.014

Yu, H. H., M. Edmunds, A. Lora-Wainwright, and D. Thomas. 2016. Governance of the irrigation commons under integrated water resources management – a comparative study in contemporary rural China. *Environmental Science and Policy* 55 (1):65-74. http://dx.doi.org/10.1016/j.envsci.2015.08.001

Zeitoun, M., T. Allan, N. Al Aulaqi, A. Jabarin, and H. Laamrani. 2012. Water demand management in Yemen and Jordan: addressing power and interests. *Geographical Journal* 178 (1):54-66. http://dx.doi.org/10.1111/j.1475-4959.2011.00420.x

Zingraff-Hamed, A., S. Greulich, K. M. Wantzen, and S. Pauleit. 2017. Societal drivers of European water governance: a comparison of urban river restoration practices in France and Germany. *Water* 9(3):206. http://dx.doi.org/10.3390/w9030206

Zwarteveen, M. Z., and R. Boelens. 2014. Defining, researching and struggling for water justice: some conceptual building blocks for research and action. *Water International* 39(2):143-158. http://dx.doi.org/10.1080/02508060.2014.891168

Appendix A. Publications included in the in-depth review

ID	Authors	Year	Publication title	Source title
P001	Araral E., Ratra S.	2016	Water governance in India and China: comparison of water law, policy and administration	Water Policy
P002	Araral E., Yu DJ.	2013	Comparative water law, policies, and administration in Asia: evidence from 17 countries	Water Resources Research
P003	Argento D., Grossi G., Thomasson A.	2011	Governance and control of externalized water service management: comparing solutions adopted in Italy and Sweden	Corporate Ownership and Control
P004	Benson D., Gain A.K., Rouillard J.J.	2015	Water governance in a comparative perspective: from IWRM to a 'nexus' approach?	Water Alternatives
P005	Benson D., Jordan A.	2010	The scaling of water governance tasks: a comparative federal analysis of the European Union and Australia	Environmental Management
P006	Benson D., Jordan A., Smith L.	2013	Is environmental management really more collaborative? A comparative analysis of putative ‘paradigm shifts’ in Europe, Australia, and the United States	Environment and Planning
P007	Benson D., Jordan A., Huitema D.	2012	Involving the public in catchment management: an analysis of the scope for learning lessons from abroad	Environmental Policy and Governance
P008	Bettini Y., Brown R.R., de Haan F.J.	2015	Exploring institutional adaptive capacity in practice: examining water governance adaptation in Australia	Ecology and Society
P009	Beucher S.	2009	National/local policy tensions in flood risk management: an international comparison	Environmental Hazards
P010	Blomquist W., Dinar A., Kemper K.E.	2007	Comparative analysis of case studies	Integrated River Basin Management through Decentralization
P011	Bohn N., Goetten W.J.	2015	Groundwater Governance in the States of São Paulo, Paraná, Santa Catarina and Rio Grande Do Sul: An Analysis from the Instruments of the National Water Resources Policy	Proceedings - 2015 9th International Conference on Complex, Intelligent, and Software Intensive Systems

ID	Authors	Year	Publication title	Source title
P012	Borowski I., Le Bourhis J.-P., Pahl-Wostl C., Barraqué B.	2008	Spatial misfit in participatory river basin management: Effects on social learning, a comparative analysis of German and French case studies	Ecology and Society
P013	Bréthaut C.	2016	River management and stakeholders' participation: The case of the Rhone River, a fragmented institutional setting	Environmental Policy and Governance
P014	Brisbois M.C., de Loë R.C.	2017	Natural resource industry involvement in collaboration for water governance: influence on processes and outcomes in Canada	Journal of Environmental Planning and Management
P015	Brown C.	2015	Scale and subnational resource management: Transnational initiatives in the salish sea region	Review of Policy Research
P016	Brown C., Ruiz J.L.C., Lowery N., Wright R.	2003	Comparative analysis of transborder water management strategies: case studies on the US-Mexican border	The U.S.-Mexican Border Environment: Binational Water Management Planning
P017	Brown J.	2014	Evaluating participatory initiativesin south africa: Not just processesbut outcomes too	SAGE Open
P018	Brown R.R., Sharp L., Ashley R.M.	2006	Implementation impediments to institutionalising the practice of sustainable urban water management	Water Science and Technology
P019	Chai Y., Schoon M.	2016	Institutions and government efficiency: Decentralized irrigation management in China	International Journal of the Commons
P020	Cuadrado-Quesada G.	2014	Groundwater governance and spatial planning challenges: examining sustainability and participation on the ground	Water International
P021	da Costa Silva G.	2011	Assessing environmental justice of community-based watershed management: A tool to build adaptive capacity in Latin America?	Local Environment
P022	de Boer C., Vinke-de Kruijf J., Özerol G., Bressers H.	2016	Collaborative Water Resource Management: What makes up a supportive governance system?	Environmental Policy and Governance
P023	Dinar A., Saleth R.M.	2005	Can water institutions be cured? A water institutions health index	Water Science and Technology: Water Supply
P024	Dombrowsky I., Hagemann N., Houdret A.	2014	The river basin as a new scale for water governance in transition countries? A comparative study of Mongolia and Ukraine	Environmental Earth Sciences

ID	Authors	Year	Publication title	Source title
P025	Doorn N.	2017	Allocating responsibility for environmental risks: A comparative analysis of examples from water governance	Integrated Environmental Assessment and Management
P026	Eberhard R., Margerum R., Vella K., Mayere S., Taylor B.	2017	The practice of water policy governance networks: An international comparative case study analysis	Society and Natural Resources
P027	Edelenbos J., Meerkerk I., van Leeuwen C.	2015	Vitality of complex water governance systems: Condition and evolution	Journal of Environmental Policy and Planning
P028	Erickson A.	2015	Efficient and resilient governance of social–ecological systems	Ambio
P029	Fournier M., Larrue C., Alexander M., Hegger D., Bakker M., Pettersson M., Crabbé A., Mees H., Chorynski A.	2016	Flood risk mitigation in Europe: How far away are we from the aspired forms of adaptive governance?	Ecology and Society
P030	Franks T., Bdliya H., Mbuya L.	2011	Water governance and river basin management: Comparative experiences from nigeria and Tanzania	International Journal of River Basin Management
P031	Garrick D., Siebentritt M.A., Aylward B., Bauer C.J., Purkey A.	2009	Water markets and freshwater ecosystem services: Policy reform and implementation in the Columbia and Murray-Darling Basins	Ecological Economics
P032	Gemmer M., Wilkes A., Vaucel L.M.	2011	Governing climate change adaptation in the EU and China: An analysis of formal institutions	Advances in Climate Change Research
P033	Grossi G., Thomasson A.	2011	Jointly owned companies as instruments of local government: Comparative evidence from the swedish and italian water sectors	Policy Studies
P034	Hamidov A., Thiel A., Zikos D.	2015	Institutional design in transformation: A comparative study of local irrigation governance in Uzbekistan	Environmental Science and Policy
P035	Harris L., Kleiber D., Goldin J., Darkwah A., Morinville C.	2016	Intersections of gender and water: comparative approaches to everyday gendered negotiations of water access in underserved areas of Accra, Ghana and Cape Town, South Africa	Journal of Gender Studies

ID	Authors	Year	Publication title	Source title
P036	Harris LM, Alatout S	2010	Negotiating hydro-scales, forging states: Comparison of the upper Tigris/Euphrates and Jordan River basins	Political Geography
P037	Heikkila T.	2004	Institutional boundaries and common-pool resource management: A comparative analysis of water management programs in california	Journal of Policy Analysis and Management
P038	Herrala M.E., Huotari H., Haapasalo H.J.O.	2012	Governance of Finnish waterworks - A DEA comparison of selected models	Utilities Policy
P039	Hill Clarvis M., Engle N.L.	2013	Adaptive capacity of water governance arrangements: a comparative study of barriers and opportunities in Swiss and US states	Regional Environmental Change
P040	Holley C., Sinclair D., Lopez-Gunn E., Schlager E.	2016	Conjunctive management through collective action	Integrated Groundwater Management: Concepts, Approaches and Challenges
P041	Hughes S.	2013	Authority Structures and Service Reform in Multilevel Urban Governance: The Case of Wastewater Recycling in California and Australia	Urban Affairs Review
P042	Huntjens P., Pahl-Wostl C., Grin J.	2010	Climate change adaptation in European river basins	Regional Environmental Change
P043	Huntjens P., Pahl-Wostl C., Rihoux B., Schlüter M., Flachner Z., Neto S., Koskova R., Dickens C., Kiti I.N.	2011	Adaptive water management and policy learning in a changing climate: A formal comparative analysis of eight water management regimes in Europe, Africa and Asia	Environmental Policy and Governance
P044	Hurlbert M.	2009	Comparative water governance in the four western provinces	Prairie Forum
P045	Hurlbert M.A., Diaz H.	2013	Water governance in Chile and Canada: A comparison of adaptive characteristics	Ecology and Society
P046	Ibele B., Sandri S., Zikos D.	2016	Endogenous Versus Exogenous Rules in Water Management: An Experimental Cross-country Comparison	Mediterranean Politics
P047	Jacobs J.W.	1999	Comparing river basin development experiences in the Mississippi and the Mekong	Water International
P048	Jager N.W.	2016	Transboundary Cooperation in European Water Governance – A set-theoretic analysis of International River Basins	Environmental Policy and Governance
P049	Kadirbeyoglu Z., Özertan G.	2015	Power in the Governance of Common-Pool Resources: A comparative analysis of irrigation management decentralization in Turkey	Environmental Policy and Governance

ID	Authors	Year	Publication title	Source title
P050	Kayser G.L., Amjad U., Dalcanale F., Bartram J., Bentley M.E.	2015	Drinking water quality governance: A comparative case study of Brazil, Ecuador, and Malawi	Environmental Science and Policy
P051	Keessen A.M., van Kempen J.J.H., van Rijswick M., Robbe J., Backes C.W.	2010	European river basin districts: Are they swimming in the same implementation pool?	Journal of Environmental Law
P052	Keskinen M., Guillaume J.H.A., Kattelus M., Porkka M., Räsänen T.A., Varis O.	2016	The water-energy-food nexus and the transboundary context: Insights from large Asian rivers	Water
P053	Knieper C., Holtz G., Kastens B., Pahl-Wostl C.	2010	Analysing water governance in heterogeneous case studies-Experiences with a database approach	Environmental Science and Policy
P054	Knieper C., Pahl-Wostl C.	2016	A Comparative Analysis of Water Governance, Water Management, and Environmental Performance in River Basins	Water Resources Management
P055	Knüppe K., Pahl-Wostl C., Vinke-de Kruijf J.	2016	Sustainable Groundwater Management: A Comparative Study of Local Policy Changes and Ecosystem Services in South Africa and Germany	Environmental Policy and Governance
P056	Larrue C., Bressers N., Bressers H.	2016	Towards a drought policy in north-west European regions?	Governance for Drought Resilience: Land and Water Drought Management in Europe
P057	Lawford R., Bogardi J., Marx S., Jain S., Pahl-Wostl C., Knüppe K., Ringler C., Lansigan F., Meza F.	2013	Basin perspectives on the water–energy–food security nexus	Current Opinion in Environmental Sustainability
P058	Lebel L., Nikitina E., Pahl-Wostl C., Knieper C.	2013	Institutional fit and river basin governance: A new approach using multiple composite measures	Ecology and Society
P059	Lieberherr E., Truffer B.	2015	The impact of privatization on sustainability transitions: A comparative analysis of dynamic capabilities in three water utilities	Environmental Innovation and Societal Transitions

ID	Authors	Year	Publication title	Source title
P060	Lopez-Gunn E.	2003	The role of collective action in water governance: A comparative study of groundwater user associations in La Mancha aquifers in Spain	Water International
P061	Lowry W.R.	2009	Policy changes on Canada's rivers: Different but not isolated	Review of Policy Research
P062	Mahalingam A., Devkar G.A., Kalidindi S.N.	2011	A comparative analysis of public- private partnership (PPP) coordination agencies in India: What works and what doesn't	Public Works Management and Policy
P063	Mees H., Suykens C., Crabbé A.	2017	Evaluating Conditions for Integrated Water Resource Management at Sub-basin Scale. A Comparison of the Flemish Sub-basin Boards and Walloon River Contracts	Environmental Policy and Governance
P064	Mees H.L.P., Driessen P.P.J., Runhaar H.A.C.	2014	Legitimate adaptive flood risk governance beyond the dikes: The cases of Hamburg, Helsinki and Rotterdam	Regional Environmental Change
P065	Meijerink S., Huitema D	2010	Policy Entrepreneurs and Change Strategies: Lessons from Sixteen Case Studies of Water Transitions around the Globe	Ecology and Society
P066	Montaña E., Diaz H.P., Hurlbert M.	2016	Development, local livelihoods, and vulnerabilities to global environmental change in the South American Dry Andes	Regional Environmental Change
P067	Moore M.L.	2013	Perspectives of Complexity in Water Governance: Local Experiences of Global Trends	Water Alternatives
P068	Mosello B.	2015	How to deal with climate change?: Institutional adaptive capacity as a means to promote sustainable water governance	Springer
P069	Mukherji, A. Shah, T.	2005	Groundwater socio-ecology and governance: a review of institutions and policies in selected countries	Hydrogeology Journal
P070	Neville K.J.	2011	Adversaries versus partners: Urban water supply in the Philippines	Pacific Affairs
P071	Newig J., Fritsch O.	2009	Environmental Governance: Participatory, Multi-Level – and Effective?	Environmental Policy and Governance
P072	Nielsen H.T., Frederiksen P., Saarikoski H., Rytkönen A.-M., Pedersen A.B.	2013	How different institutional arrangements promote integrated river basin management. Evidence from the Baltic Sea Region	Land Use Policy
P073	Pahl-Wostl C., Becker G., Knieper C., Sendzimir J.	2013	How multilevel societal learning processes facilitate transformative change: A comparative case study analysis on flood management	Ecology and Society

ID	Authors	Year	Publication title	Source title
P074	Pahl-Wostl C., Knieper C.	2014	The capacity of water governance to deal with the climate change adaptation challenge: Using fuzzy set Qualitative Comparative Analysis to distinguish between polycentric, fragmented and centralized regimes	Global Environmental Change
P075	Pahl-Wostl C., Lebel L., Knieper C., Nikitina E.	2012	From applying panaceas to mastering complexity: Toward adaptive water governance in river basins	Environmental Science and Policy
P076	Poddar R., Qureshi M.E., Shi T.	2014	A Comparison of Water Policies for Sustainable Irrigation Management: The Case of India and Australia	Water Resources Management
P077	Rabelo D.C., Espluga J., Teixeira E.C., Brugué Q.	2014	Citizenship participation in water management plans in the Doce River Basin, Brazil and Catalonia, Spain	Water Policy
P078	Ravesteijn W., Song X., Wennersten R.	2009	The 2000 EU water framework directive and Chinese water management: Experiences and perspectives	WIT Transactions on Ecology and the Environment
P079	Ross A.	2016	Groundwater governance in Australia, the European union and the western usa	Integrated Groundwater Management: Concepts, Approaches and Challenges
P080	Schlager E., Heikkila T.	2009	Resolving water conflicts: A comparative analysis of interstate river compacts	Policy Studies Journal
P081	Scott T.	2015	Does Collaboration Make Any Difference? Linking Collaborative Governance to Environmental Outcomes	Journal of Policy Analysis and Management
P082	Sehring J.	2009	The politics of water institutional reform in neopatrimonial states: A comparative analysis of Kyrgyzstan and Tajikistan	The Politics of Water Institutional Reform in Neopatrimonial States: A Comparative Analysis of Kyrgyzstan and Tajikistan
P083	Serrao-Neumann S., Renouf M., Kenway S.J., Low Choy D.	2017	Connecting land-use and water planning: Prospects for an urban water metabolism approach	Cities
P084	Silveira A., Junier S., Hüesker F., Qunfang F., Rondorf A.	2016	Organizing cross-sectoral collaboration in river basin management: case studies from the Rhine and the Zhujiang (Pearl River) basins	International Journal of River Basin Management

ID	Authors	Year	Publication title	Source title
P085	Speelman S., Frija A., Buysse J., Van Huylenbroeck G.	2011	The importance of irrigation water rights: Lessons from South Africa and Tunisia	Water Policy
P086	Srinivasan V. , Lambin E.F., Gorelick S.M., Thompson B.H., Rozelle S.	2012	The nature and causes of the global water crisis: Syndromes from a meta-analysis of coupled human-water studies	Water Resources Research
P087	Swamikannu X., Radulescu D., Young R., Allison R.	2003	A comparative analysis: Storm water pollution policy in California, USA and Victoria, Australia	Water Science and Technology
P088	Teamsuwan V., Satoh M.	2009	Comparative analysis of management of three water users' organizations: Successful cases in the Chao Phraya Delta, Thailand	Paddy and Water Environment
P089	Van Buuren A., Vink M., Warner J.	2016	Constructing authoritative answers to a latent crisis? Strategies of puzzling, powering and framing in Dutch climate adaptation practices compared	Journal of Comparative Policy Analysis: Research and Practice
P090	Varady R.G., Zuniga-Teran A.A., Gerlak A.K., Megdal S.B.	2016	Modes and approaches of groundwater governance: A survey of lessons learned from selected cases across the globe.	Water
P091	Venot J.-P., de Fraiture C., Acheampong E.N.	2012	Revisiting dominant notions: A review of costs, performance and institutions of small reservoirs in sub-Saharan Africa	IWMI Research Report
P092	Vink M.J., Benson D., Boezeman D., Cook H., Dewulf A., Termeer C.	2015	Do state traditions matter? comparing deliberative governance initiatives for climate change adaptation in dutch corporatism and British pluralism	Journal of Water and Climate Change
P093	Vinnaria E.M., Hukkab J.J.	2010	An international comparison of the institutional governance of water utility asset management and its implications for Finland	Water Policy
P094	Wang Y., Mukherjee M., Wu D., Wu X.	2016	Combating river pollution in China and India: Policy measures and governance challenges	Water Policy
P095	Wehn U., Rusca M., Evers J., Lanfranchi V.	2015	Participation in flood risk management and the potential of citizen observatories: A governance analysis	Environmental Science and Policy

ID	Authors	Year	Publication title	Source title
P096	Wiering M., Kaufmann M., Mees H., Schellenberger T., Ganzevoort W., Hegger D.L.T., Larrue C., Matczak P.	2017	Varieties of flood risk governance in Europe: How do countries respond to driving forces and what explains institutional change?	Global Environmental Change
P097	Wiering M., Verwijmeren J.	2012	Limits and Borders: Stages of Transboundary Water Management	Journal of Borderlands Studies
P098	Wu H., Leong C.	2016	A composite framework of river sustainability: Integration across time, space and interests in the Yellow River and Ganges River	Water Policy
P099	Wu X., Ching L.	2013	The French model and water challenges in developing countries: Evidence from Jakarta and Manila	Policy and Society
P100	Yang Y.	2009	From decentralized autonomy to central governance: Case of Murray-Darling River Basin and its implication for the governance of Tai Lake Basin	2009 International Conference on Management Science and Engineering - 16th Annual Conference Proceedings
P101	Yu H.	2016	Can water users' associations improve water governance in China? A tale of two villages in the Shiyang River basin	Water International
P102	Yu H.H., Edmunds M., Lora-Wainwright A., Thomas D.	2016	Governance of the irrigation commons under integrated water resources management - a comparative study in contemporary rural China	Environmental Science and Policy
P103	Zhao C., Wang P., Zhang G.	2015	A comparison of integrated river basin management strategies: a global perspective	Physics and Chemistry of the Earth
P104	Zingraff-Hamed A., Greulich S., Wantzen K.M., Pauleit S.	2017	Societal drivers of European water governance: a comparison of urban river restoration practices in France and Germany	Water

Appendix B. Review matrix

This appendix provides the matrix that guided the full-text review and the analysis of the findings. The matrix is presented here in the same order as the results are presented in the main manuscript.

Criteria	Type of information	Explanation of the category or possible options	Reference (where applicable)
A. Generic information			
Main issue	Numbered (select one option)	1. River basin management 2. Agriculture 3. Urban water services 4. Flood risk governance 5. Groundwater governance 6. Transboundary water management 7. Environmental protection 8. Watershed management	Adapted from Cook and Bakker (2012)
Specification of main issue	Free field	Further specification of the main scope of the publication	
Objective/Question	Free field	Research objective(s) or question(s) as stated in the publication	
B. Definitions, elements and frameworks			
Type of water governance definition	Numbered (select one option)	1. Existing definition 2. Own definition 3. No/unclear definition	
Definition used	Free field	If applicable, the definition (and the reference) is copied from the publication.	
Type of framework for comparison	Numbered (select one option)	1. Existing framework, 2. Own framework A (developed and then used to compare cases), 3. Own framework B (developed out of the comparison e.g. inductively or through grounded theory), 4. No/unclear framework	

Criteria	Type of information	Explanation of the category or possible options	Reference (where applicable)
Governance elements included	Free field	Description of the theoretical concepts or governance elements that are assessed and compared. For example, institutions/actors; policies; legislation; instruments; structures; coordination.	
Type of governance elements	Numbered (multiple options possible)	1. Legislation, instruments, policies 2. Participation and stakeholder involvement 3. Cooperation and coordination 4. Resources 5. Knowledge and expertise 6. Governance levels 7. Governance qualities 8. Water/environmental management and outcomes 9. Other	Expanded from Rogers and Hall (2003)
C. Case selection, location and boundaries			
Case selection rationale	Free field	If applicable, the specific method or rationale that was used to select cases, e.g. most similar, most different research design. Left as empty when no reason for selecting the cases is provided.	
Unit of analysis	Free field	The unit of analyses (cases) that are being used to compare, e.g. a watershed committee, a river basin, a participation arena. The term that is used by the authors is copied.	
Number of cases compared	Insert number	The number of cases compared	
Name(s) of country/countries	Free field	The name of up to 10 of the countries that are compared. When more than 10 countries are compared just write the number of countries and the relevant region.	
Name(s) of jurisdictional unit (not a country)	Free field	The name of the city, subnational or multi-national region that is being compared, e.g. Europe, city of Manila, region in central Spain	
Name(s) of hydrological basin(s)	Free field	The name of the basin and its location. For example, Elqui Basin (Chile); Mendoza Basin (Argentina); Pucara Basin (Bolivia)	

Criteria	Type of information	Explanation of the category or possible options	Reference (where applicable)
Case boundaries	Numbered (select one option)	1. Hydrological borders 2. Jurisdictional 3. Both (This option applies when jurisdictional borders are used to define a part of a hydrological unit (e.g. Dutch part of the Rhine basin) 4. Not clearly specified	
Hydrological borders	Numbered (select one option if hydrological borders apply)	Options for applicable hydrological unit when the cases are defined by a hydrological border (e.g. River (sub-)basins / aquifers / streams / wetlands or parts thereof): 1. Whole transboundary river basins. For example, the Rhine basin, Danube River (if tributaries and the catchment area are not considered) 2. Whole domestic river basins. For example, the Thames basin, Loire River (if tributaries and the catchment area are not considered) 3. Sub-basins of domestic or transboundary river basins. For example, the Tisza basin (part of the Danube basin), Doñana wetland, Mississippi delta 4. Aquifers	Tanago et al. (2016); Varady et al (2016)
Jurisdictional borders	Numbered (select one option if jurisdictional borders apply)	Options for applicable jurisdictional boundaries: 1. Local: Comparison of towns, communities or cities. For example, London; 2. Sub-national regions: Comparison of provinces, counties or federal states. For example, Western USA, Bavarian part of the Danube basin; 3. Countries: Comparison of countries, e.g. Spain 4. Multi-national regions: Comparison of region that encompasses multiple countries 5. Global: The comparison covers the entire world	
D. Data and methods			
Type of data	Numbered (select one option	1. Primary data (interviews, observations or documents collected for research purposes) 2. Secondary data (collected by others for other purposes, e.g. indices, censuses, monitoring data) 3. Both 4. Other	Van de Ven, 2007
	Free field	If "Other", the data used is specified.	

Criteria	Type of information	Explanation of the category or possible options	Reference (where applicable)
Methods	Numbered (select one option)	1. Only qualitative methods (in-depth case study) 2. Only quantitative methods (e.g. statistics) 3. Only set-theoretic methods (e.g. Qualitative Comparative Analysis) 4. Other (e.g. a combination of methods)	
	Free field	If "Other", the method or the combination of methods used is specified.	
E. Reflections			
Implications of comparative choices and methods	Free field	If applicable, the following questions are answered: 1. What reflections do the authors offer on their method of comparison? 2. What recommendations do the authors provide for comparative analysis?	
Current and/or emerging issues and research gaps	Free field	If applicable, the following question is answered: 1. What governance-related gaps for future research do the authors identify?	

Citations

Cook, C., & Bakker, K. (2012). Water security: Debating an emerging paradigm. Global Environmental Change, 22(1), 94-102.

Rogers, P., & Hall, A. W. (2003). Effective water governance (Vol. 7). Global water partnership.

Tánago, I. G., Urquijo, J., Blauhut, V., Villarroya, F., & De Stefano, L. (2016). Learning from experience: a systematic review of assessments of vulnerability to drought. Natural Hazards, 80(2), 951-973.

Van de Ven, A. H. (2007). Engaged scholarship: A guide for organizational and social research. Oxford University Press on Demand.

Varady, R. G., Zuniga-Teran, A. A., Gerlak, A. K., & Megdal, S. B. (2016). Modes and approaches of groundwater governance: a survey of lessons learned from selected cases across the globe. Water, 8(10), 417.

DOI: 10.1002/eet.1812

SPECIAL ISSUE ARTICLE

WILEY Environmental Policy and Governance

The lens of polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance

Nadine Jenny Shirin Schröder

Faculty of Sustainability, Research Group Governance, Participation and Sustainability, Leuphana University Lüneburg, Germany

Correspondence
Nadine Jenny Shirin Schröder, Research Group Governance, Participation and Sustainability, Faculty of Sustainability, Leuphana University Lüneburg, Scharnhorststr. 1, 21335 Lüneburg, Germany.
Email: nadine.schroeder@stud.leuphana.de

Funding information
Hans Böckler Foundation

Abstract

This paper discusses definitions that have been developed and used in the study of polycentric governance. It offers conceptual refinements with the aim of reducing fuzziness, showing challenges of operationalization and application to an empirical setting—in other words, analyzing governance arrangements through the polycentricity lens. One defining element of polycentricity is the presence of "multiple decision-making centers." This paper shows that this multiplicity is specific to the good/problem in focus, the center's tasks/responsibilities, the level in focus and analytical system boundaries. Functional overlapping among those centers is required to consider centers forming one system in relation to a good. These specificities should be examined for comparisons on polycentricity influencing the functioning of systems. The paper applies those conceptual refinements to the implementation of the EU Water Framework Directive in Berlin and Hamburg. It characterizes the two cases in terms of their polycentricity. It compares their functioning so far and how the latter relates to interactions and social interrelations. The polycentricity lens illuminates important features and differences: given an overall multiplicity of centers and a similar rule setting in both cities, the differences in the distribution of responsibilities and social interrelations led to a faster but less integrated implementation in Hamburg than in Berlin. The application of the proposed refinements yields insights into further work to be done in favor of theory-building on the functioning of polycentric governance systems.

KEYWORDS

EU Water Framework Directive, Germany, performance, polycentricity, veto-player-theory, water governance

1 | INTRODUCTION

The concept of polycentric governance is used increasingly in research—often in a normative manner associated with values such as "better performance." The analysis of different governance systems proves this. Based on existing definitions, this paper shows the fuzziness of this concept, arguing a clearer operationalization is needed to distinguish polycentric governance from other kinds of structures to analyze differences in their functioning. The question is do we really know what polycentric governance is when we see it? In addition, do we all see the same when we see it? I argue that based on existing definitions and operationalizations this is, by now, not the case.

This paper follows the statement of Ostrom, Tiebout, and Warren (1961): "Both the structure and the behavior of the system need analysis before any reasonable estimate can be made of its performance in dealing with the various public problems arising in a metropolitan community."

The first part of the paper moves forward from contrasting definitions—showing the variations of defining elements used—to propose steps to operationalize the concept and to analyze governance systems more systematically to facilitate empirical comparisons. The proposed steps focus on the multiplicity of decision-making centers and related defining elements. They are underpinned by thought experiments from the field of water governance showing that altering the analytical focus significantly alters the classification as polycentric or not, or more or less polycentric. Boxes supplement each step containing the application to the local implementation of the European Union (EU) Water Framework Directive (WFD) in the German city-states Berlin and Hamburg.

The second part is dedicated to the behavior of the system. The progress of WFD implementation in Berlin and Hamburg—the performance of both systems—illustrates the necessity of an increasing attention on interactions and social interrelations among decision-making centers to explain the functioning of those systems.

The third part, in terms of a research agenda, elaborates questions concerning the relation between multiplicity characteristics—the multiplicity of centers and related elements—and the functioning of systems.

The case data used for illustration were extracted from an in-depth case study comparison on the EU WFD implementation processes in Berlin and Hamburg, Germany. Data were collected from semistructured interviews with authorities and nongovernmental organizations (NGOs), document analysis and participatory observation (Schröder, 2014).

2 | POLYCENTRIC GOVERNANCE: YOU KNOW IT WHEN YOU SEE IT!?

A large variety of definitions of polycentricity or polycentric governance can be found in the literature (just to name the most widely cited (Ostrom, Tiebout, & Warren, 1961) and a few of the other widely cited works: (Andersson & Ostrom, 2008, p. 79; Galaz, Crona, Österblom, Olsson, & Folke, 2012, p. 22; Huitema et al., 2009; McGinnis, 2011, p. 171; McGinnis & Ostrom, 2012, p. 15; Oakerson & Parks, 2011, p. 153; Ostrom, 1999, p. 55, 73; Ostrom, 2001, p. 2; Ostrom, 2005, p. 283; Pahl-Wostl, 2009, p. 357; Skelcher, 2005, p. 89; Pahl-Wostl & Knieper, 2014, p. 140) (Table 1). Existing definitions vary in their understanding of what is covered by polycentricity: differences exist in terms of structures and/or processes as well as "a nonhierarchical, institutional, and cultural framework" (Aligica & Tarko, 2012, p. 251); in terms of the degree of autonomy or independence of actors to be considered as decision-making centers (formally independent, de-facto independent, relatively . . . semi, substantive, etc.); in terms of diverse types of organizations, and differing scales and levels; and in terms of overlapping and redundancy.

Not all elements appearing in those definitions can be combined to a common understanding of polycentric governance. What all definitions share is referring to the existence of "multiple decision-making centers" expressed in terms of actors, units, elements, authorities and organizations. Based on this commonality, I define polycentric governance systems here as characterized at least by a multiplicity of decision-making centers, which, for system comparisons, are governing a certain good or problem within defined system boundaries. This supplement is further elaborated upon below.

The one commonality of multiple centers leaves open questions on its operationalization. Clearly there are many decision-making centers in any given society. If we consider all of these then we can say everything has multiple centers and is therefore potentially polycentric—ignoring the other potential elements for now. In such a case comparing different settings with the polycentricity lens might be less revealing. This raises the question of which decision-making centers need to be considered to determine a multiplicity among them. Additionally, how does this relate to the functioning of a governance system? I assert that there are at least five characteristics determining a *multiplicity* or a singularity of centers.

First, what do centers decide on? I argue that polycentricity should be identified *specifically to a good or problem* which is governed and that centers can be considered *specifically to their tasks*.

Second, clarification is needed regarding what is *aggregated to* a unit—*a center*. Here, this is the unit where, by some sort of membership, no fully included subunit may decide (and implement) what is not intended by the whole unit. This may result in different sizes of centers in one setting ranging from individuals, to collectives, organizations or states.

Third, how *independent* does a unit need to be to be considered a *center*? This paper follows the argumentation of Marshall (2015) that centers need to have considerable de facto autonomy (in contrast to de jure autonomy). In addition, centers should actively "exercise […] diverse opinions and preferences" (Aligica, 2014, p. 61). Centers of described cases may at least be able to actively exercise their diverse opinions and preferences regarding some issues that are relevant for governing the good or problem in focus. This does not need to be the case for the full range of their decision-making capabilities.

Fourth, a reference point to determine the *boundaries* within which to look for multiple centers is needed. Here this is the analytical system.

Fifth, the centers need to be functionally interlinked in terms of the good or problem in focus, creating *overlapping* within a system.

Definitions of polycentric governance generally contain more elements than just "multiple centers." Based on these elements and their operationalization, governance systems might be identified as polycentric or not, a matter of binarity, as more or less polycentric, a matter of degree (e.g. in Pahl-Wostl & Knieper, 2014), or as type x/y/z of polycentric governance, a matter of different manifestations (e.g. Aligica & Tarko (2012, p. 257) map varieties of polycentricity). The choice of defining elements and their specific operationalization deserves further attention, especially regarding statements on performance.

This choice also determines whether polycentric governance could be understood as an umbrella concept for several other governance concepts, such as markets, federalism, hierarchies, collaborative governance and fragmentation, or as a governance type with specific characteristics and functioning.

TABLE 1 Different definitions of polycentric governance (bold emphasis added)

Ostrom, Tiebout, and Warren (1961)
"'Polycentric' connotes **many centers of decision-making** which are **formally independent** of each other. Whether they actually function independently, or instead constitute an interdependent system of relations, is an empirical question in particular cases. To the extent that they **take each other into account** in **competitive relationships**, enter into various **contractual** and **cooperative undertakings** or have recourse to **central mechanisms to resolve conflicts**, the various political jurisdictions in a metropolitan area may function in a coherent manner with consistent and predictable patterns of interacting behavior. To the extent that this is so, they may be said to **function as a 'system'**."
Ostrom (1999)
"A polycentric order is defined as one where **many elements** are capable of making **mutual adjustments for ordering relationships** with one another within a **general system of rules** where each element acts with **independence of other elements**. **Spontaneity**, in the sense that individuals will be led to organize elements in a polycentric order, initiate self-enforcing arrangements and alter basic rules, is explored as an attribute of a polycentric order." and "The essential defining characteristics of a polycentric political system is one where **many officials and decision structures** are assigned **limited and relatively autonomous** prerogatives to determine, enforce and alter legal relationships. No one office or decision structure has an ultimate monopoly over the legitimate use of force in a polycentric political system."
Ostrom (2001)
"Polycentric systems are the organisation of small-, medium-, and large-scale **democratic units** that each may exercise **considerable independence** to make and enforce rules within a circumscribed scope of authority **for a specified geographical area**. Some units may be general purpose governments whereas others may be highly specialized."
Skelcher (2005)
In "a polycentric system . . . **political authority** is dispersed across **separately constituted bodies** with **overlapping jurisdictions** that do not stand in **hierarchical** relationship to each other."
Ostrom (2005)
"By polycentric I mean a system where citizens are able to organize not just one but **multiple governing authorities** at **differing scales**. Each unit exercises **considerable independence** to make and enforce rules within a circumscribed domain of authority **for a specified geographic area**."
Andersson and Ostrom (2008)
"polycentricity—the relationships among **multiple authorities** with **overlapping jurisdictions**" and "Polycentric governance. .. is a broad type of governance regime that possesses a number of specific institutional attributes capable of providing and producing essential collective goods and services to the citizens in that regime." and "In a polycentric governance system that is operationalized to a greater or lesser extent in the world of public affairs, each unit exercises **considerable independence** to make and enforce rules within a circumscribed scope of authority **for a specified geographical area**. In such a system, some units are general-purpose governments while others may be highly specialized."
Huitema et al. (2009)
Quote Skelcher (2005) and "polycentric systems have a high degree of **overlap** and **redundancy**, and this makes them less vulnerable: if one unit fails, others may take over their functions"
Pahl-Wostl (2009)
"... polycentric governance systems are defined here as complex, modular systems where differently sized **governance units** with different purpose, organization, spatial location **interact** to form together a largely self-organized governance regime. Polycentric governance systems are characterized by many degrees of freedom at different levels."
McGinnis and Ostrom (2012)
"Polycentric governance requires a complex combination of **multiple levels** and **diverse types of organizations** drawn from the public, private, and voluntary sectors that have **overlapping realms of responsibility** and **functional capacities** ... [P] rivate corporations, voluntary associations, and community-based organizations play critical supporting roles in a polycentric system of governance, even if they have not been assigned public roles in an official manner."
Oakerson and Parks (2011)
"Polycentricity describes a process of decision making where **multiple independent actors** interact to produce an outcome that is commonly valued.. .. Polycentricity describes a pattern of governance that emerges from the **interactions** of multiple independent centers of authority. .. polycentricity depends on the **absence of dominance among various centers of authority**" and "Polycentricity thus describes a system of **qualified independence** among interdependent centers of authority"
Galaz, Crona, Österblom, Olsson, and Folke (2012)
"forms of multi-actor and multi-level responses can be viewed as providing polycentric order, in the sense that they include the **self-organizing relationship** between **many centers of decision-making** that are **formally independent** of each other" and "By 'polycentric order' we refer to the processes and structures that allow complex actor constellations **not subject to any single authoritative coordinating mechanisms or authority**, to self-organize and make **mutual adjustments**"
Aligica and Tarko (2012)
"Polycentricity. .. defined as a social system of **many decision centers** having **limited and autonomous prerogatives** and operating under an **overarching set of rules**." and "polycentric order means more than just a matter of different centers of decision operating **in competition** with each other in a specific domain or area. Polycentricity is a complex system of powers, incentives, rules, values, and individual attitudes combined in a complex system of relationships at different levels." and "Polycentricity emerges as a **nonhierarchical**, **institutional, and cultural framework** that makes possible the coexistence of **multiple centers of decision making** with different objectives and values, and that sets up the stage for an evolutionary **competition** between the complementary ideas and methods of those different decision centers. The multiple centers of decision making may act either all **on the same territory or may be territorially delimited** from each other in a mutually agreed fashion." and "Polycentricity has three basic features. .. (1) The ***multiplicity of decision centers*** .... (2) The institutional and cultural framework that provides *the* ***overarching system of rules*** defining the polycentric system .... (3) Finally, the spontaneous **order** generated by **evolutionary competition** between the different decision centers' ideas, methods, and ways of doing things." [italics in original]
Pahl-Wostl and Knieper (2014)
"According to the definition chosen in this paper, polycentric governance systems are characterized by **multiple centers** of authority and **distribution of power** along with **effective coordination structures**." and "Polycentric governance systems must fulfill at least two criteria to function as systems: presence of **multiple centers of decision making** and **coordination by an overarching system of rules**."

3 | STEPS TO REDUCE FUZZINESS IN USING THE POLYCENTRICITY LENS

3.1 | Good or problem specificity

Identifying a polycentric governance system can begin with the question: "What is being governed?" Where the provision or

production of a good or the reduction of a problem is considered, we can ask what the good or problem in question is.

Depending on the nature of the good and the interests of the society in that good, various actors gain relevance as decision-making centers, for example, zooming into a system for national defense or for water issues. I argue that if polycentricity characteristics, in particular multiplicity, are used as variables for explaining system performance, they need to be analyzed specifically with regard to a good or problem.

For instance, if there are several producers of drinking water in a water governance system but only one company treating waste water for private users, then the system is multicentric concerning "drinking water production" but monocentric in terms of "waste water treatment." If the analytical focus is changed slightly, the picture might change too. The answer to "what is being governed?" is now "the river water quality in this system." The waste water treatment company, industrial water treatment facilities (and connected actors), perhaps one or more regulatory authorities with responsibility for water quality, land users, and so on also need to be considered as centers.

Clearly defining the good or problem in focus is the key to identifying what is included in or excluded from the group of decision-making centers. This directly influences which interrelations and interactions might be relevant and should be analyzed to evaluate the functioning of a system and how it affects performance. Without this focus, a researcher might classify a system as polycentric whereas another one might classify the same system differently. This hampers theory development on polycentric governance. Making the good or problem in focus explicit would improve the reproducibility of results. Quite different governance systems might be comparable in several dimensions but if they are not compared with the focus on the same good or problem, statements on performance due to polycentricity are questionable.

Berlin and Hamburg

What is the good or problem in focus of the analysis? Which goods or problems are significantly affecting or are significantly affected by the governance of this good or problem?

The analysis here focuses on the implementation of the EU WFD in Berlin and Hamburg. The WFD-task is to reach the good (ecological) status[a] in all water bodies by 2015.[b] In particular, rivers and their basins, connecting different jurisdictions, are under pressure of conflicting usages. There are four main problems in Germany that need to be solved to reach a good status in the river systems, which are basically constant variables in the cases of Berlin and Hamburg:

- chemical water quality (nitrates/phosphates from agriculture, pharmaceuticals)
- appropriate water quantity in time and space
- connectivity for fishes and smaller organisms (e.g., damns, weirs, . . .)
- hydromorphological changes in the shape of rivers (box profile, concreted banks, straightened river shape instead of meandering, no floodplains)

The WFD tasks interact with many tasks/goals of other actors which need to be fulfilled to make use of many water-related goods in a society, e.g., drinking and process water, draught prevention, fishing, flood protection, transport means, cultural heritage, space, recreation, biodiversity/nature conservation, agriculture and energy production. This leads to numerous functionally interlinked actors with a wide range of heterogeneity in interests. They take each other into account to reach their own goals (to differing degrees depending on physical properties and power relations). If they do not coordinate with each other, zero-sum games are more probable and no actor can reach its goals.

Therefore, it is assumed that the WFD goals cannot be fully reached without coordination and public participation. Therefore, the WFD also intends to improve coordination across borders and sectors and public participation in planning measures, but without elaborated formal provisions (except from official public hearings).

[a]Good ecological status shall be reached in water bodies classified as natural and good ecological potential in water bodies classified as heavily modified.

[b]Exemptions are possible until 2027. Member states remain far from reaching this goal.

3.2 | Task specificity

Even if the good or problem—the particular purpose for which the main actors are making decisions for or against—is defined, there are several options which actors need to be considered as decision-making centers to show differences in the multiplicity of systems and its effects on the functioning of (poly)centric systems.

What characterizes system's center configurations? Do centers need to fulfill the same tasks? Or, do they only need to (partially) pursue the same goals? Or, is it sufficient for actors to only be functionally interlinked[1] concerning one good or problem to be considered as centers? Additionally, how strong[2] does this interlinkage need to be?

To illustrate this: Is it a simple question as to whether Berlin and Hamburg are in the same way polycentric? Both might be called polycentric based on the multiplicity element, but they differ significantly along the mentioned categories, with differing implications for their implementation strategies and progress (see below).

Same tasks: In Berlin (Figure 1), one water management authority is responsible for WFD implementation. In contrast, Hamburg

[1]They influence each other's goal achievement without sharing any goals.

[2]There may be numerous functionally interlinked centers causing difficulties in comparisons.

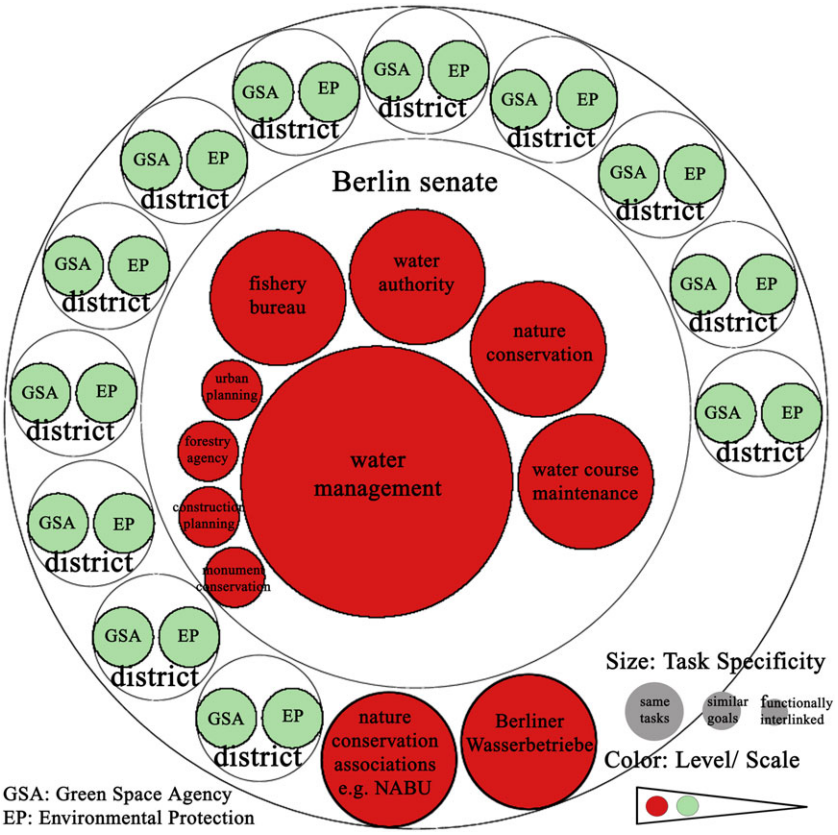


FIGURE 1 Task specificity and levels of decision-making centers in the jurisdiction of Berlin (related centers in the surroundings are omitted) [Colour figure can be viewed at wileyonlinelibrary.com]

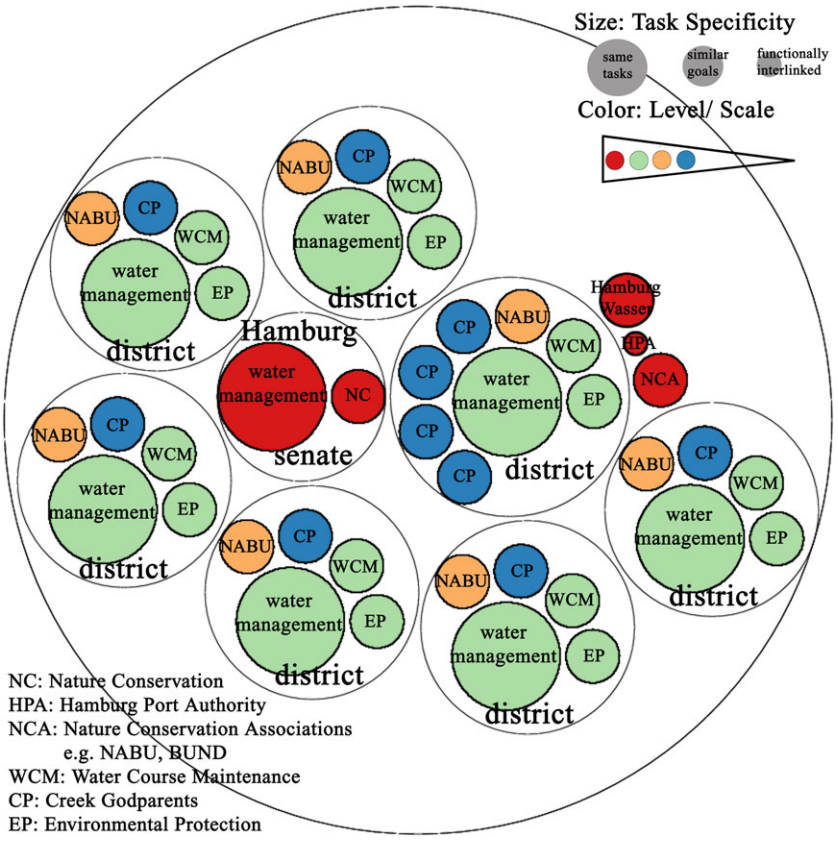


FIGURE 2 Task specificity and levels of decision-making centers in the jurisdiction of Hamburg (related centers in the surroundings are omitted) [Colour figure can be viewed at wileyonlinelibrary.com]

(Figure 2) has eight authorities at two different levels fulfilling the same task. This is illustrated by the largest (greatest task specificity) circles with the same size but different colors.

Same goals (second largest circles in Figures 1 and 2): Related to the good ecological status of waters in Berlin, at least six centers (senate and nonsenate actors) should be considered as relevant in sharing goals with

Berlin and Hamburg

Which centers are fulfilling key tasks? Which centers share goals with key centers and which centers are simply functionally interlinked?

Are tasks and goals of the different centers aligning or conflicting?

Supplementary to Figures 1 and 2, Tables 2 and 3 show the tasks of key centers and how these relate to the goals of centers categorized as "(partially) same goals" and "functionally interlinked." This analysis helps to categorize centers' general functional relationship to each other and to the good/problem in focus.

Responsibilities and tasks in Berlin and Hamburg are distributed in quite different ways. In Berlin, one senate authority[a] is responsible for the planning of WFD measures at the entire city area. In Hamburg, seven districts are responsible for WDF planning. An additional water management authority at the senate level (a department of the BSU[b]) is responsible for pre-planning and financial steering. The pre-planning is rather rough and less integrative compared to plans of Berlin's water management authority.

In both cities similar actor groups with similar goals can be found, although they play different roles, such as the nature conservation associations as nonstate actors. In Berlin these associations[c] are not actively involved. In Hamburg, some of these associations initiate several small and larger projects in the realm of the WFD. They state WFD goals as part of their own goals instead of referring more to the, traditionally established, species protection that would stronger align with goals of nature conservation authorities. There is less clear conflict between WFD planners and actors of nature conservation in Germany, mainly due to different time reference points for protection. Listed rare species (which could, in extreme, grow at a locality polluted with mineral oil) are protected under the Nature Conservation Act. Locally, some of those species, or habitats, have to be removed to reach WFD goals.[d]

Tasks are partially carried out by Hamburg's "creek godparents" (individuals or groups) as well. The creek godparents program in some districts is supported by the district environmental protection/nature conservation department.

Nonstate actors working at the edge of fulfilling state duties became possible because the senate did not describe WFD measures in river management plans explicitly, so as to not turn them to state duties.

Generally, the analysis of centers and their tasks and goals shows that it can be measure-specific regarding whether the water management authorities may expect support or conflict from their coplayers in the system. Although the general abundance of center-types might be the same among different systems, they do not necessarily need to share the same constellation of matching and contradicting goals.

[a]The senate is comparable to a ministry of other German federal states. Below it is the district level.
[b]BSU = Authority for City Development and Environment.
[c]By their own declaration they have enough to do with other projects and are satisfied with public participation conducted by Berlin's WFD planners.
[d]There is no formal prescription in the WFD to solve this problem of institutional interplay.

water management. In Hamburg those are more numerous, including several nonstate actors, and spread across four levels.

Functionally interlinked (smallest circles): In contrast to Hamburg, interview partners of Berlin's water management reported[3] several centers at district and senate level which are functionally interlinked with their WFD-related tasks. City planners, for example, prefer space close to rivers to build houses with scenic views. This space is lost as restoration area for natural river development.

To conclude, actors considered as centers can at least be categorized in these three different ways when using the polycentricity lens. Whether specific systems with different task specificity configurations should in the same way be called polycentric is not a trivial question. It needs to be included in the analysis when making any statement on a system's polycentricity and its performance.

3.3 | System boundaries and level/scale specificity

System boundaries are rarely mentioned in existing definitions. As some of these refer to systems, it seems to be logical for system boundaries to be used as a reference point in operationalizing the existence of multiple centers. The system, as understood here, draws boundaries around centers which are functionally interlinked with each other in relation to some good or problem. This does not need to perform in a certain way to be called a system.[4]

The system boundaries should reflect the good/problem in focus as well as the level/scale of analysis. Both should be given by the research question.

To illustrate this, the given good is now the possibility of shipping by a river. Here, it seems to be useful to draw the analytical system boundaries along a sub-basin. There could be one water board counted as a decision-making center which is responsible for the maintenance (task) of the defined river. The system configuration for this specific good would be called monocentric. However, if the

[3]The figures include only centers which were reported as relevant by interview partners. Many actor-types, invited by Berlin's water management authority to develop integrative river restoration plans, are not reported as being relevantly active in Hamburg. This might be due to the fact that Hamburg's WFD authorities are less ambitious in involving other actors in their planning. They try to bypass conflicts about contradictory goals.

[4]In some definitions the term system is used only if polycentric governance is performing in a certain way (well-performing or "in a coherent manner" (Ostrom, Tiebout, & Warren, 1961)), but it thus remains unclear within which boundaries centers need to be considered and their joint performance needs to be evaluated.

Berlin and Hamburg

What are the system boundaries?

At what levels are the considered decision-making centers located?

System boundaries of analysis: two cities embedded in sub-basins

The implementation of the EU WFD in Germany remained in federal state responsibility, although River Basin Communities (RBCs) were established along the 10 major basins. No planning competency was transferred to RBCs.

The good status of water bodies within the city is influenced by the activities within the basins—within and beyond city borders. Therefore, the analytical system boundaries are drawn along all sub-basins of rivers flowing at least partially through the city jurisdictions. It covers the cities and functionally interlinked areas of the surrounding federal states with all the different water usages and users and across different kinds of jurisdictional borders.

Multiple levels of involved centers

Berlin and Hamburg differ in the number of relevant levels (compare Figures 1 and 2) as well as in the location of key centers. Both cities share the RBC Elbe as a level on top of local implementation. Below this, in Berlin two levels can be identified: the senate level and the level of citizens and nature conservation associations, which are mainly active in participating in info-fora and workshops. In Hamburg up to four levels can be found, but a hierarchy of levels is difficult to define. Water management at senate and district levels is supplemented by nonstate-actors: citizens as creek godparents, as participants in projects of nature conservation associations or in district action days and in one of the few district experiments with public participation in planning. The nature conservation associations can here be considered as an extra level if scale is used to identify levels. This is interwoven with other levels through projects of differing scales and varying collaborations with authorities, citizens and very local member groups of the associations.

analyzed good is the possibility of shipping in a larger river network, it may be useful to draw the system boundaries along the basin or a nation-state. Several water boards and other actors need to be considered. For this specific good multiple centers constitute the system.

Changing the focus slightly, now fish habitats in the defined river (good water quality/adequate hydromorphology), alters the picture. The sub-basin might serve as a system boundary. Open-cast mining at the edge of the sub-basin could influence the water quality. Processes and actors outside the sub-basin but within the area of influence of the open mining might strongly influence the decisions made there. The analytical system boundaries should cover these causal chains so that actors within these boundaries are considered as centers.

The system boundaries can be defined territorially, for example according to natural borders such as basins, artificial borders such as the area covered by infrastructure or administrative jurisdictions, or nonterritorially according to possibilities of access or membership.

The level/scale of analysis (e.g., local, regional, national, supranational, global) alters the system boundaries as well. For the good "good status of waters" different governance research questions can be posed:

- Local: How to restore a river stretch?
- Regional: How to reduce diffusive nitrate pollution on agricultural sites?
- National: How to find common standards on water quality and how to safeguard and monitor them?
- Supranational: How to effectively calibrate efforts among nations in favor of implementation control?

The good stays the same, but the research question defines the level in focus, the scale and related to this the system boundaries. Significantly different types and numbers of decision-making centers need to be considered for the system: whereas a water management authority is taken into account at the local level, at the national level these may be different public authorities and lobbying associations. A system could be characterized by a lower multiplicity of centers at one level compared to another level.

3.4 | Overlapping

Actors need to form a common system to be considered decision-making centers. In some definitions "overlapping" is a precondition for a system to be called polycentric (McGinnis, 2011; McGinnis & Ostrom, 2012; Skelcher, 2005). Centers may overlap in space or in individuals affected by their decisions and in the membership of individuals forming centers. Here it is assumed that functional overlapping between centers allows them to form a governance system (a network of interrelations) for a good or problem.

This directs the focus to overlapping caused by decisions,[5] specifically spatial overlapping. Similar distinctions seem to be reasonable for groups of individuals affected by decisions.

Two kinds of overlapping are conceivable. Functional overlapping occurs where centers overlap in their sphere of influence. Centers affect the sphere of overlapping through given functional interlinkages. Territorial overlapping refers to an overlapping of responsibility spheres (or target areas). For public authorities these are jurisdictions. Where the sphere of influence of a center is larger than the sphere of responsibility, functional overlapping corresponds to the concepts of externalities and spillovers. If hydrological scales are not adopted in water governance systems, functional overlapping is presumably larger than territorial overlapping. For instance, two centers in flood protection with identical tasks form one analytical system. They do not overlap territorially as the jurisdictional borders are clearly defined and not overlapping. Nevertheless, they overlap

[5]For information exchange/learning processes, overlaps in social relations might also be important.

Berlin and Hamburg

What is the scale of decision-making centers and how do they overlap?

Scale and overlapping may be analyzed at different levels of detail depending on the research question. Here as roughly outlined, the two cities overlap functionally with the surrounding federal states in sharing basins (Berlin: Brandenburg; Hamburg: Schleswig–Holstein/ Lower Saxony). They need to solve similar issues with their surrounding counterparts (which may be at the same or different levels resulting in horizontal or vertical overlapping) such as water quality and quantity and river connectivity. Issues of river restoration (in addition to influences on flood protection) create small-scale functional overlaps, but are expected to be managed more effectively and/or cost-efficiently if coordinated in basins across jurisdictional borders. The two states follow different implementation strategies. Hamburg's authorities indicated that they tolerate Lower-Saxony's activities, because they affect only a very small area. It would be very difficult to agree on one implementation strategy with both surrounding states. Hamburg avoids having two different strategies within its jurisdiction.

Hamburg additionally features vertical territorial overlapping between the senate water management (designated responsibility of area coordinators) and the district level and horizontal functional overlapping among districts themselves. The various activities of nature conservation associations create another layer of functional and territorial overlapping specific to each project.

Visualizing the overlapping with the numerous other centers within and around the city jurisdictions would result in a very complex picture.

functionally as upstream and downstream decisions can influence each other.

If centers are not functionally interlinked with each other (although they might overlap territorially—such as authorities for childcare and water management) they should not be considered as centers for identifying a single polycentric governance system, but rather separate systems.

Furthermore, we can differentiate between vertical overlapping and horizontal overlapping. Horizontally overlapping centers belong to the same level whereas vertically overlapping centers decide on different levels. The latter may contain hierarchical structures[6] or overlaps without hierarchical relations among centers. In federal systems jurisdictions are vertically territorially neatly nested. Attention should be given to vertical and horizontal functional overlap beyond territorial overlapping.

In complex systems it is very likely that centers overlap in several ways, both territorially and functionally, at the same time. Considering task specificity and overlapping, redundancy among centers is not automatically given in polycentric governance systems. Several conditions need to be fulfilled for centers to take over the tasks of other centers in the case of failures (which should be the effect of redundancy).

4 | THE ROLE OF INTERACTION AND SOCIAL INTERRELATIONS

The second main part concerning definitions on polycentricity is on social interrelations—in−/interdependencies—and interaction of centers: "take each other into account," "competition," "coordination," "contractual and cooperative undertakings" and "conflict solving mechanisms." Depending on the chosen defining elements, quite different operationalizations are possible and necessary. They have different implications for the functioning of a system; for example, choosing just competition might lead to market analogies.

The functioning of a system affects its outcome(s)—the performance to govern the good or problem in focus, here the good ecological status of waters. In Berlin (by 2014; Schröder, 2014) only a few river restoration measures have been constructed (e.g., in pilot projects), mainly because the first elaborated integrated concept (finished in 2009) remains stuck in a plan-approval procedure.[7] Concepts for further river sub-basins have already been developed but have not entered plan-approval procedures by 2014 or be constructed. The water maintenance authority was persuaded to conduct experiments on changing maintenance practices in favor of the WFD. Convincing them further could have accelerated WFD implementation in Berlin.

Hamburg achieved a higher share of constructed measures. WFD planners started with easily identifiable tasks (e.g., connectivity measures) instead of large integrated concepts[8] (on, e.g., river restoration) and they framed measures as water maintenance to avoid time-consuming approval procedures. However, the ecological outcomes (and cost-efficiency) in both cities—once Berlin has constructed the planned measures—remain uncertain.

How can those differences in functioning be explained? The rule setting in Berlin and Hamburg is similar. The same holds for the presence of center-types (compare the first columns in Tables 2 and 3). However, they are spread across different levels and vary on other multiplicity characteristics as laid out in the operationalization steps above. Does interaction, specifically coordination, among centers explain the different outcomes? Coordination (including public participation) is analyzed here because the WFD requires coordination across borders and sectors.

For some authors coordination is a defining characteristic of polycentric governance systems. Pahl-Wostl, Lebel, Knieper, and Nikitina

[6]Nevertheless, independence of lower authorities may be given through discretion.

[7]No progress was reported on Berlin's websites by March 1, 2017 Retrieved from http://www.stadtentwicklung.berlin.de/umwelt/wasser/eg-wrrl/de/inberlin/panke2015.shtml

[8]Districts receive finance only for planning within their own jurisdictions. Joint and integrated plans would cause high decision costs.

TABLE 2 Responsibilities and goals of decision-making centers in Berlin: e.g., River restoration is the goal of the water management authority. This goal partially contradicts with goals/tasks from the nature conservation authority because (b) they protect a certain habitat status which might not align with the status resulting from river restoration measures [Colour table can be viewed at wileyonlinelibrary.com]

Tasks of key centers	Protection and resettlement of species	Improvement of chemical water quality	Removal of/ bypasses for barriers for fishes and smaller organisms	River restoration/ habitat improvement	No degradation of local flood protection	Near natural water quantity	Elimination of invasive species in and near rivers
(1) Centers with the same tasks:							
Water Management Authority							
Comparable authorities in Land Brandenburg	(perhaps different priorities)						
(2) Centers with partially same goals as (1):							
Water Maintenance Authority						d	
Nature Conservation Authority	a			b	b	b	c
Water Authority	g						
Fishery Bureau	a						a
Nature Conservation Associations *(locally not very focused on the WFD)*	a						a
Berliner Wasserbetriebe (drinking water production & waste water treatment company)		e				f	
(3) Functionally interlinked centers*:							
Urban Planning							
Berlin Forestry Agency							
Monument Conservation Authority							
Construction Planning	h						

Goal of this center

Matching of water management goals with those of the respective center

Neutral (irrelevant for center)

Unknown

Partially contradicting goals (context dependence)

Contradictions of water management goals with those of the respective center

Mixed: general tendency based on interviews and document analysis | range of possibilities based on special cases

[a]Certain species are preferred

[b]Protection of a certain status (e.g., a problem is cutting trees of a certain size for river restoration)

[c]Differing definition of invasive "alien" species

[d]Priority of fast drainage and navigability for shipment

[e]For drinking water production, better water quality in certain areas is preferred (refers also to inflowing water from Brandenburg) whereas conflicts arise when waste water treatment should be further improved (it is already highly regulated)

[f]Berliner Wasserbetriebe are also responsible for rain water management and prefer measures without costs for the company

[g]Protection of water-related systems in new "constructions" and water usage allowance, but weighing up of all objectives of existing usages and new construction plans in plan-approval procedures

[h]Plans of the water management need to be further developed by the construction planning authority, but they have no background in ecology and are less willing to coordinate with the water management authority.

*Goals of these centers fit or do not fit to goals of the water management authority, but goals are never the same

TABLE 3 Responsibilities and goals of decision-making centers in Hamburg: e.g., the protection of species is the goal of water management authorities. This goal conflicts with those of the Hamburg Port Authority, which aims to ensure shipment with, e.g., dredging of the fairway (destroying habitats) [Colour table can be viewed at wileyonlinelibrary.com]

Tasks of key centers	Protection and resettlement of species	Improvement of chemical water quality	Removal of/ bypasses for barriers for fishes and smaller organisms	River restoration/ habitat improvement	No degradation of local flood protection	Near natural water quantity	Elimination of invasive species in and near rivers
(1) Centers with the same tasks:							
7 Water Management Authorities (one in each district): planning							
Water Management Authority (senate level): Pre-planning							
(2) Centers with partially same goals as (1):							
Water Maintenance Authority (same department as water management in districts)						d	
Environmental Protection Authority (one in each district)*							
Nature Conservation Authority	a			b	b	b	c
Water Authority**	e						
Fishery Bureau	(Not reported as an involved actor in planning)						
Nature Conservation Associations***	a						a
Hamburg Wasser (drinking water production & waste water treatment company)	*(Not reported as an involved actor in planning)*						
Creek godparents	f						
(3) Functionally interlinked centers**:**							
Urban Planning	*(Not reported as an involved actor in planning)*						
Monument Conservation Authority	*(Not reported as an involved actor in planning)*						
Hamburg Port Authority							

Goal of this center

Matching of water management goals with those of the respective center

Neutral (irrelevant for center)

Unknown

Partially contradicting goals (context dependence)

Contradictions of water management goals with those of the respective center

Mixed: general tendency based on interviews and document analysis | range of possibilities based on special cases

[a]Certain species are preferred

[b]Protection of a certain status (e.g., a problem is cutting trees of a certain size for river restoration)

[c]Differing definition of invasive "alien" species

[d]Priority of fast drainage and navigability for shipment

[e]Protection of water-related systems in new "constructions" and water usage allowance, but weighing up of all objectives of existing usages and new construction plans in plan-approval procedures

[f]Goals vary from individual to individual and group to group

*Variation of goals among different districts is very likely

**Same department as water management in districts: the head of department may decide in favor of the water management or the water maintenance or may find a compromise

***Very active in the implementation process of the Water Framework Directive

****Goals of these centers fit or do not fit to those of the water management authority, but goals are never the same

(2012) use high "effective coordination" to distinguish polycentric governance regime types from fragmented types. High coordination is operationalized as institutionalized coordination. However, rules-on-paper do not need to correspond with rules-in-use. Galaz, Crona, Österblom, Olsson, and Folke (2012) use communication patterns, ranging from information sharing to permanent interactions, and the degree of their formalization to distinguish systems in their degree of polycentricity. Though assuming that a strong formalization of numerous coordination processes lowers the independence of centers by lowering their discretion, it seems unreasonable to say that such systems have a stronger polycentric order than systems with less formalized processes.

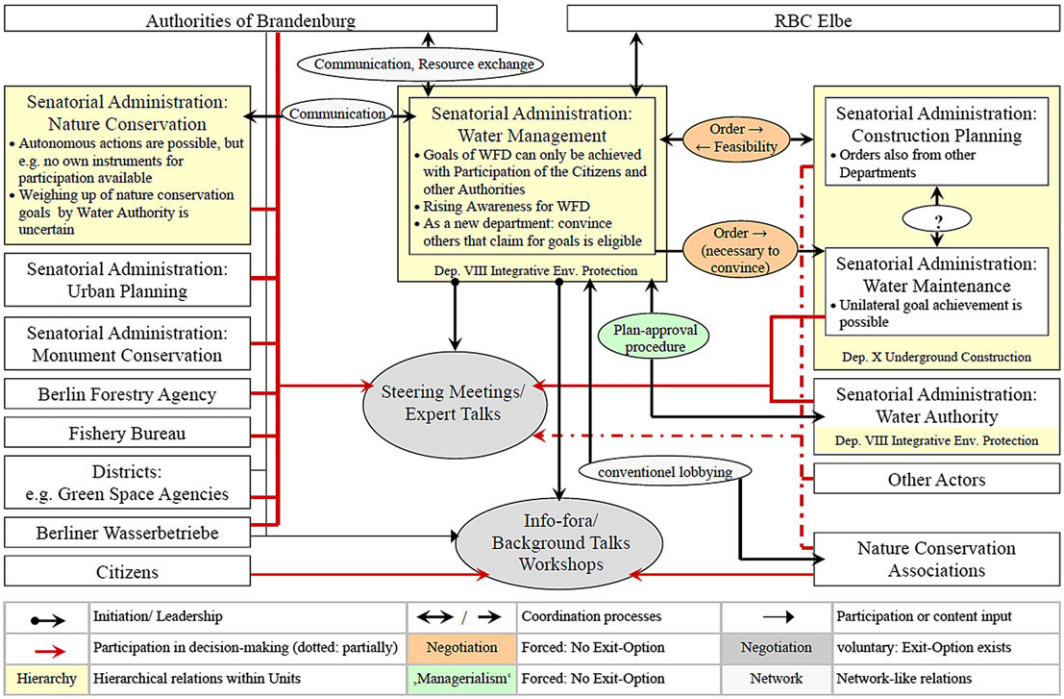


FIGURE 3 WFD coordination processes in Berlin: e.g., coordination between water management and nature conservation associations is given through conventional lobbying activities [Colour figure can be viewed at wileyonlinelibrary.com]

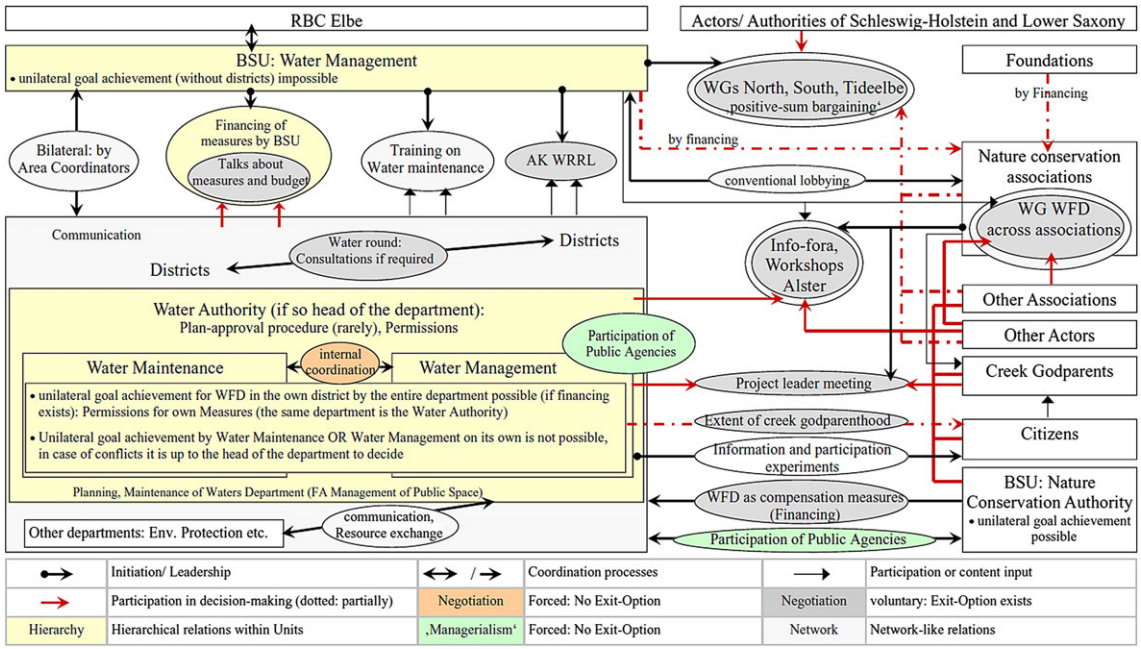


FIGURE 4 WFD Coordination processes in Hamburg: e.g., the water authority must (no exit) weigh up the interests of different agencies, such as the nature conservation authority, in a WFD plan ("participation of public agencies"). Nevertheless, the water management tries to avoid such formal procedures (bubble without ingoing arrows) by defining measures to be as small as possible, such as maintenance measures [Colour figure can be viewed at wileyonlinelibrary.com]

I propose that coordination[9] processes should be in-use rather than formally provided and need to fit the purposes (e.g., information sharing, conflict resolution, use of synergies) of a governance system for good performance. This means adequate quality, frequency and formalization between relevant actors, even though adequacy differs strongly among systems with differing multiplicity characteristics as refined above.

Figures 3 and 4 give an overview on WFD-related coordination processes in Berlin and Hamburg. They illustrate the complexity in comparing processes. Berlin shapes the planning processes systematically. The water management authority attempts to gather all relevant actors within each sub-basin (across jurisdictional borders according to WFD requirements) at an early planning stage (before plan-approval procedures) for an integrated concept: steering meetings for authorities and experts and Info-Fora/Workshops for the public. In contrast, coordination processes initiated by Hamburg's water management are predominantly bilateral, irregular, unpredictable and often restricted to information exchange. Authorities do not try to gather all actors for planning, except in the Working Groups North, South and Tideelbe on how to classify transboundary water bodies (natural, heavily modified or artificial), which influences ecological goal-setting. District authorities come together in the budget talks (once a year), in the AK WRRL for information exchange on general WFD topics and in the Water Round for sporadic exchange on WFD issues (predominantly on other water governance topics) excluding the senate. None of the processes facilitates integrated planning across jurisdictions. Only the local nature conservation associations established a participatory pilot project for the river Alster to show the state authorities how it works. They "copied" the public part of Berlin's approach. One district tried to follow the example in a pilot project for 100 m of a river. In general, district water managers try to avoid formal procedures by cooperating with the water maintenance. Reported conflicts during the construction phase due to a lack of public participation and coordination with other authorities indicate an inadequate treatment of conflicts in Hamburg.

Coordination processes explain why Hamburg shows more progress in constructing measures compared to Berlin—by closely cooperating with water maintenance authorities and by avoiding retarding procedures. However, this analysis does not explain why this cooperation functions. Berlin has tried to establish this kind of cooperation but with little success. Social interrelations among centers may provide the expanation.

The focus on such interrelations is covered by polycentricity definitions (compare with Table 1; different terms are used) including:

- "institutional setting": Which decision-making center must interact with whom and how? Who has the freedom to interact with others (discretion)?
- "independence": Who has the incentive to interact with whom and, if applicable, how?

This indicates what might happen between centers. Other factors and spontaneity influence how they really interact within their creative leeway.[10]

Veto-player theory (Benz, 2009 referring to Tsebelis, 1995, 2002) turned out to be a useful tool to analyze in−/interdependencies and to answer those questions. It identifies that the chances of policy changes decrease

- with an increasing number of veto-players[11] in a system,
- with increasing ideological distance among those, and
- with an increasing homogeneity[12] of collective actors with veto-power.

Given the various possible interrelations among centers, the theory gives a hint to the center's (un)willingness to interact. A reduced ability of some centers to reach their goals unilaterally may increase the willingness to coordinate. Unilateral goal achievement, in contrast, may decrease the willingness to coordinate (goal achievement aspects are included in Figures 3 and 4).

Social interrelations among centers in Berlin and Hamburg differ significantly. Different types of veto-players from WFD planning to construction are illustrated in Figures 5 and 6. Key centers in both cities face similar institutional restrictions (e.g., plan-approval procedures conducted by the local water authority).[13] Both are relatively free in choosing strategies for public participation and for collaboration with other authorities. Their discretion is restricted by differing availability of finance and personnel resources. However, the different organizational settings of similar center-types result in varying in- and interdependencies with veto-points leading to different incentives for interactions, largely corresponding to the findings on coordination processes.

Berlin's planners face several centers with veto-power as plans need to be detailed by the water maintenance or the construction planning authority and revision in plan-approval procedures. Hamburg has a strikingly low number of veto-players. District water management and maintenance belong to the same department. WFD planners use this structural vicinity and their discretion to frame many of their measures as maintenance measures[14] to avoid formally provided processes, especially long-lasting plan-approval procedures. Organizational separation from the maintenance authority prevents this in Berlin.

To conclude, it seems questionable that governance systems with multiple centers but different interrelation and coordination characteristics are equally polycentric and perform in the same way. Centers have different interaction incentives, may use their discretion

[9]Here: loose contacts, information exchange, consultations, joint projects, joint decision-making, singular and repeated processes, voluntary and forced processes, and so on.

[10]The existence of discretion does not automatically lead to its use.

[11]Veto-players are actors whose agreement for a decision is necessary or whose nonagreement hampers change (Benz, 2009, p. 53).

[12]Greater homogeneity means fewer internal conflicts.

[13]All objections of other actors in a plan containing construction works are weighed up.

[14]Traditional maintenance practices cause various ecological problems. Changing them offers a faster and less expensive strategy for habitat improvement compared to large-scale river restoration projects.

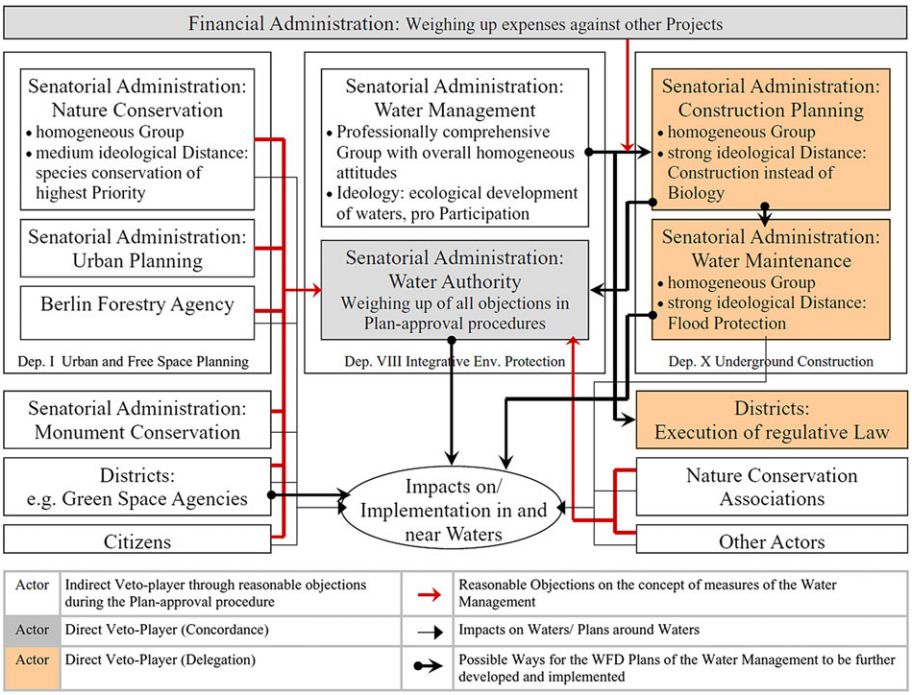


FIGURE 5 Veto-player constellations for WFD planners, Berlin: plans of the senate water management need to be processed to a planning per meter by the construction planning/water maintenance authority (strong veto-players: able to change the plans in unintended ways). Most WFD measures go into plan-approval procedures conducted by the water authority, which therefore becomes a direct veto-player (albeit in favor of the WFD). Actors participating in plan-approval procedures become indirect veto-players (not deciding on approval). Additionally, two minor veto-players are the financial administration (competition for financial resources with other projects) and district authorities (e.g., for the approval of jetties) [Colour figure can be viewed at wileyonlinelibrary.com]

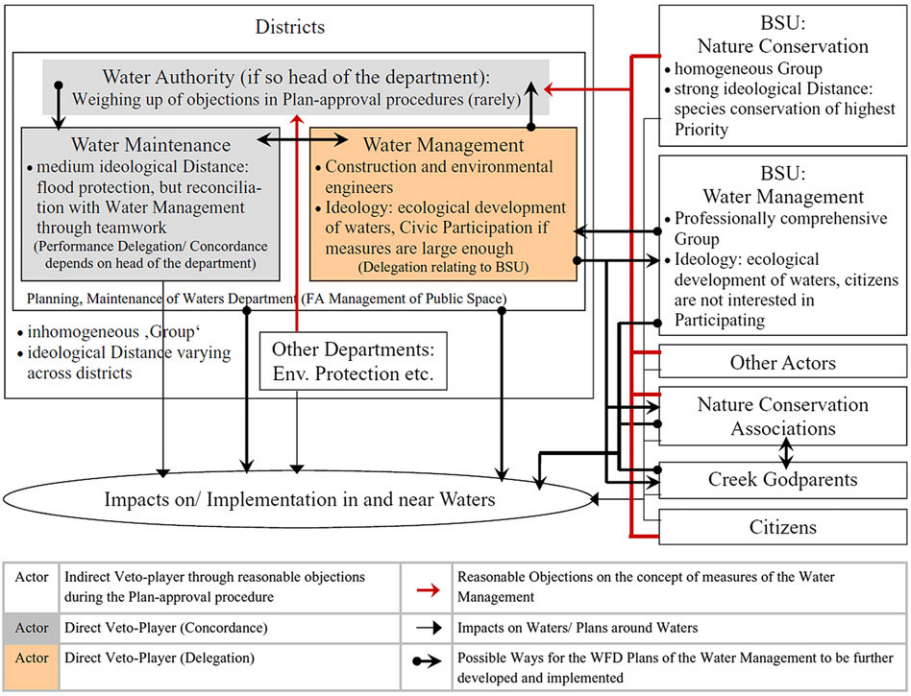


FIGURE 6 Veto-player constellations for WFD planners, Hamburg: WFD plans are elaborated by the seven district water management authorities (close to detailed construction planning). They are partially competing for money distributed by the senate water management. In the case of nonagreement between water management and maintenance their department head has the final decision. This department constitutes simultaneously the water authority approving its own plans. Districts can hamper (veto) the senate from enforcing measures [Colour figure can be viewed at wileyonlinelibrary.com]

differently and may self-organize through voluntary interactions with differing priorities and degrees of success. Therefore, there might be different subcategories of polycentric governance systems or some of them should not be called polycentric. Requiring only "mutual adjustment" or "take each other into account" seems to reduce the possibility for meaningful propositions on system performance.

Centers may adjust and so on in a nonconstructive way or even contradictory to good performance due to different interests and options for action.

5 | HOW DO MULTIPLICITY CHARACTERISTICS INFLUENCE THE FUNCTIONING?

Based on the described conceptual refinements, I make some propositions on the functioning of a system. Some are taken from existing theories and others from empirical observations. Some have opposing tendencies in terms of the overall functioning of systems. In terms of a research agenda to theorize the functioning of polycentric governance systems, they need further empirical testing. An interesting question is whether some elements might be influenced in favor of performance without rearranging responsibilities, because of the trade-offs when the overall governance of multiple goods is optimized.

5.1 | Task specificity and level/scale specificity

Spreading responsibilities and tasks horizontally and vertically is likely to influence goal conflicts as well as ideological distances and increases costs for coordination and conflict resolution (Benz, 2009). Hamburg's district water management, for example, indicated problems accessing monitoring data collected by the senate. This caused unexpected conflicts and deepened uncertainties in planning.

The relationship of good specificity and level/scale specificity to the functioning of a system might be theorized by decision cost theory (Benz, 2009 citing Buchanan & Tullock, 1962), for example, an increasing number of centers and levels raises decision-making costs and therefore reduces a center's interaction efforts. Differentiating the center configurations of systems by task specificity refines the picture. Presumably, in systems with a low number of key centers in contrast to a high number of non-key centers, key centers may feel more responsible for taking the initiative for coordination (such as with Berlin's water management). However, Berlin and Hamburg also show that a differing organizational structure of possible coordination partners (located at different levels or having different responsibility scales) may hamper interaction because of difficulties in identifying relevant centers and complying with hierarchies.

5.2 | Overlapping

Overlapping may influence functioning through influencing decision costs, externalities/spillovers and redundancy. Every overlap may cause functional conflicts as well as synergies with additional variations through the task specificity configuration, as illustrated in Tables 2 and 3. Derived from this, systems with more overall overlapping would face higher potentials for both. Presumably, decision costs will increase with the multiplicity of different kinds of overlapping as more interests need to be integrated. They might diminish the occurrence of (voluntary) coordination. However, the kind of potential conflicts and synergies themselves provides a reason to interact in specific ways, to avoid or solve conflicts or to find and use synergies.

TABLE 4 Degree of redundancy based on task specificity and overlapping: potential ability to take over tasks from other centers of the same system

Two centers with …	Territorial overlapping	Only functional overlapping
the same task	Strong	Weak
the same goal	Weak	Very weak
functional interlinkages	No	No

Additionally, incentives for affected centers are given by the occurrence of externalities/spillovers. Those may outweigh their decision costs.

Overlapping also affects the degree of potential redundancy. Table 4 provides different scenarios, for example, territorially overlapping centers with the same task may develop a stronger redundancy than centers with the same goal. The occurrence of effective redundancy depends on further variables (see below).

5.3 | Independence

The independence of centers is characterized by their possibility for unilateral goal achievement, and therefore their incentives for interaction, and their discretion. The last of these affects redundancy.

Hamburg shows a higher *potential for redundancy* through overlapping compared with Berlin. Hamburg's nature conservation associations started to work—voluntarily—on state-responsibilities—developing redundancy. Besides the *necessity for discretion* to become active in fulfilling tasks of other centers, it seems that this was a spontaneous development in combination with a longer tradition of creek godparenthoods (since 1986). Berlin's maintenance authority hampers (veto) citizen activities as compared with Hamburg, although Berlin's water management reveals a *willingness* to support those.

Hamburg's senate (steering function with some attempts to plan measures) and district water management (measure planning) cannot sufficiently take over each other's tasks. Therefore, *redundancy* among them is not *effective*. This raises the question of how strong redundancy of tasks (or the discretion) among centers needs to be to positively influence system performance in the case of centers' failures.

5.4 | Interdependence

Veto-player theory highlights the number of veto-players and the ideological distance between centers. While the center's configuration on task specificity provides a hint to the overall decision-making costs, the veto-player configuration may indicate interdependencies with especially high conflict potential that may be explanatory for the overall (non-)change in systems.

The ideological distance, given by institutionalized and individual goals, between water management and maintenance was comparable within Hamburg's district and Berlin's senate level. In contrast to Berlin, Hamburg's centers indicated that their physical and departmental vicinity (see above) led to better cooperation. This raises the question of whether physical or organizational vicinity helps to overcome ideological distance and whether it induces interaction as a

phenomenon of spontaneity, which would occur at a lower probability among distant centers.

6 | CONCLUSIONS

Establishing a clear definition and operationalization of polycentric governance would help in treading the path of theory building. Given the existing plurality, "You know it when you see it" does not imply that we all identify the same as polycentric. Assuming that not everything should be called polycentric, this paper shows that there are at least five determinants for identifying a multiplicity of decision-making centers, ignoring other elements of the definition: (i) good or problem specificity, (ii) aggregation to units, (iii) independence as a criterion to consider actors as centers, (iv) analytical system boundaries and (v) functional overlapping of centers.

Four steps are proposed to reduce fuzziness in operationalizing polycentricity for comparative governance analysis. These steps illuminate characteristics of governance systems regardless of whether those systems are called polycentric in the end. Analysis of the multiplicity of centers according to their (i) good and (ii) task specificity (key centers, centers with similar goals, functionally interlinked centers) shows who is influencing the outcome, although some centers might not be included in coordination processes. Their tasks and goals may cause conflicts and synergies in different combinations. (iii) The overlaps map where conflicts, synergies and redundancy might appear. (iv) System boundaries are set analytically but also need to be adjusted to the functional interlinkages. They determine the comparability of systems regarding the multiplicity of centers.

Using the polycentricity lens illuminates here the relationship between multiplicity characteristics and the functioning of systems. The cases of EU WFD implementation in Berlin and Hamburg show that, overall, both are characterized by a multiplicity of centers. However, they differ in how responsibilities, functions, power and resources are distributed horizontally and vertically as well as in who is involved in interactions and in social interrelations.

Overall, both might be called polycentric according to the minimum requirement of a multiplicity of centers, but in terms of key centers directly responsible for WFD implementation, Berlin appears significantly more centralized. While Hamburg shows a faster but less integrative implementation, how the ecological outcomes unfold is uncertain. Interaction patterns in both cases explained the outcomes, but at first glance seem, besides the reasoning through conflicts and synergies, merely spontaneous. The analysis of social interrelations (merely discretion and veto-player characteristics), however, proved to be useful in finding explanations for the functioning of those systems.

In favor of theory building on performance in polycentric governance systems, social interrelations and interactions need to be looked at in more details. Propositions on the system's functioning based on the described conceptual refinements are set out in terms of a research agenda.

ACKNOWLEDGMENTS

I thank William Blomquist for discussions on polycentric governance and for thinking through various thought experiments with me. I am very grateful for the valuable comments on earlier versions of the manuscript by the Vincent and Elinor Ostrom Workshop Community during my time as a Visiting Scholar there in April and May 2016. This research was supported by a scholarship from the Hans Böckler Foundation.

REFERENCES

Aligica, P. D. (2014). Institutionalism and polycentricity. In P. D. Aligica (Ed.), *Institutional diversity and political economy: The Ostroms and beyond* (pp. 30–70). Oxford, UK: Oxford University Press.

Aligica, P. D., & Tarko, V. (2012). Polycentricity: From Polanyi to Ostrom, and beyond. *Governance*, *25*(2), 237–262. https://doi.org/10.1111/j.1468-0491.2011.01550.x

Andersson, K. P., & Ostrom, E. (2008). Analyzing decentralized resource regimes from a polycentric perspective. *Policy Sciences*, *41*(1), 71–93. https://doi.org/10.1007/s11077-007-9055-6

Benz, A. (2009). Theorien von Governance in Mehrebenensystemen. In *Politik in Mehrebenensystemen* (pp. 50–80). Wiesbaden, Germany: VS Verlag für Sozialwissenschaften.

Galaz, V., Crona, B., Österblom, H., Olsson, P., & Folke, C. (2012). Polycentric systems and interacting planetary boundaries—Emerging governance of climate change–ocean acidification–marine biodiversity. *Ecological Economics*, *81*, 21–32. https://doi.org/10.1016/j.ecolecon.2011.11.012

Huitema, D., Mostert, E., Egas, W., Moellenkamp, S., Pahl-Wostl, C., & Yalcin, R. (2009). Adaptive water governance: Assessing the institutional prescriptions of adaptive (co-)management from a governance perspective and defining a research agenda. *Ecology and Society*, *14*(1), 26. https://doi.org/10.5751/ES-02827-140126

Marshall, G. R. (2015). Polycentricity and Adaptive Governance. A paper presented to the panel 'The new polycentricity? Conceptual basis and operationalisation for the study of the commons' convened during the 15th Biennial Global Conference of the International Association for the Study of the Commons, Edmonton, Canada, May 25–29, 2015.

McGinnis, M. D. (2011). An introduction to IAD and the language of the Ostrom workshop: A simple guide to a complex framework. *Policy Studies Journal*, *39*(1), 169–183. https://doi.org/10.1111/j.1541-0072.2010.00401.x

McGinnis, M. D., & Ostrom, E. (2012). Reflections on Vincent Ostrom, public administration, and polycentricity. *Public Administration Review*, *72*(1), 15–25. https://doi.org/10.1111/j.1540-6210.2011.02488.x

Oakerson, R. J., & Parks, R. B. (2011). The study of local public economies: Multi-organizational, multi-level institutional analysis and development. *Policy Studies Journal*, *39*(1), 147–167. https://doi.org/10.1111/j.1541-0072.2010.00400.x

Ostrom, E. (2001). Vulnerability and polycentric governance systems. *Newsletter of the International Human Dimensions Program on Global Environmental Change*, *Number 3/2001*.

Ostrom, E. (2005). Robust resources governance in polycentric institutions. In E. Ostrom (Ed.), *Understanding institutional diversity* (pp. 255–288). Princeton, NJ: Princeton University Press.

Ostrom, V. (1999). Polycentricity (Part 1). In M. D. McGinnis (Ed.), *Polycentricity and local public economies: Readings from the workshop in political theory and policy analysis* (pp. 52–74). Ann Arbor, MI: University of Michigan Press.

Ostrom, V., Tiebout, C. M., & Warren, R. (1961). The organization of government in metropolitan areas: A theoretical inquiry. *American Political Science Review*, *55*(4), 831–842. https://doi.org/10.1017/S0003055400125973

Pahl-Wostl, C. (2009). A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change*, *19*(3), 354–365. https://doi.org/10.1016/j.gloenvcha.2009.06.001

Pahl-Wostl, C., & Knieper, C. (2014). The capacity of water governance to deal with the climate change adaptation challenge: Using fuzzy set qualitative comparative analysis to distinguish between polycentric, fragmented and centralized regimes. *Global Environmental Change*, *29*, 139–154. https://doi.org/10.1016/j.gloenvcha.2014.09.003

Pahl-Wostl, C., Lebel, L., Knieper, C., & Nikitina, E. (2012). From applying panaceas to mastering complexity: Toward adaptive water governance in river basins. *Environmental Science and Policy*, *23*, 24–34. https://doi.org/10.1016/j.envsci.2012.07.014

Schröder, N. J. S. (2014). *Die Umsetzung der Wasserrahmenrichtlinie in Berlin und Hamburg. Vergleich der Ansätze zur Maßnahmenausarbeitung. Der Einfluss lokaler Bedingungen*. Humboldt Universität zu Berlin, Lebenswissenschaftliche Fakultät, Master Thesis. https://edoc.hu-berlin.de/docviews/abstract.php?id=41379 (German with English abstract)

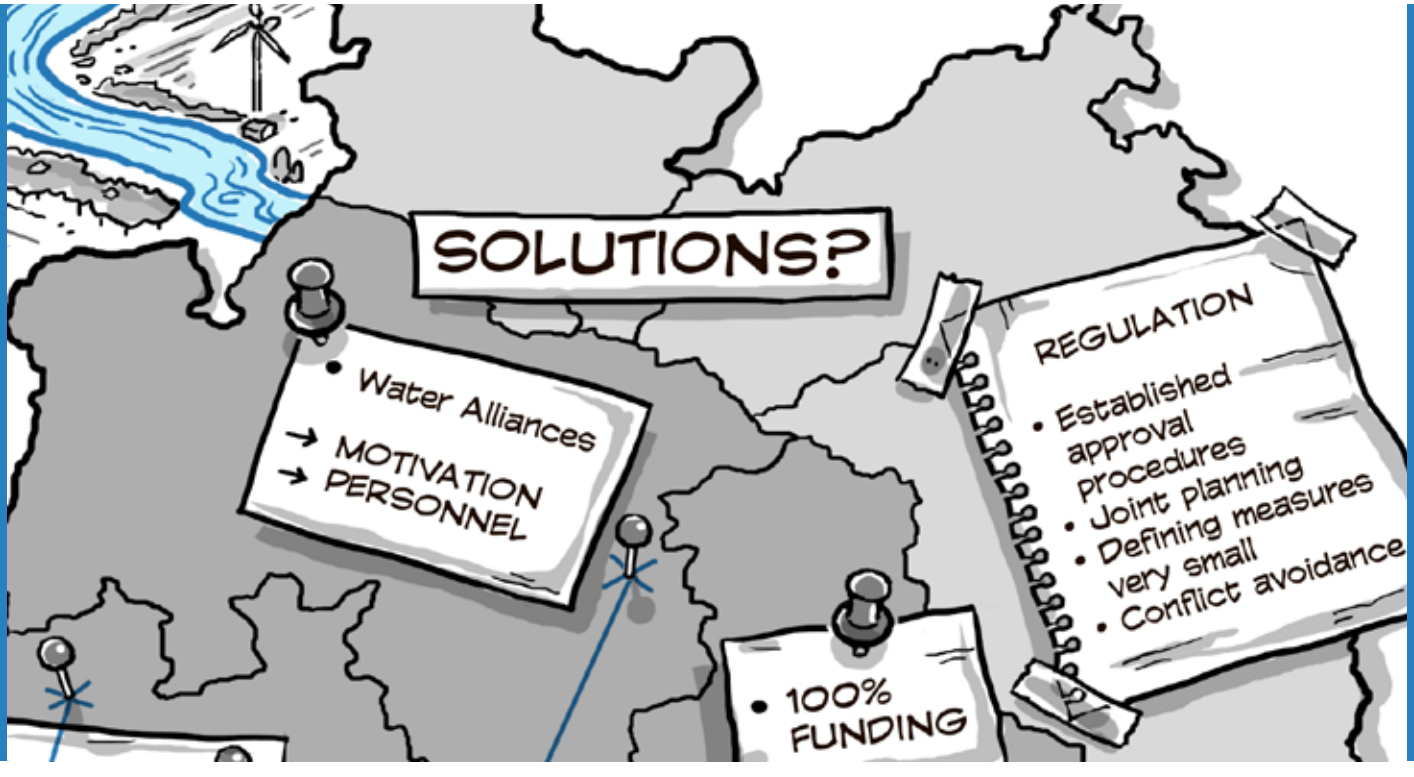
Skelcher, C. (2005). Jurisdictional integrity, polycentrism, and the design of democratic governance. *Governance*, *18*(1), 89–110. https://doi.org/10.1111/j.1468-0491.2004.00267.x

How to cite this article: Schröder NJS. The lens of polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance. *Env Pol Gov*. 2018;28:236–251. https://doi.org/10.1002/eet.1812

THESys Discussion Paper No. 2020-2

Trapped between barriers OR Flowing despite barriers?

Nadine Jenny Shirin Schröder
Nikhil Chaudhary



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IRI THESys – Integrative Research Institute on
Transformations of Human-Environment Systems
Humboldt-Universität zu Berlin
Unter den Linden 6
10099 Berlin
Phone: +49 30 2093-66336
Fax: +49 30 2093-66335
Web: www.iri-thesys.org

Contact:
Nadine Jenny Shirin Schröder, THESys Graduate Program & Leuphana University Lüneburg (Research Group Governance, Participation and Sustainability),
nadine.schroeder@stud.leuphana.de
Nikhil Chaudhary, European Institute of Innovation & Technology's (EIT) Climate Knowledge & Innovation Community (Climate-KIC),
nikhilchaudhary.aj@gmail.com

THESys Discussion Papers
ISSN 2566-7661 (Print)
ISSN 2566-5561 (Online)
edoc.hu-berlin.de/series/thesysdiscpapers

Editor in Chief:
Jonas Østergaard Nielsen (IRI THESys)
jonas.ostergaard.nielsen@hu-berlin.de

Please cite as:
Schröder, N. J. S.; Chaudhary, N. 2020: Trapped between barriers OR Flowing despite barriers? THESys Discussion Paper No. 2020-2. Humboldt-Universität zu Berlin, Berlin, Germany. Pp. 1-13.
https://doi.org/10.18452/21269

Cover © Nikhil Chaudhary

Print: HU Druckerei, Dorotheenstraße 26, 10117 Berlin

Preface

Sustainability topics need formats that go beyond and complement traditional science articles and lectures: formats that address a non-academic audience and are able to reach younger target groups as well as formats that help stakeholders to communicate their concerns. Ideally, these formats can help create a deeper understanding and greater motivation in society for a better relationship between humankind and the environment.

Science comics are one such format. They combine image and text in an entertaining way. They allow facts and emotions to coexist. Above all, they offer a stage for all the heroes of everyday life, from whose perspective climate change and environmental protection can be illustrated. Last but not least, comics are able to show how scientists work and that research can be a lot of fun.

This science comic was created in cooperation between a young scientist and a comic artist. The data came from the doctoral project of the environmental scientist, the pictures from the pen of the artist. All ideas were developed jointly. During the work in tandem, which lasted several months, the talents and abilities of the two complemented each other wonderfully and everyone learned from the other. The result is a six-page comic that tells of the complex difficulties involved in implementing the European Water Framework Directive locally.

Nadine Schröder and Nikhil Chaudhary deserve our huge thanks for their joint work!

Anne Dombrowski, Science Communicator at IRI THESys
Berlin, December 2019

Trapped between barriers OR Flowing despite barriers?

Nadine Jenny Shrin Schröder & Nikhil Chaudhary

Abstract

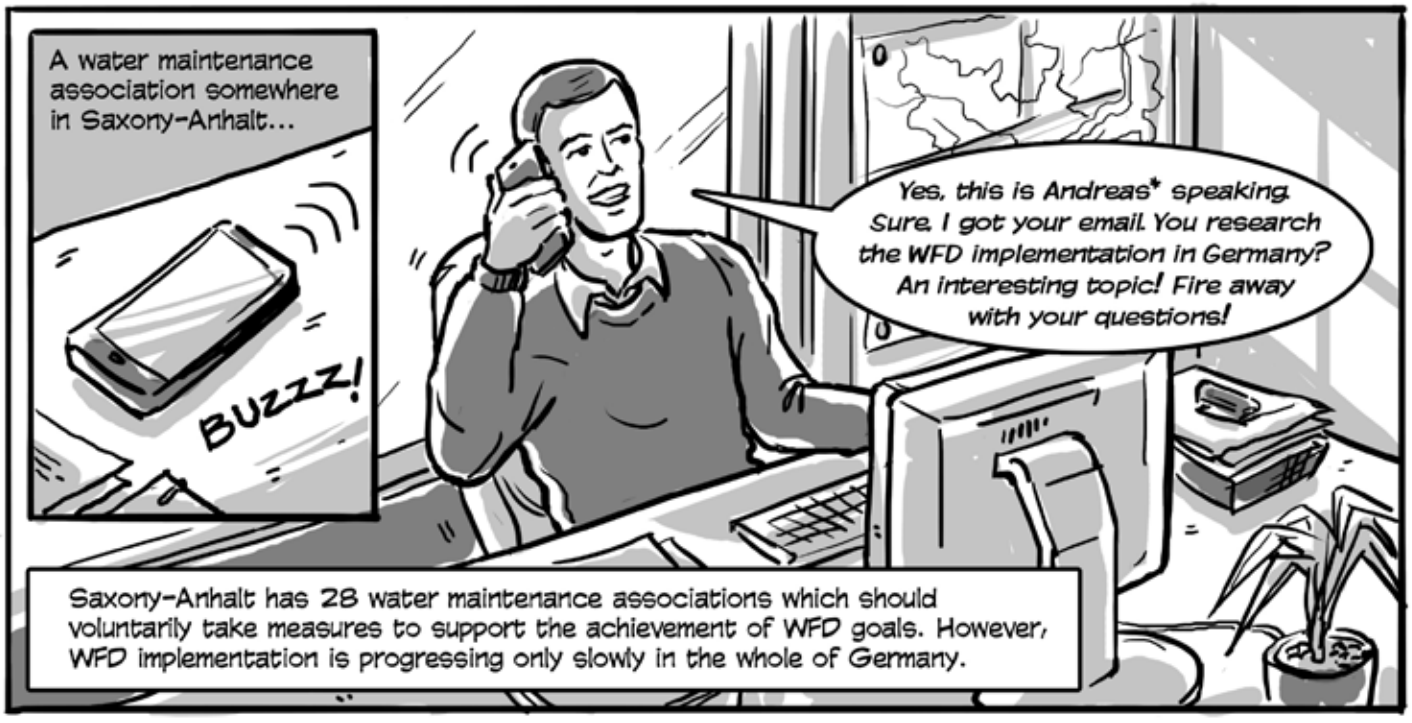
The EU Water Framework Directive (WFD) is said to be a directive of a new generation as it is very flexible to avoid institutional misfits during implementation. Nevertheless, 20 years after putting the WFD into force the ambitious aims, the good (ecological and chemical) status in all European Waters, are far from being reached by the member states.

There may be several ecological reasons why a time horizon of 15 to 27 years is too tight to undo 500 years of anthropogenic influence. However, in some places implementation has not even started yet, has been delayed or the measures taken are insufficient to achieve WFD goals. Reasons for this may be found in national and local governance structures and processes.

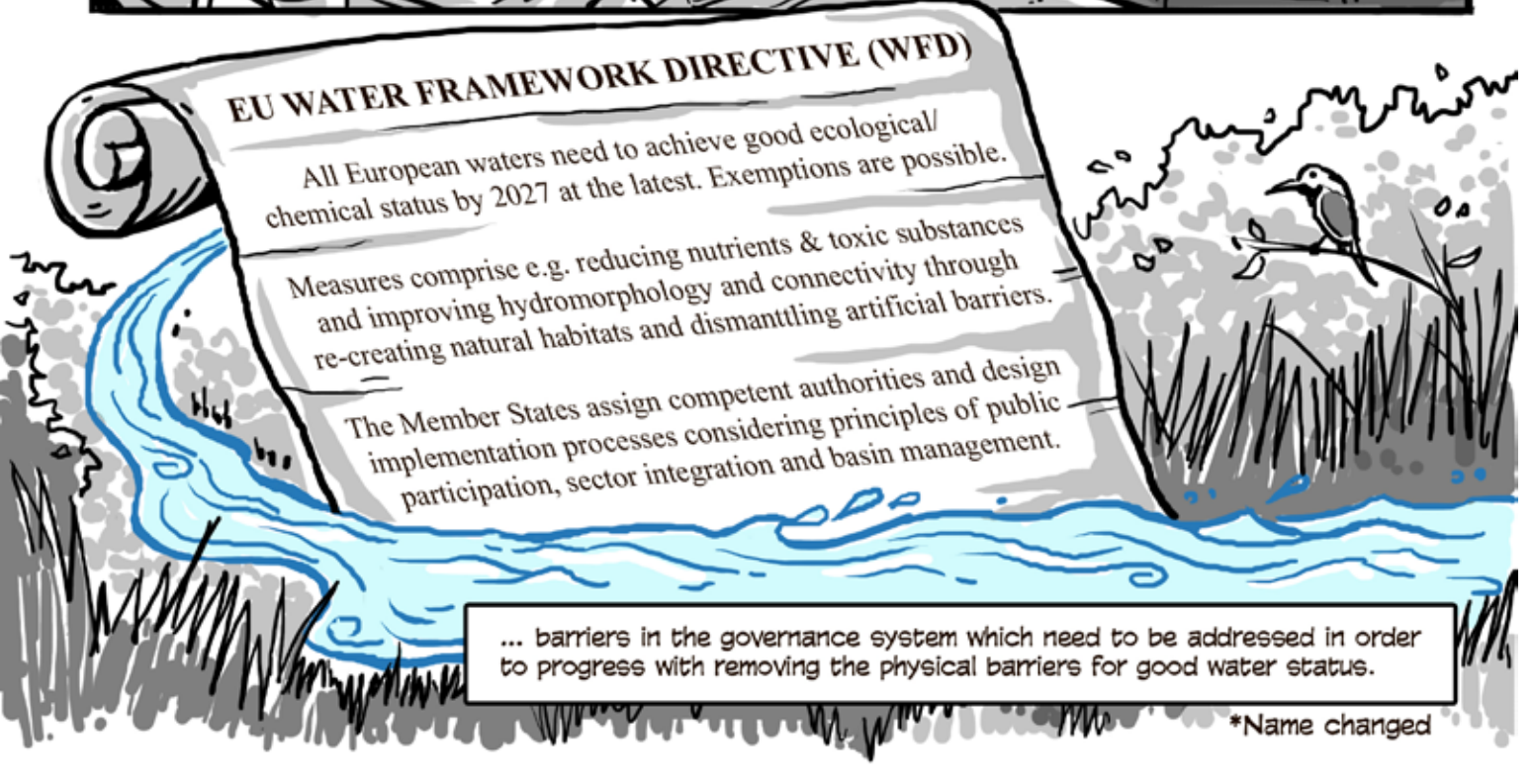
This comic aims to visualize barriers for WFD implementation at the local level in Germany. WFD implementers were asked how they are implementing WFD measures and which barriers they face or which conflicts they perceive. The German federal states are characterized by different constellations of decision-making centers in WFD-related water management: including water authorities, water management authorities, water course maintenance associations and enterprises, water and soil associations, nature conservation authorities, nature conservation associations, companies and other state and non-state actors. The states vary in their institutional settings, levels involved in decision-making and the kinds of ecological-administrative boundaries they face. Nevertheless, local WFD implementers share certain types of barriers, although details vary. These barrier types are motivation, financial and personnel resources, land resources and institutional interplay. The results reflect not so much the single case which was used to illustrate the barriers but rather the sum of all analyzed local actors implementing WFD measures. These face different barriers to varying extents. The states address some of these barriers through a variety of strategies.

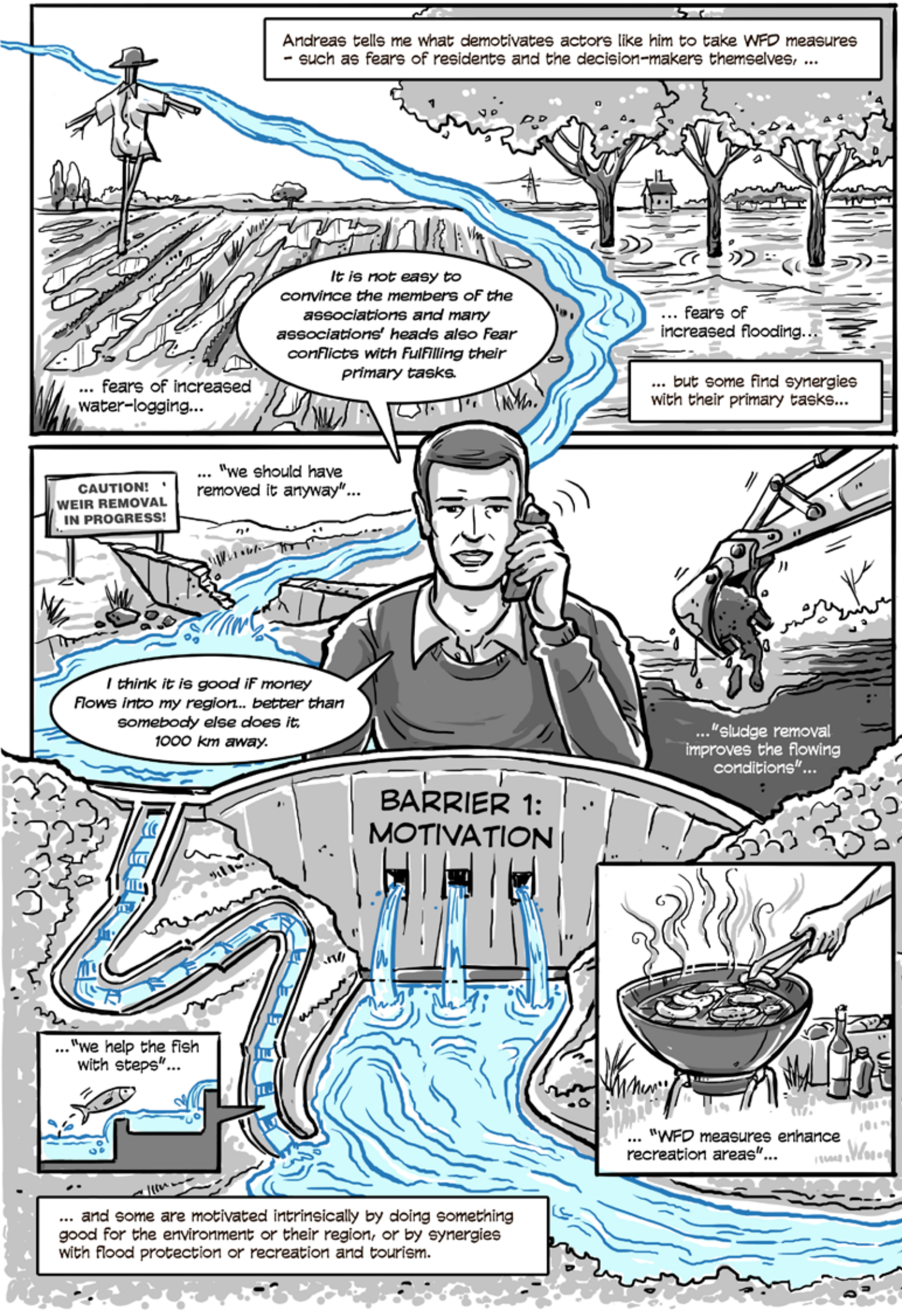
Data for the analysis was gathered in 66 semi-structured interviews with authorities from all levels and non-state actors in six federal states — Hesse, Lower Saxony, Saxony, Saxony-Anhalt, Thuringia and North Rhine Westphalia — as well as through the analysis of policy documents and official websites.

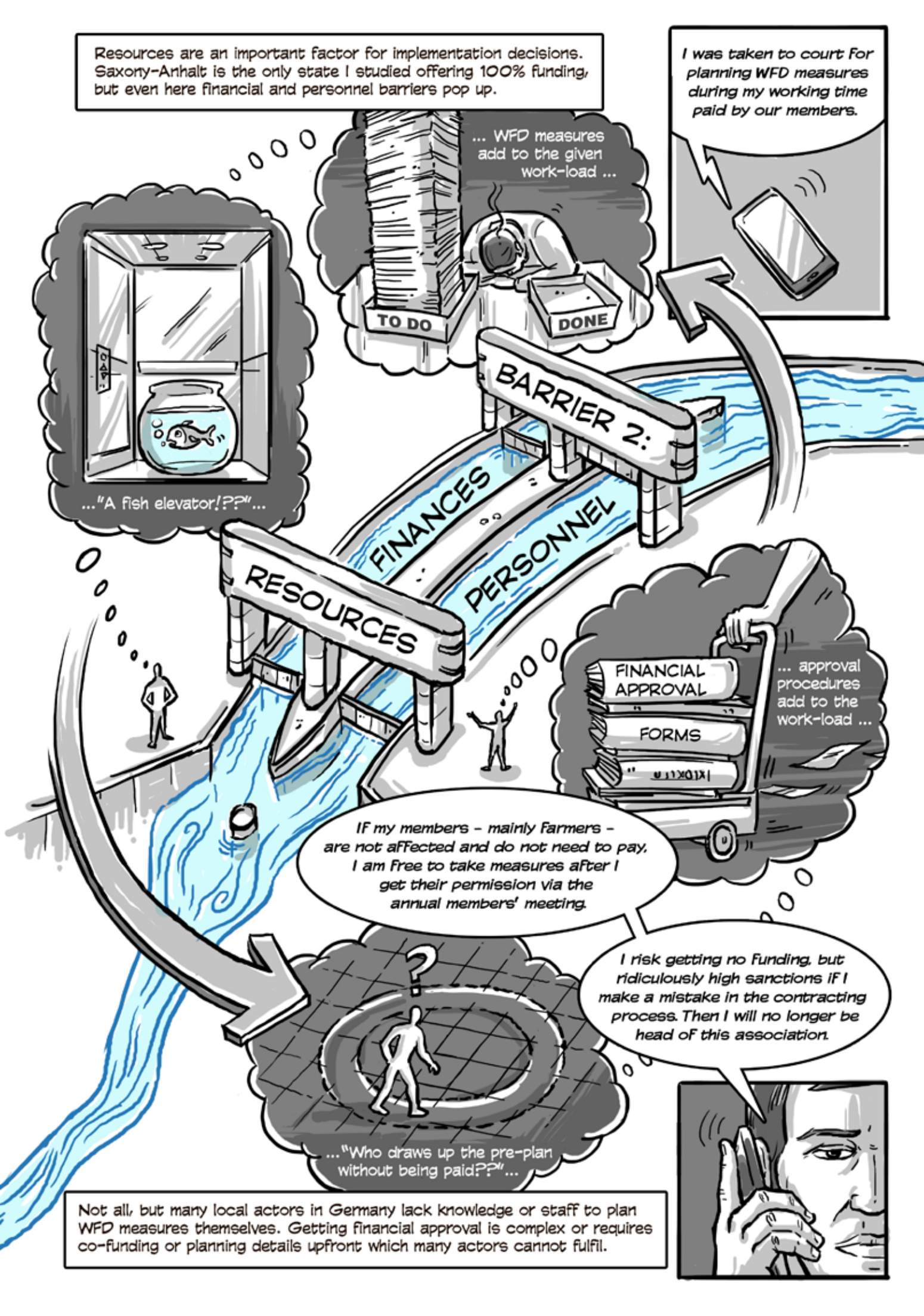
Keywords: EU Water Framework Directive, WFD, policy implementation, implementation barriers, implementation strategies, Germany, Saxony-Anhalt, Comic

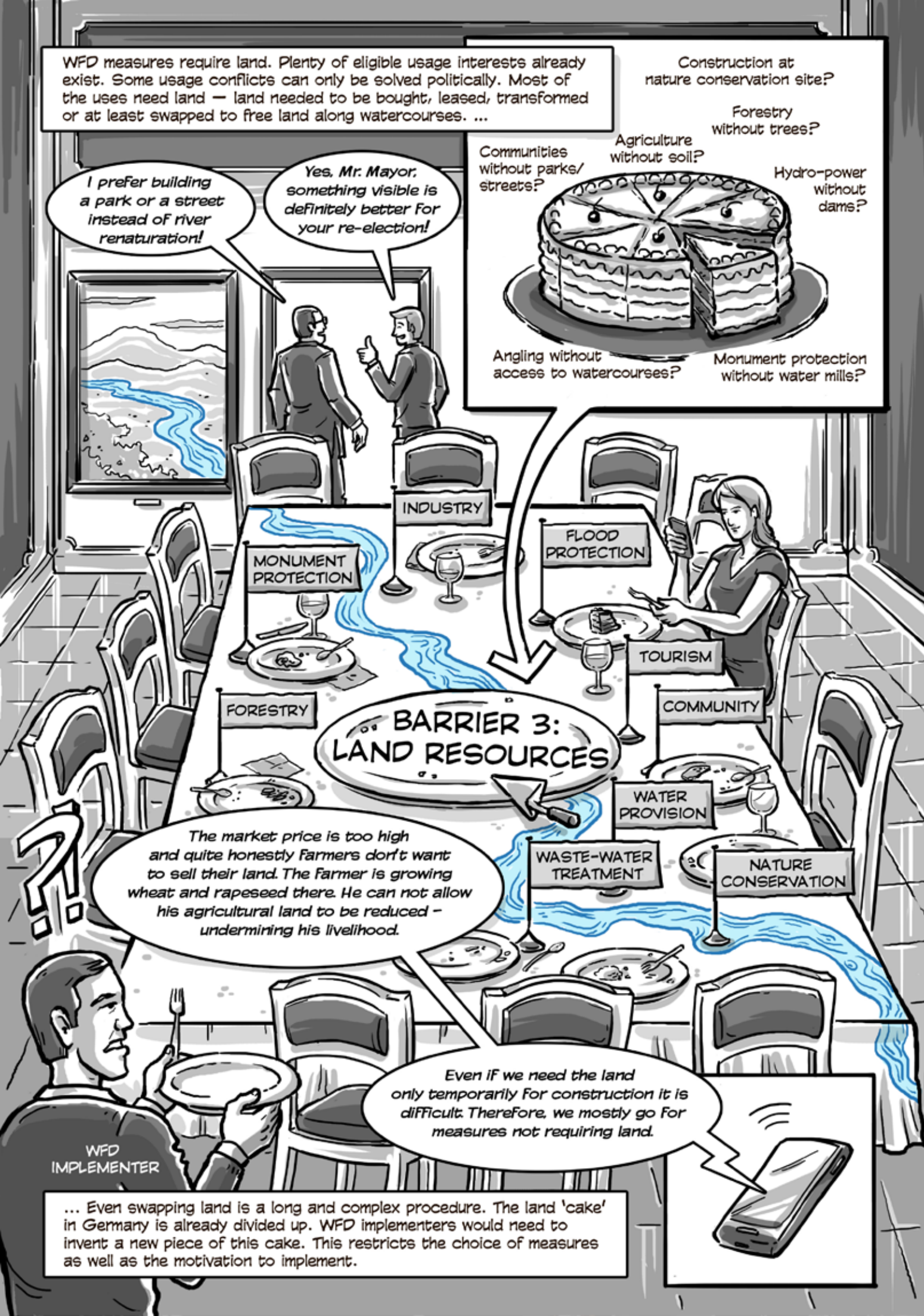

A water maintenance association somewhere in Saxony-Anhalt...
BUZZZ!
Yes, this is Andreas* speaking. Sure, I got your email. You research the WFD implementation in Germany? An interesting topic! Fire away with your questions!
Saxony-Anhalt has 28 water maintenance associations which should voluntarily take measures to support the achievement of WFD goals. However, WFD implementation is progressing only slowly in the whole of Germany.


Is there a typical way how your WFD measures come into being? What problems do you face?
In my PhD, I analyse which barriers are hindering the local implementation of hydromorphology and connectivity measures — one piece in the puzzle for good water status.
By now, I have conducted 66 interviews in six federal states of Germany. The situation in Saxony-Anhalt illustrates nicely barriers I found in many of my cases, ...


EU WATER FRAMEWORK DIRECTIVE (WFD)
All European waters need to achieve good ecological/ chemical status by 2027 at the latest. Exemptions are possible.
Measures comprise e.g. reducing nutrients & toxic substances and improving hydromorphology and connectivity through re-creating natural habitats and dismanttling artificial barriers.
The Member States assign competent authorities and design implementation processes considering principles of public participation, sector integration and basin management.
... barriers in the governance system which need to be addressed in order to progress with removing the physical barriers for good water status.
*Name changed


Andreas tells me what demotivates actors like him to take WFD measures – such as fears of residents and the decision-makers themselves, ...
... fears of increased water-logging...
It is not easy to convince the members of the associations and many associations' heads also fear conflicts with fulfilling their primary tasks.
... fears of increased flooding...
... but some find synergies with their primary tasks...
CAUTION! WEIR REMOVAL IN PROGRESS!
... "we should have removed it anyway"...
I think it is good if money flows into my region... better than somebody else does it. 1000 km away.
..."sludge removal improves the flowing conditions"...
BARRIER 1: MOTIVATION
..."we help the fish with steps"...
... "WFD measures enhance recreation areas"...
... and some are motivated intrinsically by doing something good for the environment or their region, or by synergies with flood protection or recreation and tourism.


Resources are an important factor for implementation decisions. Saxony-Anhalt is the only state I studied offering 100% funding, but even here financial and personnel barriers pop up.
I was taken to court for planning WFD measures during my working time paid by our members.
... WFD measures add to the given work-load ...
TO DO
DONE
...''A fish elevator!??''...
BARRIER 2:
FINANCES
PERSONNEL
RESOURCES
FINANCIAL APPROVAL
FORMS
... approval procedures add to the work-load ...
IF my members – mainly farmers – are not affected and do not need to pay, I am free to take measures after I get their permission via the annual members' meeting.
I risk getting no funding, but ridiculously high sanctions if I make a mistake in the contracting process. Then I will no longer be head of this association.
...''Who draws up the pre-plan without being paid??''...
Not all, but many local actors in Germany lack knowledge or staff to plan WFD measures themselves. Getting financial approval is complex or requires co-funding or planning details upfront which many actors cannot fulfil.


WFD measures require land. Plenty of eligible usage interests already exist. Some usage conflicts can only be solved politically. Most of the uses need land — land needed to be bought, leased, transformed or at least swapped to free land along watercourses. ...
I prefer building a park or a street instead of river renaturation!
Yes, Mr. Mayor, something visible is definitely better for your re-election!
Construction at nature conservation site?
Forestry without trees?
Agriculture without soil?
Communities without parks/ streets?
Hydro-power without dams?
Angling without access to watercourses?
Monument protection without water mills?
INDUSTRY
MONUMENT PROTECTION
FLOOD PROTECTION
TOURISM
FORESTRY
COMMUNITY
BARRIER 3: LAND RESOURCES
WATER PROVISION
WASTE-WATER TREATMENT
NATURE CONSERVATION
The market price is too high and quite honestly farmers don't want to sell their land. The farmer is growing wheat and rapeseed there. He can not allow his agricultural land to be reduced – undermining his livelihood.
Even if we need the land only temporarily for construction it is difficult. Therefore, we mostly go for measures not requiring land.
WFD IMPLEMENTER
... Even swapping land is a long and complex procedure. The land 'cake' in Germany is already divided up. WFD implementers would need to invent a new piece of this cake. This restricts the choice of measures as well as the motivation to implement.

Some conflicts are the result of prescriptions in laws – fixed interests, goals or procedures – what makes the redistribution of the cake even more difficult. Also if the actors themselves were more willing to compromise. ...

My association was already active before my time and principally I think the WFD is a good thing. However, I can understand my colleagues not being motivated to take WFD measures. Maybe I will give up as well.

BARRIER 4: REGULATION

Nature Conservation Law

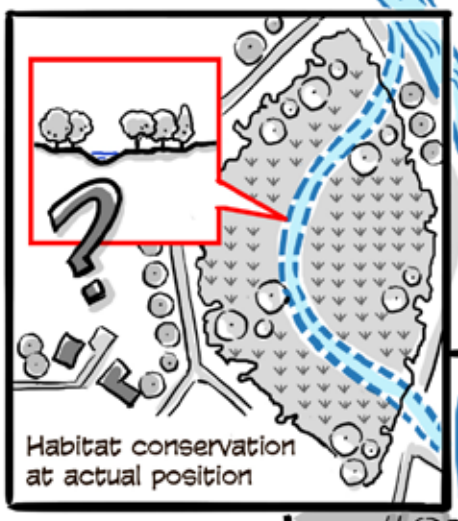
Protect specific species and their habitats

Construction works forbidden during breeding times

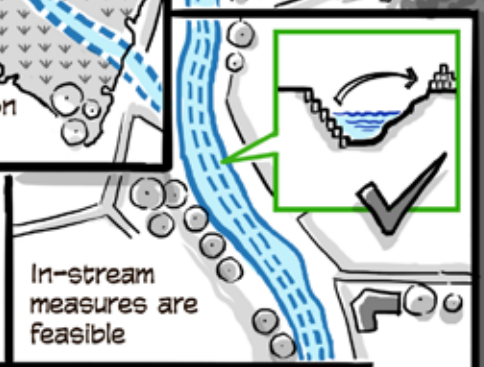
Compensate interventions in nature

WFD measures may count as interventions

WFD measures may or may not count as compensation



Habitat conservation at actual position



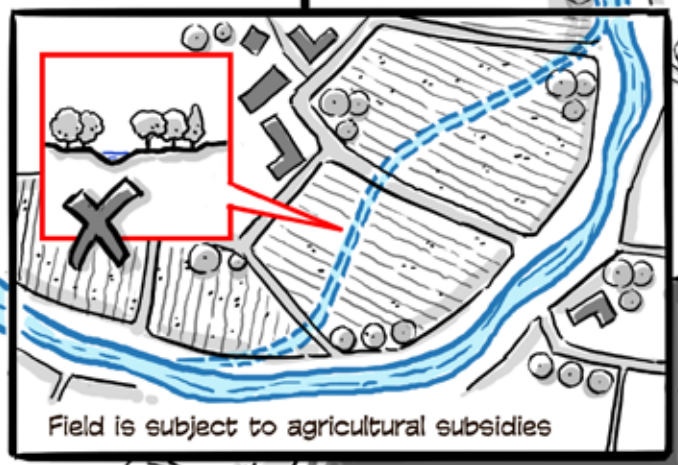
In-stream measures are feasible

Agricultural Policy

Area-based subsidies

...

Area-based subsidies are so high that farmers are not interested in selling land even when it has no high value for their cultivation activities. This way, EU agricultural policy hampers land provision additionally.



Field is subject to agricultural subsidies

Renewable Energy Law

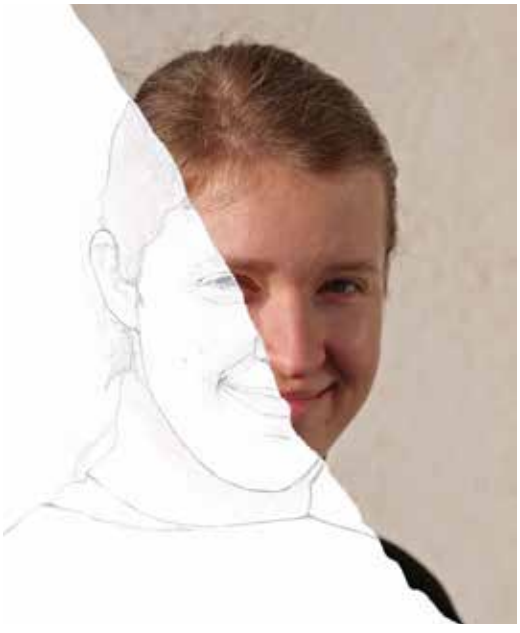
... Solutions here require political decisions and political influence by local actors – which aim gets priority here? Decisions taken might not be in favour of the WFD.


In Germany, the numbers on goal achievement and on non-implementation of measures tell us that something needs to be changed to achieve the WFD goals.
Like in a large policy experiment, German states undertake more or less continuously incremental changes for process improvements, local actors take isolated steps, but does all this suffice?
SOLUTIONS?
• Water Alliances
→ MOTIVATION
→ PERSONNEL
REGULATION
• Established approval procedures
• Joint planning
• Defining measures very small
• Conflict avoidance
• 100% FUNDING
Water advisors:
• District govt.
• Municipal advisory agency
→ MOTIVATION
Water Advisors:
• Funding bank
• New maintenance associations
→ MOTIVATION
PERSONNEL & MOTIVATION
• Move task to larger unit:
o To county
o To special purpose association
• Contract out:
o To Landscape planning association
• Spread motivation:
o county → water and soil associations (Cover co-funding with compen-sation money + advice)
LAND & FINANCIAL RESOURCES
Mixed strategies
• Avoid requiring land
• Use land when available
• Land swapping
• Use compensation instruments for (co-) funding & land obtainment
• Buy land ahead of planning
• Co-funding by foundations, communities, counties ...
... With approaches like these we may swim all the way back from here coping more or less with each barrier. Finally, the motivation barrier seems to be unbreachable from the outside. Should we re-think who we expect to implement WFD measures? And what can WFD actors learn from each other about meaningful strategies?
END.

Acknowledgements

We would like to thank all interviewees for their openness and the numerous hours of their limited time spent answering questions. We also thank Timothy Moss for commenting on the draft. We are grateful to the IRI THESys for funding and supporting this project of alternative science communication, especially to Anne Dombrowski and Kathrin Klementz.

About



"I enjoyed the ping-pong in developing visualization ideas with Nikhil. It taught me that science communication may start already while developing a publication through explaining the topic to the artist. Even the draft of the final comic may already be a door-opener for the communication with practitioners as it is much easier to be grasped."

The scientist

Nadine studied Integrated Natural Resource Management M.Sc. at Humboldt-Universität zu Berlin and Environmental Engineering M.Sc. at Technical University of Berlin in parallel. She is interested in water and soil issues seen from different perspectives and broadening these through interdisciplinary work.
In her PhD she investigates how polycentric governance structures influence the local implementation of the EU Water Framework Directive in Germany: how river basin management is realized, how sector integration functions, how the public participates in implementation processes and which barriers local actors face in implementing this directive.

Photo by Andreas Renkewitz,
drawing and collage by Nadine Schröder

"Nadine's research taught me how environmental policies and on-the-ground decision-making operate in the German regional context. This co-creation effort made me realise how the medium of comics lends itself well to presenting such a complex and multi-dimensional topic — through its simultaneous interplay of ideas, text, composition, visual motifs and graphic expressions. The resultant storytelling was an absolutely pleasurable process!"

The artist

Nikhil Chaudhary is an architect and urban-planner, and recently finished his Master in Public Policy from the Hertie School of Governance at Berlin. He was previously a Senior Associate with the World Resources Institute, where he was engaged in sustainable urban development initiatives for municipalities across Asia. His side-project to impactfully communicate urban issues for a non-technical audience by creating comics was subsequently expanded into an art-practice across India and Europe. His stories have so far been published in diverse print and online media in 6 countries.
Nikhil currently works as an Advisor (Urban Transformation) for the European Institute of Innovation & Technology's (EIT) Climate Knowledge & Innovation Community (Climate-KIC).

Photo by Udayabhanu Prakash Vaddi,
drawing and collage by Nadine Schröder

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Unter den Linden 6
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Article

IWRM through WFD Implementation? Drivers for Integration in Polycentric Water Governance Systems

Nadine Jenny Shirin Schröder

Research Group on Governance, Participation, and Sustainability, Leuphana University Lüneburg, 21335 Lüneburg, Germany; nadine.schroeder@stud.leuphana.de

Received: 5 April 2019; Accepted: 20 May 2019; Published: 22 May 2019

Abstract: This paper uses an empirical approach to explore what motivates the adoption of integrated water resources management (IWRM). The study compares cases of local implementation of the EU Water Framework Directive (WFD) from five German federal states representing various types of local policy addressees. Data were collected using policy analysis methods, including participatory observation and interviews with planners who had implemented WFD measures and conducted integration attempts of various types throughout the planning processes. The planning narratives on integration were analysed iteratively and its characteristics, drivers, and hampering factors were identified. It was found that policy addressees attempt integration due to the incentives for reaching their goals rather than according to their paradigms. Depending on the power relations, incentives result in the integration of different actors during different planning phases. The findings suggest that in order to strategically induce integration, it would be necessary to enhance the incentives based on a detailed knowledge of power relations. The WFD as a general regulatory framework was found not to be a driver for local integration, but the WFD did induce increased integrated management through setting goals.

Keywords: IWRM; integrated water resources management; drivers; EU water framework directive; implementation; coordination; participation; Germany; water governance; polycentricity

1. Introduction

The EU Water Framework Directive (WFD), due to its flexibility, is known as a directive of a new generation. Although this flexibility was introduced to avoid problems of fit in order to improve implementation efforts [1], many member states are far away from reaching the Directive's goals to achieve a good (ecological/chemical) status or potential in all European Waters by 2015 or with exemptions latest by 2027. Extensions became the rule ([2], for Germany see e.g., [3]). Two of the variously mentioned reasons for the implementation deficits which may be influenced by integration are the numerous usage conflicts and institutional interplay/policy incoherence [3].

This paper is inspired by discussions at the Workshop 'Rethinking the Governance of European Water Protection' which revealed the research gap which is addressed here (International Workshop "Rethinking the Governance of European Water Protection" 8–9 January 2019 at UFZ Leipzig organized by the author in cooperation with the UFZ Leipzig and ZALF with 38 water governance researchers from Germany, France, United Kingdom, Switzerland, Denmark, the Netherlands, Norway, Austria and Australia participating. In preparation for the discussions, 25 participants handed in two-pagers before the workshop answering the following questions based on their prior research: What do we already know about European water protection implementation? What do we still need to know on water governance to eliminate implementation deficits? What are the most important/urgent problems of European Water Governance? And what should political-administrative actors do (differently) to improve policy implementation?). However, this paper does not present findings from the workshop.

Increased integration was in varying governance contexts repeatedly discussed as a solution to overcome WFD's implementation deficits which also result from a governance point of view from numerous usage conflicts and institutional interplay. Discussions also revealed that there is a lack of clarity regarding who, where and how integration should occur. This challenge is reflected in the wider integrated water resource management (IWRM) literature, such as: "How can these issues be integrated (even if they can actually be integrated since many of the issues are mutually exclusive), who will do the integration and why, what processes will be used for integration (do such processes currently exist?), or will the integration, if at all it can be done, produce the benefits that proponents have claimed." [4] (see also [5,6]) Additionally, in looking for a possible pathway to overcome WFD implementation deficits, "at present the main question is not whether such a process is desirable, but rather can this be achieved in the real world in a timely, cost-effective and socially acceptable manner?" [4] Because the concept demonstrated to be a challenge for operationalization by decision-makers and planners [7]. Gallego-Ayala reviewed the IWRM literature from 2000 to 2011, but nevertheless, drivers for integration are not covered by the list of research topics treated in IWRM literature [7]. Considering also the literature on environmental policy integration, Waylen et al. found that little is known yet about drivers to policy integration in practice, the importance of individual and organization processes [8].

This situation leads me to ask here what motivates actors to adopt integrated management practices? I compare local German WFD implementation cases with a range of varying practices concerning WFD measure realization. Although the WFD prescribes elements of IWRM in various ways (compare Junier and Mostert [9]) and shows the relevance of integration for implementation, Boeuf and Fritsch still found gaps in WFD research on basin approaches and sector integration [10]. Generally, it is contested whether the WFD itself can be regarded as an example for IWRM. Some authors clearly consider the WFD to be IWRM in practice [9,11,12], but overall Beveridge and Monsees found the WFD and IWRM to be two distinct discourses in the research literature. There are only a few articles addressing both IWRM and WFD [13]. Those articles raise the question of whether it is "useful or even appropriate to categorize the WFD as IWRM", but see as well the little research conducted on the interrelationships between those two and the potential for mutual learning [13]. Waylen et al. elaborate that further research on implementation processes is needed and that these do not necessarily need to be supportive for IWRM at the local and catchment scale [8]. In this spirit, I analyse how local WFD policy addressees integrate, who is involved, which drivers and obstacles are important for integration, including whether in the light of the results the WFD itself can be seen as a driver for integrated water resources management.

The concept of polycentricity (compare Schröder [14] and see next section) and the findings on the relevance of local factors for WFD implementation in Schröder [15] informs this current paper by focusing on the role of decision-makers and the organizational context their decisions are embedded in for WFD implementation. In Germany environmentally relevant decisions are taken by more or less independent policy actors at a very local level and in various organisational settings (for their relation to higher levels see Section 4.1). Gallego-Ayala's literature review on IWRM analyzed the scale of analysis for IWRM researched and lists seven scales oriented on hydrological units (river basin, lake, aquifer, irrigation scheme) and administrative units (municipality, regional, country) [7]. Individual decision-makers are missing as unit of analysis. I argue here that integration also needs to be analyzed as an individual and strategic decision repeatedly taken for every new measure in a polycentric system of independent actors, despite the fact that there is national regulation prescribing integration such as the WFD. Independent decision-making centres always have some degree of discretion. In terms of WFD implementation and integration in Germany, this discretion is extensive. Policy addressees in Germany are not just about realizing plans elaborated at higher levels such as River Basin Management plans, as they have their own interests, goals and decision-making rationales (see Section 4.1). As Watson et al. described "political, administrative and cultural beliefs, attitudes, customs, and norms vary from country to country, from region to region, and even in some cases, from

community to community" [16], therefore the decision-makers themselves are an important unit of analysis for researching integration drivers.

This paper uses data drawn mainly from semi-structured interviews with WFD planners and WFD related decision-makers at various administrative levels. By analyzing their narratives iteratively, the paper offers an empirical perspective on IWRM with the focus on what these empirical accounts show. It keeps the following conceptual part on IWRM and polycentricity short. The empirical part of the paper, which appears after the section on methods and cases, covers evidence of integration attempts, how they may be characterized, and what actors influenced to adopt those approaches. The empirical part concludes by relating back the findings on WFD implementation to the conceptual basis of the paper. The final discussion reflects on the transferability and the applicability of the results for strategically approaching integration and broader insights for IWRM.

2. IWRM and Polycentricity

The term 'IWRM' is as fuzzy as widespread. This paper is not going to enlarge the number of available definitions. Rather, it is seeking a working definition feasible to subsume the phenomena in the field. Three definitions out of the literature shall help to approach this fuzzy concept.

First, the most often quoted definition formulated by the Global Water Partnership (GWP) in 2000, IWRM is "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" [1].

Second, the definition of Grigg [6] who illustrated vividly the various possibilities of what should or could be integrated: "Integrated water resources management is a framework for planning, organizing and operating water systems to unify and balance the relevant views and goals of stakeholders."

Third, a basic working definition of Cardwell et al. proposed by parsing the term word by word that: "Integrated Water Resource Management is a coordinated, goal-directed process for controlling the development and use of river, lake, ocean, wetland, and other water assets.", with "Integrated" defined as "to have made whole by bringing all parts together; unified n.: Integrity—completeness, unity" [17].

What do these definitions have in common and how do they differ? At first glance, these definitions look similar, but it is not trivial to find real commonalities. GWP and Cardwell et al. define IWRM as a process whereas Grigg use the term 'framework' which would lead me to analyze the organizational and institutional setting as a means of giving the frame for management processes with a certain aim. This aim is unifying and balancing views and goals, as in Griggs definition, but maximizing welfare in GWPs definition. Cardwell et al. do not provide a specific aim. GWP defines the process by the promotion of a result—the coordinated management. The use of the term 'promote', instead of e.g., 'lead', implies that the intention but not necessarily the process outcome may define a process as integrated. Cardwell et al. describe the process itself as coordinated and goal-directed, which would lead me to consider any type of coordination process with a goal.

These three definitions neatly illustrate the fuzziness of the concept and possible contradictions in using the concept for analysis. The questions of who integrates whom or what, and how, are not even addressed. Some other questions are also left open—see Biswas [4] for a detailed analysis of the GWP definition. If goals and views, according to Grigg [6], shall be unified, in which direction shall they be unified? Do we still call it IWRM if goals are unified in favour of agricultural land use instead of water quality protection, or just in favour of flood protection instead of water quality? Biswas [4] phrase this concisely: "what makes the water profession believe that they can superimpose their views on the other professions, who were not even consulted and on which they have only limited knowledge and expertise? Equally, why should the professionals from other professions accept the view of some people from the water profession?"

Reflecting this complexity, in the following analysis, I include all kinds of coordination, cooperation and participation processes in my cases of implementation of WFD measures. I treat the cases as

attempts for integration. Following the more encompassing definitions, the sum of processes would need to prove whether they are unifying or balancing views and goals and/or overall maximizing welfare. Analyzing the drivers leading to such coordination processes also allows analysis of whether there is a framework leading to processes which unify and balance views and goals.

Based on Biswas' [4] list of 35 categories of what can be integrated, Grigg [6] composed a list of eight elements to be integrated:

- Policy sectors
- Water sectors
- Government units
- Organizational levels
- Functions of management
- Geographic units
- Phases of management
- Disciplines and professions.

For the data collection and the categorization of empirical findings I focussed on elements given by the WFD (articles 3 and 14) such as sectors (policy and water sectors), geographic and government units and, out of the range of Grigg [6], the wider public (it might be a matter of perspective whether some actors would count as public or as representatives of a sector e.g., individual farmers or volunteering environmentalists). This allows assessing the fulfilment of these kinds of WFD process requirements.

"The governance literature demonstrates that nearly all processes are to varying extents polycentric and multi-level, working within between and amongst horizontal and hierarchical networks" [8]. Actors analyzed here are embedded in polycentric governance systems. Polycentric governance is understood here "as characterized at least by a multiplicity of decision-making centres, which, for system comparisons, are governing a certain good or problem within defined system boundaries." [14]. Polycentric governance demonstrates a plural landscape of definitions similar to that of IWRM. For an analysis of different nuances in those definitions and their relevance for identifying polycentric governance systems see Schröder [14]. In relation to IWRM, especially the multiplicity itself, the independence and interdependence of decision-making centres may be important factors influencing coordination—which is also often treated as a defining element of polycentric governance—and overall integration.

First, concerning the multiplicity of actors, it can be assumed that creating an integrated system gets increasingly complex and difficult with an increasing multiplicity of decision-making centres which affect the goal which shall be supported by integration.

Second, independence (see [18,19]) of decision-making centres characterizes polycentric governance systems. It is assumed here that independence creates discretion which may also leave decisions on whom to integrate, when, and how to the various decision-making centres. Independence may also reduce incentives for integration if centres may reach their goals independently. Nevertheless, no decision-making centre is completely independent, and must face interdependencies which may incentivize integration attempts.

Due to the combinations of independence and multiplicity, IWRM in polycentric governance systems may be analyzed as a collective action problem [20] or a matter of self-organization, which leads to the practical implications of polycentricity for adopting integrative approaches. This is the non-trivial identification of stakeholders and their integration [13] which becomes an ever-more challenging task with an increasing multiplicity of actors. Furthermore, it is a question whether such systems require some sort of centralization to reach IWRM or whether actors need to find ways to interact and address coordination problems [8,12,21,22]. Waylen et al. state this problem as follows: "Whilst much of the literature on IWRM stresses integration of topics, the governance literature stresses coordination between actors. This has implications for how integration might practically be achieved;

for example, it might be more important that different individuals are able to liaise and meet, rather than necessarily subsuming them into an integrated organisation." [8]

3. Methods and Cases

Data presented here are drawn from an in-depth comparative case study. WFD implementation in Germany demonstrates polycentric governance in various forms (compare [14]). Concerning governance, the WFD itself is very complex, requiring an in-depth analysis of dependencies and therefore restricts the scope of the study to one-member state. However, the situation also offers a vast plurality of settings making commonalities in integration characteristics relevant for learning on general integration drivers. The cases selected here represent various organizational structures used to implement the WFD in Germany. German federal states can be classified as area states or city states. Furthermore, area states can be classified according to having government districts, a middle authority or neither government districts nor middle authorities. Cases presented here are located in Saxony, Hesse and North Rhine-Westphalia (NRW) (with government districts; note that Saxony had government districts only until 2012. Districts themselves do not appear to plan WFD measures in contrast to Hesse and North Rhine-Westphalia. Nevertheless, basic organizational structures of former districts prevail and may induce additional variety within Saxony) as well as Saxony-Anhalt and Thuringia (with middle authority). States without government districts or middle authority are not represented by the case selection here. However, local level policy addressees in those states are water maintenance associations (The specific governance structure and name of those associations may vary among and within states, compare with Monsees [23]) which also can be found in Saxony-Anhalt (covering the whole state) as well as in NRW and Thuringia (covering parts of the states). I intended that cases cover all types of policy addressees in each state planning specific measures on hydromorphology and connectivity to reach WFD goals, but missed very small-scale actors such as communities and water and soil associations (Those actors are generally weak WFD implementers in Germany as they often have no personnel capacities really covering WFD implementation or water maintenance as a task). A few of them, I could assess indirectly, for example, by interviewing umbrella organizations. Interviewees of small-scale actors were identified using a snowballing approach and asking higher level authorities for details regarding who was actively implementing WFD measures.

The states covered in the study share common types of policy addressees in varying combinations, allowing sub-groups to be identified and identification of similarities based on organizational structures and differences resulting from other factors. Table 1 provides an overview of local policy addressees for WFD implementation, and the cases selected for each federal state. Entries shown in grey indicate a weak database either because the actor type was not interviewed or the actual planner in this organization could not be interviewed, but another relevant person was interviewed. In cases that were indirectly assessed, when data are included in the following tables and they are shown in grey.

By focusing only on hydromorphology and connectivity measures, the usage pressures and the problems actors need to cope with generally were kept constant across cases. Those pressures are the availability of land and conflicting usage interests with agriculture, city development, nature conservation and so on as well as the needs for personnel and financial resources. Therefore, the cases essentially share the needs for and prospects of integrated management.

For each state official websites, policy documents and documented information materials from participatory processes were analysed to identify relevant decision-makers and interviewees at higher levels. This was complemented by participatory observation data on processes between 2016 and 2019 (according to opportunities that arose, such as meetings and conferences). The latter also supported the identification of, and access to, active decision-makers for interviews and the assessment whether pre-plan integration may have an influence on local planning. The majority of data here are drawn from semi-structured interviews with policy addressees as well as lower, middle and upper authorities which have steering functions related to measures on hydromorphology and connectivity. These interviews were complemented by interviews with non-state actors with related responsibilities and

aims, or in positions to give a detailed overview of the implementation situation in the states especially nature conservation associations which took the position of a critical observer and environmental advocate in political processes in the chosen states (According to my observation there is a difference between nature conservation authorities and nature conservation associations and lower and higher levels whereas associations act supportive for WFD implementation at higher levels, at local levels more conflicts arise due to institutional interplay between WFD and nature conservation law which needs to be implemented by nature conservation authorities). The 54 conducted interviews lasted two hours each on average.

Table 1. Local policy addressees for realizing specific measures to reach Water Framework Directive (WFD) goals in each selected federal state and cases analyzed.

Actor Type	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia
District governments	(-)		X RP Darmstadt	X BR Arnsberg	
State enterprise	X LTV	X LHW			X Thüringer Landgesellschaft
Counties				(X) Soest	
County-free cities	X Dresden		X Wiesbaden	X Hamm	X Erfurt, Gera
Communities	X		X City Taunusstein	X	X City Blankenhain
Maintenance associations		X UHV Ehle-Ihle			
Water and soil associations				X WuB with County Coesfeld	
Special-law water associations				X Lippeverband	
Special purpose associations			X Abwasser-verband Main-Taunus		X GUV Harzvorland
Nature conservation associations					X NATURA2000-Station
Landscape planning associations	(X)				(X) LPV Thüringer Grabfeld

RP (Regierungspräsidium: government district) Darmstadt, BR (Bezirksregierung: district government) Arnsberg, LTV (Landestalsperrenverwaltung: state dam administration), LHW (Landesbetrieb für Hochwasserschutz und Wasserwirtschaft: state enterprise for flood protection and water management), Thüringer Landgesellschaft (Thuringian land society), UHV (Unterhaltungsverband: maintenance association) Ehle-Ihle, WuB (Wasser- und Bodenverband: water and soil association), Abwasserverband (waste water association) Main-Taunus, GUV (Gewässerunterhaltungsverband: water maintenance association) Harzvorland. X policy addressee, (X) special actor generally not addressed, X not interviewed, interviewed actor other individual than planner (indirect assessment).

The purpose of the analysis, observation, and interviews was to trace who is taking environmentally relevant decisions in such polycentric governance systems (compare Schröder [14] for categories of decision-making centres) and how those decisions are influenced by other decision-making centres. The specific issue of drivers for integration presented here is analysed using interviewees answers on how they plan measures (step by step until construction), how they generate ideas for measures, who they coordinate with or which participation/coordination processes they use and participate in,

complemented by questions on barriers, conflicts, their relevance and possibilities for improvement. The questions were open-ended and in order to avoid answers being unduly affected by concerns about political correctness, I did not ask directly why they coordinate and why with specific actors and not with others. Most interviewees gave their own reasons and interpretation without prompts from the interviewer. Therefore, instances for integration and driving factors are identified based on the researcher interpreting their narratives iteratively. Several interviewees made direct statements regarding processes and why they acted in a certain way. Those responses where used to identify initial categories of integration instances and driving factors. The interviews were analysed iteratively twice to identify statements more indirectly pointing to categories found in the first (and second) round of data analysing. There may be other drivers and hampering factors in addition to those described here, as the method of data collection focussed particularly on individually perceived drivers which are then used to describe the planning processes. Other potential factors may not be perceived (as important) and therefore not mentioned by interviewees (Nevertheless, if factors were not perceived as relevant by actors for reasoning their proceeding, this is an important finding in itself). Therefore, in order to avoid politically correct answers, this procedure may miss out some other drivers hampering integration. The latter are elaborated here as far as the data allow, but a systematic analysis is not possible.

4. Empirical Findings

WFD implementation in Germany is under the purview of the federal ministries. It is expected that policy addressees voluntarily implement measures to reach the WFD goals. These policy addressees have different organizational structures as categorized in Table 1. They largely existed prior to the WFD and have mainly primary tasks related to water maintenance with goals such as flood protection, navigation and land drainage for agriculture.

In the context of WFD implementation, integration initiatives exist at various levels. There are processes with the intention of advising, information exchange, conflict resolution, coordination and acceptance organized by ministries, middle authorities/government districts and technical authorities, which are mentioned on websites and in policy documents in order to fulfil the WFD requirement of public participation and coordination. Beyond accompanying the WFD implementation process in general these processes intend to coordinate activities for setting up the river basin management plans (RBMP) and programs of measures (PoM) according to the requirements of the WFD. These might be understood as attempts to integrate several perspectives into planning documents. Article 3 and 14 of the WFD states "active involvement of all interested parties (...) in particular in the production, review and updating of the river basin management plans" (article 14) and coordination in particular of all programs of measures (article 13). Therefore, it seems to be inherent to the WFD that a classical approach to implementation from goal setting over strategy development, planning and realization applies. This implies that plans developed at higher levels are simply realized by local policy addressees with very little if any discretion. In such a case, developing plans such as the PoMs with integrative processes might lead to integrated management. However, this way of approaching WFD implementation ignores that local policy addressees need to be considered as independent decision-makers in a polycentric governance system (compare Schröder [14]). Additionally, the PoMs and related more detailed plans are still so general that the idea generation and development for measures needs to be done by local policy addressees (the relation between pre-plans and local planning is elaborated in 4.1). The more detailed a plan gets the more conflicts and restrictions become visible due to dependence on the same land resources and time frames required for different goals and activities. This implies that, if integration has the goal to unify or balance views and goals or to maximize welfare or to control water resources, it also needs to happen locally for hydromorphology and connectivity measures due to the nature of the good.

Local integrated management is not explicitly prescribed in the WFD like RBMPs or PoMs. However, I decided to focus here only on local integration attempts. This has the advantage that drivers for adopting integrative procedures can be studied with a decreased effect of (perceived) institutional

coercion for integration. I analyze integration attempts which resulted in measure realization, and not those which generally led to strategy or PoM development.

This section starts by showing the planning stages with integration attempts observable in local cases, by characterizing the integration attempts by actors involved, integration along vertical or horizontal scales, sectors and the public. It is followed by analyzing the factors which led to those integration attempts and the factors which hamper integration. The section is completed by analyzing whether the described cases can be regarded as being integrated through the WFD.

Interview sources are only noted in the following if the respective actor (case) is not named in the text passage or if there are multiple interviewees making statements for one case. All interview partners are listed in Appendix A and are numbered by I1–I54 for referring to them in the text. Participatory observation data are numbered by O1–O9 for referring to them.

Empty table cells mean that there were no instances in the interviews for this category but do not allow conclusions on the absence of characteristics.

4.1. What Kind of Integration Is Observable in Local German WFD Implementation?

The federal states of Germany established multiple processes to fulfil WFD prescriptions on coordination and participation. However, due to the conflicts especially arising when a measure is realized on the ground, an integration process needs to reach/influence the decisions for realizing measures. This would mean that the plans written at higher levels with integrative processes need to be used by policy addressees e.g., for idea generation. If larger plans or pre-plans do not affect local decision-makers, this level might only be considered as integrated if local decision-makers conduct their own integration attempts.

Sevä and Sandström found that only one-third of the street-level bureaucrats in Sweden made their decisions based on the programs of measures, which may increase the probability of working "in line with old routines and well-established practices rather than with new policies" [24]. In Germany, the influence of pre-plans varies across the analyzed federal states. River basin management plans and programs of measures are widely described as being too unspecific to derive specific hydromorphological and connectivity measures from them. *Saxony* did not prepare more detailed plans above the local level. Dresden uses its own pre-plan for idea generation, but this was not compiled integratively (I16, I17, O3). *Hesse* conducted participation platforms for its PoM. Several local water development concepts thought as pre-plans were prepared, mainly ordered by government district authorities. However, there is no instance that those pre-plans were prepared with integrative processes. They are thought of as a "wish-list" (I30), they do not contain restrictions (I30) and they are questioned for their implementability by local actors (I25, I30) and alternative ways for idea generation are used such as water shows (I30) or own pre-plans and experiences (I25,I31). For *Saxony-Anhalt* water development concepts are prepared one after another with project accompanying working groups compound by various actors for each concept. These concepts are intended to be a pool for measure idea generation by maintenance associations (I5, I6). However, those who were interviewed for the maintenance association reported that they did not use the concept for its territory since its completion (three years before) and that they do not intend to use it in the coming three years. They implement ideas developed in their network of actors many years before the concept completion. *North Rhine-Westphalia* prepared its PoM with round tables for participation and implementation road maps with a higher level of detail. The cooperation along this compilation process seems to vary regionally. One actor stated she had used some ideas for measures out of a road map (I34), another one stated that the road maps are already outdated and no longer fitted due to a different availability of land (I37). *Thuringia* compiled water framework plans for priority waters conducting participatory workshop talks. The less detailed PoM was upscaled from these plans. Water framework plans are used to generate ideas for compensation measures (I54) and connectivity measures (I43) and idea generation is complemented by water maintenance plans (I48). However, one actor indicated to often zeroise the

plans due to the fact that the measures would have only been derived for water management needs and do not consider restrictions (I49).

Overall, Thuringia is the state in this comparison with the highest influence of pre-plans on local measure implementation. How integrative procedures to compile pre-plans have been remains an open question. Nevertheless, participatory observation of a recent workshop talk for plans of the coming WFD cycle allowed me to explore the statement that plans merely consider water management needs and take up less of the remarked local restrictions. This is illustrated with the explanatory statement often appearing in measure overviews for participants that measures are kept in the plan because they are indispensable for WFD goal achievement (O9).

This overall observation suggests integration attempts are left to the local decision-makers. Table 2 shows categories of integration attempts of local policy addressees derived from interviewees answers given on questions on cooperation and participation processes on the way to realize measures. The iterative categorization led to the identification of integration attempts according to different planning stages from idea development via approval procedures to construction site briefing (the latter was only a single case (Abwasserverband Main-Taunus) and therefore left out in the table). It is complemented by two categories not related to specific stages: organizational structure and project accompanying working groups.

The *organizational structure* comprises an overall, institutionalized integration attempt. Its effect depends on its specific characteristics but shares to be applicable on the general discretion range of a policy addressee. All kinds of associations and two cities analyzed here show this specificity. Measures taken by the UHV Ehle-Ihle need the agreement by the members assembly comprised of farmers (I3). This way farmers views are integrated in WFD measure planning (In the long run it might be interesting to research whether the repeated process of agreeing on suggested measures lead to an integration of WFD supportive behaviour in farmer's management decisions). In this case, this leads to a restriction to certain types of measures (basically not requiring land). The GUV Harzvorland has a public member's assembly (members are communities) which decides on all measures and specifically on financial resources spent. However, all intended measures are related to primary tasks. WFD measures are mainly taken to compensate interventions for flood protection measures and are not influenced content-wise by the member's assembly. Similarly, the member's assembly of the Lippeverband (communities, industry, mining industry) decides on financial resources to spend. Communities raise there their voices on issues of land, tourism and experiencing landscapes but rarely veto the ecological plans itself. The LPV Thüringer Grabfeld reported that its member's assembly (communities, nature conservation, agriculture—one third each) improved the general cooperation. However, WFD specific measures are agreed upon between the LPV and the concerned/ordering community. For the city Taunusstein, one single person is responsible for reaching the goals of city development, nature conservation and water protection. This necessarily needs finding synergies or weighing up trade-offs of conflicting goals. Whereas, construction measures usually pass approval procedures, in Hamm maintenance measures need to be prescribed in water maintenance plans. Yearly, those plans need the agreement of the nature conservation advisory board which is comprised of seven users and seven conservationists with a farmer as a chairperson. The case of WuBs in NRW are more complex. WuB members are land owners along the river stretch and within the catchment and hinderers (e.g., owners of bridges, water treatment plants). Above a certain level of total costs, decisions cannot be taken by the association's chairperson, but by the elected association's council. The county Coesfeld (lower water authority) tried to foster WFD implementation by offering to pay the WuBs co-payment required by the WFD financial scheme in NRW. This offer was realized with financial resources from ecological compensation requirements through cooperation with the lower nature conservation authority of county Coesfeld. However, the county's council take over decisions of how to spend compensation money above a certain sum of costs.

Table 2. Integration attempts of local policy addressees according to planning stages.

State	Policy Addressee	Organizational Structure	Project Accompanying Working Group	Idea Development Stage	Planning Start Consultation	Preliminary Reconcilement (Restrictions)	Approval Procedures	Sources
Saxony-Anhalt	UHV Ehle-Ihle	X	X	X	X		X	(I3)
Saxony	LTV			X				(I18)
	City Dresden			X			X	(I16) (I17)
	Community			X				(I13)
Thuringia	Thüringer Landgesellschaft				X	X	X	(I49)
	City Erfurt			(X)	X	X	X	(I43)
	City Blankenhain			X		X	X	(I47)
	GUV Harzvorland	X		(X)		X	X	(I54)
	LPV Thüringer Grabfeld	X		X		X	-	(I48)
Hesse	City Wiesbaden					X		(I25)
	City Taunusstein	X		X			-	(I31)
	Community ideally			X	X		X	(I26) (I21)
	Abwasserverband Main-Taunus				X	X	-	(I30)
North Rhine-Westphalia	BR Arnsberg		X				X	(I40) (I42)
	Lippeverband	X		X				(I36)
	County Soest				X	X	X	(I34)
	City Hamm	X		X		X	X	(I37)
	Water and soil associations with County Coesfeld	X		X			X	(I41)

X incidence for this kind of integration attempt; (X) no incidence for regular procedure (Erfurt: A single measure was realized as a compensation measure; GUV Harzvorland: a pilot project at the early times of WFD implementation); - explicit incidences for no integration at this stage. Grey Indirect Assessment.

Beside the organizational structure, cases are characterized to varying degrees by integration attempts throughout the whole planning process. Integration processes, therefore, have differing degrees of influence on the outcome - which is expected to be highest at the idea development

stage. Surprisingly all cases show attempts aimed at integration at an early planning stage (project accompanying working groups, idea development stage or planning start consultation). In eleven cases measure plans pass approval procedures which are classified here as (institutionalized) integration attempts in their function to weigh up different interests and affectedness and to make regulatory requirements such as changing plans or making amendments. However, in three cases, approval procedures are avoided using actors' own discretion, although those cases show integration attempts during earlier phases. Four cases explicitly mention regulatory requirements by the lower nature conservation authority (GUV Harzvorland), the lower water authority (city Blankenhain), by built heritage conservation (county Soest) and requirements made for funding approvals without another approval procedure (Abwasserverband Main-Taunus).

Additionally, it was analyzed which actors were involved in the aforementioned integration processes and in which planning phase they were involved. For a detailed table see Appendix B. Cooperating actors mentioned in the interviews were listed and grouped. (The list is likely to be incomplete, but it is assumed that interviewees mention the most important actors coming to their mind. Especially the less important actors were sometimes named vaguely such as 'agriculture' in general without specifying whether authorities, associations or individual farmers are meant. Specifications in the table in Appendix B are made if given. Sometimes only the process itself was mentioned. This was especially the case if the process, such as an approval process, was not conducted by the interviewee but by another authority.) The most important actor types (mentioned in four or more cases) were: Financial authority, upper water authority, lower water authority, lower nature conservation authority, (other) nature conservation actors, actors from fishery/angling, agriculture and concerned communities. Other actor types were more rarely mentioned.

One or the other actor category was mentioned for several phases especially for the early planning stage, which is not surprising. Additional work can be avoided if the non-agreement for a measure is given at an early planning stage. Financial authorities and upper authorities are less often involved than lower authorities, but if so, mainly at an early planning stage. Financial approvals are often given by upper water authorities (in Thuringia by the Thüringer Aufbaubank). Therefore, some cases cooperated with only one actor combining both actor types. The entries for lower water and nature conservation authorities correlate with institutional dependencies through required approval procedures. Both lower water and lower nature conservation authorities were involved in nearly all analyzed cases either at an early planning stage or for preliminary reconcilement. Only those cases miss an entry which rely on upper instead of lower authorities for their measures (Dresden is a mixed case and responsible actors within Dresden work closely together). Communities have no entry when the actor in focus itself is a community or county-free city. Therefore, integrating communities does not seem to be necessary. Nevertheless, it also means that communities outside the territory are not integrated. It depends on the kind and size of measure and its effect on the basin whether other communities should be considered as concerned or having a stake in decisions made. Non-community actors involve the concerned communities mainly at an early planning stage or through their organizational structures.

Integrating agricultural perspectives ranges from institutionalization in the organizational structure to cooperation with agricultural authorities, associations, and professionals (farmers). It is difficult to identify commonalities among actors integrating agricultural perspectives. However, actors which did not mention agriculture for cooperation share that they are less directly dependent on agriculture (Agriculture has a higher importance for WFD goals concerning nutrients and other pollution whereas for actors here land and the type of agricultural usage close to rivers is most important) or that the local way of planning reduces direct contacts. Blankenhain and GUV Harzvorland for example justify their measures with the flood protection argument. This is reported to be more convincing and has additional legal possibilities to require necessary land resources from owners such as farmers. This may lead to reduced incentives to convince agriculture for cooperation. Others, such as Erfurt and Dresden, avoid requiring land for implementing their measures, which is perceived to be

difficult to realise or alternatively they rely on other authorities and processes (rural replotting) for obtaining land (Taunusstein, Abwasserverband Main-Taunus, Hamm).

In Saxony, it is a requirement that the fishery authority joins for the water show of the lower water authority. This specific water show has the intention to generate ideas for WFD measures. However, it is reported that the fishing authorities are often lacking personnel capacities to join water shows (I18, O3). The few other cases with entries for fishery/angling or nature conservation mention those actors predominantly for early planning stages. This supports the assumption to integrate them because of their knowledge about and interest in local water bodies.

Other actors mentioned, merely for preliminary reconcilement and approval procedures, were: (named more than once:) built heritage conservation/archaeology, civil engineering and green space office, line providers, building authority, waste, and were (named once:) lower soil protection authority, road traffic authorities, tourism, forest management, canoeists, industry, explosive ordnance disposal service and a rural replotting authority.

The following summarizes the integration attempts from the conceptual perspective. I have elaborated above that integration may have different dimensions, that decisions may be integrated by scale (vertically and horizontally), by sector and by public. The integration attempts described above are categorized according to those dimensions in Table 3.

Vertical integration appears to be widespread. However, a closer look shows vertical integration attempts mainly involving upper water authorities/financing authorities due to financial approval processes. Large scale actors also involve lower scale actors and middle scale actors such as the Abwasserverband Main-Taunus upper and lower water authorities. Therefore, it is not surprising that actors relying less on funding programs did not or rarely indicate vertical integration.

In contrast, horizontal integration was rarely being observed at all. It gets more obvious that (sub-)basin approaches are rarely applied on the local level as this would require cooperation across organizational units with non-hydrologic boundaries. Most of the analyzed cases are characterized by administrative boundaries or are just partially following hydrologic boundaries (e.g., Lippeverband, water and soil associations). As maintenance tasks are organized according to basins in Saxony-Anhalt, maintenance associations come closest to realize a basin approach by its own. (Nevertheless, those hydrologic boundaries do not match with hydrologic boundaries applied with WFD implementation and additionally maintenance associations do not cross state borders to apply a basin approach completely.) Wiesbaden mentioned one project cooperation with surrounding communities. BR Arnsberg is providing maintenance tasks for parts for of the neighbouring government district and mentioned a regular exchange with responsible persons from all other government districts in North Rhine-Westphalia, which roots in yearly budget talks organized by the ministry.

There is no case demonstrating not at least some sector integration, but it is elaborated above that there are numerous variances of which sectors are involved and at which planning stage.

In contrast, the public was less often mentioned to be integrated. In such cases, participation lies closer to information giving than counselling or joint decision-making. Dresden, Wiesbaden, LPV Thüringer Grabfeld (also informing via telephone), GUV Harzvorland and Erfurt described the plan presentation in local councils. The Thüringer Landgesellschaft named public relations, county Soest press releases at the beginning and the end of projects and Hamm the description of measures in the planning process on their webpage which provided the occasion for interested citizens to ask questions. Other attempts named are the water inspection with citizens and communities and question times. The LPV Thüringer Grabfeld pointed to public participation in workshops conducted to compile PoMs and Soest noted that concerns by neighbours are probably gathered and considered by the contracted engineering office.

Table 3. Conceptual categorization of integration attempts.

State	Policy Addressee	Sector	Measure Implementation Incentive	Scale		Sector	Public	Sources
				Vertical	Horizontal			
Saxony-Anhalt	UHV Ehle-Ihle	Maintenance (agriculture)	Positive for region	X		X	-	(I3)
Saxony	LTV	Water provision/flood/maintenance		X		(X)		(I18)
	City Dresden	Maintenance/flood	Positive for region, flood protection and WFD			X	X	(I17)
	Community	(probably varying)		X		X		(I13)
Thuringia	Thüringer Landgesellschaft	Land management/WFD/flood protection	WFD as mandate	X		X	(X)	(I49)
	City Erfurt	Maintenance (flood)	WFD and flood protection	X		X	X	(I43)
	City Blankenhain	Maintenance (flood)	Flood protection	X		X		(I47)
	GUV Harzvorland	Maintenance (flood)	Flood protection			X	X	(I54)
	LPV Thüringer Grabfeld	Landscape management/maintenance/WFD	WFD as mandate			X	(X)	(I48)
Hesse	City Wiesbaden	Maintenance/lower water authority for non WFD-measures	WFD and flood protection/climate change	(X)	(X)	X	X	(I25)
	City Taunusstein	environment	Sustainable environmental protection	(X)		X		(I31)
	Community	(probably varying)		X	X		(I26)	
	Abwasserverband Main-Taunus	Maintenance/waste water/flood	WFD within maintenance (without approval procedures)	X		(X)		(I30)
North Rhine-Westphalia	BR Arnsberg	maintenance/construction	WFD	X	X	X		(I40) (I42)
	Lippeverband	Mixed/mining aftermath	Mining aftermath with renaturation	X		X		(I36) (I38)
	County Soest	Maintenance	WFD	X		X	(X)	(I34)
	City Hamm	Lower water authority	WFD with compromises	X		X	(X)	(I37)
	Water and soil associations with County Coesfeld	Maintenance (agriculture) with Lower water authority	support WFD implementation	(X)		X		(I41)

X incidence for this kind of integration attempt; (X) no incidence for regular procedures; - explicit incidence for no integration. Grey Indirect Assessment.

Additionally, Table 3 presents the case characterization by the sector, actors originate from, and the incentives decision-makers had to implement WFD measures. In two cases, decision-makers perceive flood protection as their primary task where WFD aims were integrated in (here mainly due to approval procedures and financial incentives). Other cases intended to integrate other sectors into WFD implementation decisions and approximately half of them already combine WFD aims with other aims such as recreation and flood protection in their incentive to implement WFD measures. Only a few of them perceived WFD implementation as their primary task, more actors perceive it like an instrument and occasion to decide according to their personal conviction (Dresden expressed it very explicitly: Also without WFD I would not do anything differently. With WFD I can justify it by law (I17)).

4.2. What Leads to Those Forms of Integration?

Above, it was shown that the integration attempts vary by who is when included in decision-making processes along the planning procedure. The question is now what drives this kind of integration attempts? What motivates the adoption of integrative decision-making?

Drivers were examined iteratively, with the same procedure as above, collected and are presented in Table 4. Those categories cover drivers which are named directly or indirectly by interviewees to justify or explain their planning approach. It should not be confounded with the integration attempts itself. A decision-maker, for example, may involve another actor at the idea development stage but might do this with the intention of conflict prevention and not idea development. Some drivers are closely related to each other (see below).

Table 4. Drivers to adopt integrative practices.

State	Policy Addressee	Organizational Structure	Idea Development	Improve Decisions	Finding Synergies	Conflict Solution/Prevention	Goal Achievement	Financial Reasons	Regulation	Knowing Each Other	Conviction	Sources
Saxony-Anhalt	UHV Ehle-Ihle	X		X			X	X	X	X	X	(I3)
Saxony	LTV								X			(I18)
	City Dresden	(X)					X	X	X	X	X	(I16) (I17)
Thuringia	Thüringer Landgesellschaft					X	X			X	X	(I49)
	City Erfurt					X	X					(I43)
	City Blankenhain					X			X			(I47)
	GUV Harzvorland					X	X		X			(I54)
	LPV Thüringer Grabfeld					X	X		X	X	X	(I48)
Hesse	City Wiesbaden						X					(I25)
	City Taunusstein				X		X	X				(I31)
	Community							X	X			(I26)
	Abwasserverband Main-Taunus							X				(I30)
Northrhine-Westfalia	BR Arnsberg			X		X	X		X		X	(I40) (I42)
	Lippeverband								(X)			(I36)
	County Soest	X				X			X	X	X	(I34)
	City Hamm		X			X	X	X	X	X	X	(I37)
	Water and soil associations with County Coesfeld	X						X	(X)			(I41)

X incidence for this kind of driver; (X) no incidence for regular procedures. Grey Indirect Assessment.

The drivers may be summarized in four groups: drivers relating to the decision itself (idea development, improve decisions, finding synergies), drivers influencing whether an actor is able to realize goals (conflict solution/prevention, goal achievement, financial reasons), drivers

related to the personal characteristics of a decision-maker (knowing each other, conviction) and the institutionalization of integration (organizational structure, mandatory (legislation)).

The majority of cases show three or less drivers for actual integration attempts which are mainly in the group of realizing goals. These are precisely the cases that do not show drivers of personal conviction that integration is important or networks of that different actors are also integrated because of knowing each other well. Only two of the cases named more than six drivers each. However, the number of mentioned drivers does not seem to relate directly to the kind of integration attempts or kind or number of sectors involved by those decision-makers. Interestingly, although a majority of cases reported integration attempts at an early planning stage, especially in the phase of idea development, drivers show that only a few of them intended *idea development*, *improving decisions* generally or *finding synergies*, but rather do early steps to ensure realizing their goals considering known conflicts, possible lacks of acceptance and the necessity to gain sufficient resources.

Conflict prevention/solution is operationalized by noting worrywarts (I42) such as nature conservation authorities (I42, I34, I48), built monument conservation (I34) and land owners (I37, I49, I54) and the necessity to get them around the table for solving conflicts as well as by noting the intention to realize measures based on consensus to convince land owners to provide land (I37). WFD implementation does not happen in a dependency-free orbit (I49).

Goal achievement includes acceptance considerations (I54, I49, I25, I43, I42, I3) but also incentives of expected results from integration. Cooperation with other actors to implement measures, measures which wouldn't have a chance within the regularly used procedures, may disclose other funding opportunities (I43, I37, I48, I17, I42) but also enhance the discretion of an actor. In example, the cooperation and the agreement between Taunusstein and the lower water authority based on trust allows categorizing more measures as maintenance and funding them with compensation money in cooperation with the lower nature conservation authority avoids complex and long-lasting financial approval processes (I31). On the one hand, this may lead to an easier and faster implementation, but on the other hand, it may reduce institutionalized integration attempts for measures else wise being categorized as measures requiring an approval procedure. The approval procedure would integrate other actor's perspectives.

Overlapping with the goal achievement category, *financial reasons* include that decision-makers have to cooperate with a certain actor purely to obtain sufficient funding. It is treated as a separate category because decision-makers have less discretion avoiding the following integration process and face this issue on their regular way of planning instead of disclosing additional possibilities. Predominantly this means that decision-makers need to integrate upper and/or lower water authorities throughout the financial approval process (I3, I26, I30) or that the generally offered funding possibilities do not apply (I17) or require a co-payment (I37). An interviewee for Dresden reported that they do not have any target water body which would be covered by the funding scheme and Hamm noted that the lower nature conservation authority is the only actor possessing financial resources there. The county Coesfeld attracted water and soil associations to implement WFD measures to cover their co-payments out of compensation money, which required cooperation between the lower water authority, the water and soil associations and the lower nature conservation authority.

The category *regulation* comprises named regulations inducing the integration of other actors except for pure financial reasons. Water shows/water inspections need to be undertaken, by the UHV Ehle-Ihle according to its own statutes and by all lower water authorities in Saxony (it is also reported that actors cannot manage to fulfil this in its entirety) (I18) and by lower water authorities in Hesse with various actors. In NRW (Soest) the financial approval authority requires approval procedures for all measures no matter whether they might be categorized as maintenance measures by the lower water authority not requiring any approval. GUV Harzvorland and Blankenhain described the necessity of approval procedures for flood protection measures, which offers the chance to integrate WFD aims to the lower water authority by making obligations and to the nature conservation authority as any construction need an equivalent compensation. Dresden described this necessity for compensating

any construction plans as the driver that other actors seek the cooperation (being integrated in that actors planning so to say). Furthermore, project accompanying working groups (BR Arnsberg) are said to be prescribed in all regulations and authorities of the same level need to be involved in any official decision. This category also comprises the rules to obtain the agreement for water maintenance plans from the nature conservation advisory council (Hamm) and for compensation measures from the county council for measures above a threshold of costs (Coesfeld). Ultimately, coordination might also be perceived as mandatory (Lippeverband: the compilation of measure overviews) without knowing what coordinated specifically means under the given conditions.

The category *organizational structure* is less perceived as a driver than regulation although it is more present in the integration attempts similar to idea development. In Soest, the responsible person partially fulfils also tasks from the nature conservation authority and has a farmer's background leading to the will of integrating conflicting perspectives and finding solutions. The agreement necessity by members of an association (Coesfeld, UHV Ehle-Ihle) on measures taken lead to the consideration of members in the planning process. However, sometimes are those considerations taken into account in a way that certain measures are not even planned (presumption of possible non-agreement if asked later in the planning process). An effect of the organizational structure is based on dependencies and physical vicinity which may facilitate learning on others interests and possible solutions (Waylen et al. also found a relevance of physical co-location or virtual teams as being relevant for practicing coordination and collaboration for integration [8].). The latter is also given in Dresden if city's politicians urge an actor to do public participation who depends on their support e.g., for obtaining funding. Potentially, the strength of dependencies and related discretion, as well as a perception of the organizational structure as probably more given (unchangeable) than regulations (which also changed throughout the period of WFD implementation), may lead to the few entries as a driving force.

The vicinity through organizational structures supports here the driver of *knowing each other*. Soest, Hamm, and Dresden noted that integrated sectors sit in the same building which leads to ensured meetings and intensive exchange (I37) or that other actors such as investors approach decision-makers personally or that nature conservation associations approach the nature conservation authority which forward ideas because of knowing each other (I16, I17). The Thüringer Landgesellschaft uses this effect for identifying further actors for integration processes when asking involved actors whether they know further important actors to be involved. In projects of the UHV Ehle-Ihle, cooperating actors know each other since study times and from voluntary work within the association (I3, I8). The LPV Thüringer Grabfeld established this kind of network with communities through regular contacts during its own activities which moved the coordination from community council meetings to communication via telephone.

Conviction takes two forms here: One is that integration is generally important e.g., it is a task to enthuse humans (I42), it needs environmental education (I49), it is a give-and-take basis requiring the search for compromises (I34) and sitting together at one table, from the beginning on, should not be avoided (I48). On the other hand, integration helps to realize own goals e.g., the believe, that they never would have obtained so much land with coercion, WFD implementation deficits result from a lack of communication (I42) and processes proved of value (I3, I37).

Overall, drivers of realizing goals and institutionalization (regulation is absolutely dominating) dominate across all cases. Approximately half of the cases with sufficient data show conviction and knowing each other as drivers.

4.3. What Hampers Integration?

The cases analyzed here also provided insights regarding factors which hamper the adoption of integrative procedures. Statements can be grouped by categories such as personnel resources, effort for integration, willingness to compromise and independence in decision-making.

In many cases, it is mentioned that *personnel resources* are neither sufficient for planning the measures itself nor for conducting time-consuming integration procedures. Whereas Dresden and RP Darmstadt, although being aware of the necessity for integration, are recognized to be better situated with personnel resources than other WFD implementers, they note that they do not have enough personnel for integrated management to its full extent (I16, I21). The small water and soil associations in NRW are lead by volunteers not professionals. Having the personnel resources in such cases is even more unlikely (I35). Additionally, integration does not only depend on the personnel resources of the integrating actor but also of the actor to be integrated. Actors might be invited but do not show up due to low personnel capacities (I18). This barrier for integration is also described in the IWRM literature [7,8].

Personnel resources are strongly related to the perceived *effort* of integration and the perceived outcomes. Participation processes take a lot of time (I42). The effort of planning with round tables stands in no relation to the outcome (I37). Most measures are far away where nobody is interested (I34) or there is no benefit from public participation, we talk to affected people directly, they know us (I17).

Besides the fact that actors need to participate in an integrative procedure the perceived *willingness to compromise* plays a role on both sides. This factor can also be found in Waylen et al., it is described that collaboration needs patience and skill and takes compromise [8]. BR Arnsberg described other integrating processes as cultivating enemy images and the trouble-shooter needs to cope with personal offences (I42). Hamm avoids funding approvals by using compensation money in cooperation with the nature conservation authority in order to avoid the influence of the upper water authority which is perceived as not being willing enough to compromise (I37). Therefore, here one actor is involved more to involve another actor less.

Another factor which may reduce integration attempts seems to be *independence* in terms of decision-making (not in an ecological sense). Measures are kept (small) within the own discretion range (I30, I27, I31). Cooperation for financial reasons is not necessary given the funding structure (I36). The county Coesfeld raised concerns about losing influence on water and soil associations with the change of the water law 2016 due to the fact that these associations became financially independent. Before, the county's water authority and nature conversation authority had influence through the incentive of covering the necessary co-payment and prefinancing of planning costs by compensation money (I41).

Some actors also see the *responsibility for integration* processes with other actors, e.g., the federal state (I48) or see it already fulfilled by processes on the pre-plan stage (I21).

4.4. Integrated Water Management through WFD?

The WFD prescribes, in order to achieve its high ecological goals, process requirements which encompass ideas pertaining to IWRM. However, do the analyzed integration attempts match with the ideas of IWRM? It was shown above that single processes variously address vertical integration, but rarely follow a (sub)basin approach and that they realize to various degrees sector integration, especially with flood protection and nature conservation, and fewer times include (simple) public participation. In order to fully answer this question, it needs to be noted that two of the above chosen IWRM definitions tend to focus on a system's overall status instead of single processes which were analyzed in the previous sections. Whether integration happened is not then a matter of the intention of single processes, but of the result of processes in sum. The WFD itself might be understood as the process or framework promoting coordinated management or unifying/balancing views and goals according to the GWP and Grigg's definition. What is out of the scope of this study is analyzing whether actual views and goals were unified or balanced through the analyzed processes and even less whether any welfare has been maximized locally, regionally or nationally by implementing measures with the given processes. Nevertheless, as these cases of successful WFD measure implementation indicate, actors often managed to circumvent or solve power relations with negative effects on their goal achievement. This limitation is important: It means that a dependency on actors is known

which probably hampers goal achievement and that predominantly those actors tend to be integrated. Critically, actors with less power but probably important interests are not integrated in such processes either because their (actual or future) interests are not known or perceived or are for the sake of a smoother implementation ignored. Considering the factors hampering integration it suggests itself that actors restrict their effort on integration attempts.

Taking the system's perspective again, integration attempts may happen at different levels such as policy, strategy development, pre-planning and detailed planning. Certain levels for certain issues might be more appropriate than others. Concerning WFD implementation there are as shortly described above integration attempts at higher levels in each federal state but found to have merely little effects on local decisions of measure choice. For other issues than hydromorphology and connectivity, another picture might be drawn.

Considering the drivers for integration found here, they are beside several funding instruments not a result of the WFD as a regulation as such. They base on individual backgrounds, pre-existing organizational structures and pre-existing institutions such as plan approval procedures and compensation law and resultant incentives. Therefore, it could be said, that the WFD is not the framework leading to more unification/balancing views and goals at the local level in Germany. Nevertheless, WFD implementation was the occasion for many integration attempts at different levels although integrating effects as an outcome cannot be traced (yet). The WFD put goals on the agenda. These achievements are rarely possible without more integration attempts due to the given power relations. Whereas the original tasks such as maintenance (e.g., draining fields) can be managed often rather independently by the respective actors. This way the WFD as a process is thoroughly the reason for more integrated water resource management in the analyzed federal states.

5. Discussion

The following section discusses the transferability of results, their applicability and their implications for IRWM as a paradigm.

5.1. Result Transferability

The analyzed cases represent policy addressee's experience regarding hydromorphology and connectivity measures in the selected federal states. The comparability of characteristics and drivers for actors in the same category vary in quality and quantity. Whereas, related to this policy only one state enterprise (with the possibility of differently proceeding sub-units) in a federal state exists, there are five government districts in NRW and three in Hesse. The former described rather different communication styles affecting integration processes among the government districts (I40). The number of county-free cities per federal state ranges from three to 22 and the number of communities from 396 to 664. Based on the in-depth analysis of the chosen cases, it can be assumed that characteristics vary with the size of the community and whether it has special personnel e.g., for water maintenance or flood protection, one person for all environment-related tasks, an official for a very broad range of tasks or only a volunteering mayor for everything what needs to be done. With decreasing community size, the hampering effects of personnel resources and effort may increase.

The maintenance associations in Saxony-Anhalt are established on the same basis by (one) law and are assumed to be quite homogeneous. Though, the special-law water associations in NRW cannot be expected to be represented by the Lippeverband. Each of them was established on its own law and fulfils diverging tasks. They are traded as examples of more successful WFD implementation in NRW compared to other policy addressees e.g., due to better resources. The Lippeverband interviewee itself was less optimistic.

The other cases were special cases of local solutions, and do not represent a larger set of actors. Differing characteristics, especially the task distribution, may lead to differing power relations and therefore incentives for integration beyond processes which are more or less mandatory through institutionalization.

5.2. Result Applicability

The underlying question of this study is what motivates actors to adopt integration approaches, with the intention to investigate how policy transfer takes place in order to reach a more integrated approach for solving implementation deficits. However, it should not be called policy transfer from the WFD as it was shown that the driving forces for integration here are not a result of WFD prescriptions. Nevertheless, some drivers root in other policies such as nature conservation law.

Watson [25] stated that the question on how IWRM "implementation should be approached strategically (. . .) have been largely overlooked". Which of the drivers found here can be influenced strategically to achieve more integrated approaches?

Drivers relating to the quality of decisions itself and drivers related to personal characteristics very much depend on individual's opinion and experiences. Of course, there might be experiments for creating acceptance and learning. There are already projects with water advisors for convincing policy addressees on implementing any WFD measures (NRW (I33), Thuringia (I45)). However, considering the sheer number of policy addressees and the time and effort needed to convince them one by one seems not to be a promising approach. In the (very) long run there might be institutional change in the direction of more conviction on the necessity of integration due to a generation change. Though, that hampering factors also apply to convinced policy addressees should not be forgotten.

Making integration mandatory might be an alternative. Saxony decreed integrative water shows for idea development, but interviewees reported that other actors such as the fishery authority did not participate in several cases due to similar personnel shortages. If actors show up which are not willing to contribute to the process, can goal-oriented processes be expected? This gives an illustrative glance on the importance of the necessity of two sides for integration, the integrating and the integrated, and both need the willingness and the capacities to make integration successful.

Regulations and organizational structures as institutionalized drivers are numerously mentioned. This induces again the idea of steering integration by mandating integration processes but leaving open who needs to be integrated at least (and who decides on this). Nevertheless, some cases show that discretion may be used to circumvent mandatory processes which are perceived as hampering in goal achievement. Sometimes certain integration processes are circumvented by using integration processes with other actors. It may be discussed what would be the favourable situation and whether the goal achievement regarding water issues would take precedence over integration processes if goals can only be achieved in avoiding integration processes.

The fourth group of incentives found relates to goal realization considerations such as preventing and solving conflicts, financial issues, and acceptance. These drivers might be addressed by increasing advantages of cooperation and lowering barriers for the usage of known incentives. Increasing advantages may be additional financial (see also Watson et al. [16]) or personnel resources through cooperation (short-term or long-term), increased discretion (there might be a trade-off with accountability or democratic issues), technical support or increased planning security and so on and so forth. Important is that any approach needs to take into account the local barriers and needs to go beyond the usual approaches for incentivizing, e.g., a 80% funding for a measure is solely not an incentive to implement this measure for an actor which is not convinced of the importance of this measure, which holds for integration procedures as well if not mandated - contrariwise the 20% gap and the extra workload would be disincentives. Several federal states offer funding schemes for the implementation of WFD measures which are thought as incentives but require a co-payment by policy addressees. Saxony-Anhalt is (by 2019) the only state in the case selection here offering a 100% funding for WFD measure implementation for local policy addressees. However, this example demonstrates that also with 100% funding other incentives are necessary to convince individuals to take action such as the personal opinion in favour of the environment or synergies with the goals of the own organization.

Incentives need to be thought about not only for water managers but also for actors to be integrated, e.g., farmers were described to be more cooperative on land changes through saving notary fees if land

change is conducted by the authority (I34). This example demonstrates that the interests of relevant decision-makers in the field and their drivers need to be understood to conduct successful integration procedures. A precondition for influencing complex water governance systems strategically is a deep analysis of prevailing power relations and interests. This analysis needs to go beyond preconceived opinions: e.g., farmers are not necessarily hinderers by themselves but they also stick in dependencies (e.g., created by EU agricultural policy) and nature conservationists are not necessarily supporters as they follow nature conservation law which has its own rationale for environmental protection which may locally conflict with WFD rationales.

Overall, it is clear that these drivers are not easily to influence, and this points on the question of at which level or levels drivers need to be addressed? Further important questions include:

- 'Do any of the drivers found here need to be jointly present in a case to drive integration?'
- 'Is conviction significantly changing the perception and influence of other integration drivers and should this be considered for a potential strategy?'
- 'How to design more general integration procedures, like given on higher administrative levels, to induce positive effects (positive experiences, not cultivating enemy images) and may those support the adoption of integrated approaches at other levels—integration fostered by integration?'
- 'Is the intensity of restrictions and dependencies or positive synergies relevant for factors playing out as driving forces?'

The findings of Lundin [26], showing the complexity of a policy influences the effectiveness and therefore necessity of inter-agency cooperation, support this observation. The WFD can be considered a highly complex policy, meaning in this sense requiring cooperation for effective implementation, but how much integration is sufficient and which driving forces would be necessary for a strategic approach?

5.3. Implications for IWRM as a Paradigm?

Finally, what are the potential implications of the empirical findings for IWRM itself as a paradigm?

First, integration and who or what needs to be integrated is a matter of *perception*. There is a risk that affected actors are not perceived as significant or important by the decision-maker who might be expected to conduct an integrative planning process (e.g., Taunusstein: the fishery is not affected and would be only involved if affected, and, water advisors do not play a role as we know what we have to do, we are known as a model community (roughly depicted: I31). Some affected actors might not be noticed at all. This coincides with Beveridge and Monsees [13]. Additionally, some sectors may be perceived as being integrated but it is questionable which actor may represent a group of actors. Is it the same for integration if a sector is represented by a department on e.g., agriculture within an organisation, or an individual farmer, a farmer's association or an agricultural authority? For the finding of compromises or the negotiation of specific solutions this may change the whole setting and probably the outcome of the process. However, a precondition for balancing out interests is that it is known that there are other interests. This probably means managing the unknown.

Second, whether the management can be considered being integrated is a matter of defining integration as *a process or a result*. If integrated management is a process the process outcomes do not matter, but probably process characteristics. Do actors only need to come together to sit on a table, do all restrictions need be retrieved or does it need a specific process weighing up all interests? According to what criteria and by whom? All those nuances are present among the analyzed cases. If integrated management yet is a result, the outcomes are probably more relevant than the process characteristics. Do actors in such a case need always need to find win-win-situations, need to find a consensus or at least a consensus about a conflict resolution mechanism to consider it being integrated management? WFD measures with various extents were implemented in all analyzed cases. Some win-win-situations were found (e.g., I47, I54), but others found their solutions in rejecting the aims of another actor (e.g., I49). Overall, integrated management as a result cannot be assessed here. Furthermore, is it more or less integrated if one actor is integrated in order to exclude another actor or a certain integration

process (e.g., I48)? Is it IWRM if aims of the water sector are lowered down to not affect the goals of other actors (e.g., I3)? What is balancing and who, at least, needs to be satisfied by the process or result? In case integration leads to lowering goals, is more integrated management then desirable? Who decides on how much integration is desirable? Cases analyzed here predominantly tend to integrate as much as necessary and do not integrate for integration itself but for their goal achievement. Nevertheless, any kind of coordination or participation is a necessary precondition for elaborating solutions which are not only based on the own perspective.

Third, the preceding remarks suggest that some *levels* are more appropriate than others *for integration* attempts. Biswas [4] and the discussions on how and where to solve WFD implementation deficits led me to think about integration on different levels. Integration may happen via coordination between actors at different stages of policy implementation and at different planning stages and on different scales (locally, regionally, nationally), it may be institutionalized as well within organizational structures (separation or combination of responsibilities within the same unit) or by regulations e.g., approval procedures. Although it needs to be considered that decision-makers always have a certain range of discretion and may circumvent regulations. Here only local integration processes were analyzed, but some conflicts cannot be solved on the local level e.g., those of institutional interplay. In this case, a distinction between conflicts due to contradicting goals and instruments to reach them is worthwhile. Whereas conflicts out of instruments should be solved, it is a matter of perspective whether to integrate already the goals. Grigg [6] stated that "Integrated approaches, of course, will imply deliberately moving away from fragmented approaches" what sounds like overcoming a disadvantage. Biswas [4], though, points on possible negative implications of IWRM such as the "consolidation of institutions, in the name of integration, is likely to produce more centralization, and reduced responsiveness of such institutions to the needs of the different stakeholders". Additionally, embedding certain goals into others, e.g., water into agricultural regulations, probably gives certain goals a higher priority, this might be socially desired, but wouldn't this already go beyond balancing views and goals? In contrast, giving no goal a priority through parallel and equally applying regulations moves conflicts to lower levels, here the water managers. They need to solve political questions of what goals should get priority when win-win-situations are not possible—without having instruments for this yet and being embedded in local power relations. Leaving the priority of goals open means also leaving open to what integration may lead to. From the local self-organization perspective this is a reasonable procedure, but from the state regulation perspective this probably leads to unforeseeable outcomes of which goals are finally reached and which ones not ('participation trap' [12]). Strategically different levels for integration should be considered, but probably at any point, it will leave the management stage (see Lautze et al. [27] for the relation between water governance and IWRM).

Forth, IWRM implies that any other perspectives are integrated into water management. However, the cases illustrate that there is no 'the' water management and that matters for incentives in the given institutional and organizational setting with its power relations. Does it matter for thinking integration whether the specific policy addressee is *integrating other* perspectives *or* whether the policy goal is *integrated by other actors*? For sure it makes a difference for approaching integration strategically. Although from a theoretical perspective every sector may need more or less integrated management, the shared responsibility may lead to a lack of integration as described by Grigg [6] and Waylen et al. [8]. The necessity for integration to reach the WFD goals goes beyond the capacities and power of water management actors. They are able to integrate other's perspectives, but they cannot expect others to integrate their views and goals.

Due to the various uncertainties and open questions regarding the IWRM concept approaching it as a ladder may be useful for analysing empirical instances of IWRM. The steps of the ladder encompass the variety of increasing intensities of integration procedures. At the same time the first steps are preconditions for the following steps on the ladder:

1. knowing that there are actors with different interests
2. knowing differences in interests of actors
3. elaborating solutions for balancing out interests or conflict solutions
4. take solutions into account by integrating sector
5. take solutions into account by integrated sector

6. Conclusions

This paper takes an empirical approach to investigating what motivates to adopt integrated water resources management approaches by comparing local WFD implementation cases with various integration attempts. Cases represent the diversity of policy processes and actors in five German federal states. Integration attempts were found along all phases of measure planning from idea development to approval and construction, but also institutionalized through the organizational structures of policy addressees and regulations. Integration attempts dominated at the idea development stage and in approval procedures. Involved lower water and nature conservation authorities followed by financial authorities, fishery/angling and agriculture were predominantly involved. Vertical integration (mainly with upper or lower authorities) and sector integration (to very different extents) were quite common in contrast to horizontal integration (crossing administrative boundaries) and public participation. In contrast to the numerous integration attempts at the idea development phase drivers are much less related to idea development, but more to goal realization considerations and regulations. Integration is hampered by a lack of personnel capacities, high efforts for integration, the willingness to compromise, independence from other actors and that responsibility for integration is associated with other actors in the system. The WFD was found not to be a driver for integration as a regulative framework but induced an increased number of integration attempts through setting goals which can rarely be achieved without integration. The results are transferable to several entities with similar characteristics. Using the identified drivers strategically to induce integration, however, is difficult. It would need a critical and deep analysis of power relations and incentive structures. The latter might be enhanced to foster integration by integrating actors and also need to be addressed for actors to be integrated. Finally, an integration ladder is proposed to map empirically observable integration attempts in the context of a wider understanding of the concept. This also indicates there are some important preconditions for intensive integration approaches, starting by (1) knowing that there are actors with different interests, to (2) knowing differences in interest of actors, (3) elaborating solutions for balancing out interests or conflict solutions, (4) take solutions into account by the integrating sector and (5) taking solutions into account by the integrated sector.

Funding: This research was enabled by a PhD scholarship by HANS-BÖCKLER FOUNDATION awarded to the author and field work expenses were supported by the IRI THESYS GRADUATE PROGRAM (Integrative Research Institute on Transformations of Human-Environment Systems at Humboldt-Universität zu Berlin).

Acknowledgments: I like to thank all participants of the Workshop "Rethinking the Governance of European Water Protection" 8–9 January 2019 for inspiring contributions and discussions and all my interviewees for their openness and spending numerous hours of their limited time capacities for answering my questions. I also thank my husband for ensuring me not being troubled with family work during writing this up. And I like to thank Barbara Schröter, Pranay Ranjan, Nigel Watson and two anonymous reviewers for their valuable comments on an earlier version of this article.

Conflicts of Interest: The author declares no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Appendix A

The following tables show the actors interviewed and processes observed for the case study analysis for each German federal state. They are numbered for referencing in the text. The time frame for interviews is indicated.

Interviews:

Table A1. Saxony-Anhalt: January 2017, March-June/August 2018.

No.	Actor
I1	Landesverwaltungsamt, department water
I2	City Magdeburg, lower water authority
I3	Unterhaltungsverband Ehle-Ihle a
I4	Unterhaltungsverband Ehle-Ihle b
I5	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW), hydrology and ecology a
I6	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW), hydrology and ecology b
I7	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW), hydrology and ecology c
I8	Wasserstraßen- und Schifffahrtsamt Magdeburg - Burg
I9	BUND Saxony-Anhalt friends of the earth Germany
I10	Ministry for Environment, Agriculture and Energy of the state Saxony-Anhalt, waste water treatment, facilities for handling water-polluting substances, water provision, water protection, water framework directive
I11	NABU Sayony-Anhalt (Nature and Biodiversity Conservation Union) + County Börde lower nature conservation authority

Table A2. Saxony: January/April/May 2017, December 2018, January 2019.

No.	Organization
I12	City Dresden, environment
I13	Landesdirektion Sachsen—Dresden a
I14	Landesdirektion Sachsen—Dresden b
I15	Wasser- und Schifffahrtsverwaltung des Bundes, WSA Dresden
I16	City Dresden, lower water authority
I17	Community Dresden, water and soil maintenance
I18	Landestalsperrenverwaltung, EU directives, nature conservation
I19	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie (technical authority), surface waters, water farmework directive

Table A3. Hesse: September, November 2018.

No.	Organization
I20	Hessisches Landesamt für Naturschutz, Umwelt und Geologie (HLNUG), water ecology
I21	Regierungspräsidium Darmstadt placed in Wiesbaden, surface waters
I22	Hesse Ministry for environment, climate protection, agriculture and consumer protection, surface water protection/water ecology
I23	Hesse Ministry for environment, climate protection, agriculture and consumer protection, questions of principle, state-crossing and international cooperation, coordination of water framework directive, public relations a
I24	Hesse Ministry for environment, climate protection, agriculture and consumer protection, questions of principle, state-crossing and international cooperation, coordination of water framework directive, public relations b
I25	City Wiesbaden, protection and management of waters, water maintennace/lower water authority for non-WFD issues
I26	Rheingau-Taunus-County, lower water authority
I27	Main-Taunus-County, lower water authority
I28	Gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung GmbH (organizes water neighborhoods for the exchange of experiences)
I29	NABU Hesse (Nature and Biodiversity Conservation Union)
I30	Abwasserverband Main-Taunus, water maintenance
I31	City Taunusstein, city development, technical environmental protection, nature conservation, water protection

Table A4. NRW: October–December 2018, February 2019.

No.	Organization
I32	Water network NRW (by nature conservation associations)
I33	Bezirksregierung Arnsberg, water management including facility related environmental protection, water advisor
I34	County Soest, water maintenance
I35	Kommunalagentur NRW (community agency), water advisor
I36	Lippeverband, river area development, central department EU directives, nature conservation
I37	City Hamm, lower water authority
I38	agw—Arbeitsgemeinschaft der Wasserwirtschaftsverbände in Nordrhein-Westfalen (umbrella organization of special water law associations)
I39	Ministry for environment, agriculture, nature and consumer protection of the state North Rhine-Westphalia, river area management, water ecology, flood protection
I40	Bezirksregierung Arnsberg, funding approvals, conceptual work
I41	County Coesfeld lower water authority
I42	Bezirksregierung Arnsberg–building authority, water maintenance

Table A5. Thuringia: January–March 2019.

No.	Organization
I43	City Erfurt, lower water authority, surface waters
I44	Thüringer Landesamt für Umwelt, Bergbau und Naturschutz, river area management
I45	Thüringer Aufbaubank, agricultural advancement, infrastructure, environment, regional water advisor
I46	City Erfurt, garden and graveyard authority, water maintenance
I47	City Blankenhain, building authority
I48	Landschaftspflegeverband "Thüringer Grabfeld" e.V., landscape development, water maintenance
I49	Thüringer Landgesellschaft, water construction
I50	NATURA2000-Station
I51	City Gera, lower water authority, water maintenance
I52	Flussbüro Erfurt (engineering office), representative of nature conservation associations in the Thuringian water advisory council
I53	Thuringian Ministry for environment, energy and nature conservation, water protection, flood protection
I54	GUV "Harzvorland", water maintenance

Table A6. Participatory observation.

No.	Time	Process
Saxony-Anhalt		
O1	June 2018	2nd project accompanying working group for the water development concept of the river Aller
O2	October 2018	Water advisory council
Saxony		
O3	April 2017	Regional working group for the river Elbe
Hesse		
O4	September 2018	Water advisory council
O5	November 2018	Water forum
NRW		
O6	September 2018	WFD symposium
O7	December 2018	Information of policy addressees with maintenance and construction duties on measure overviews to be compiled
Thuringia		
O8	February 2019	Discussion forum for policy addressees to establish water maintenance associations in whole Thuringia by 2020
O9	March 2019	Water workshop to determine measures for the water body 'middle of Unstrut'

Appendix B

Table A7. Involved in integration attempts (own category for a minimum of four entries).

State	Policy Addressee	Financial Authority	Upper Water Authority	Lower Water Authority	Lower Nature Conservation Authority	Nature Conservation	Fishery/Angling	Agriculture	Concerned Community	Others	Sources
Saxony-Anhalt	UHV Ehle-Ihle (alles PAG)		2	2	2		(2) L	1	2		(I3)
Saxony	LTV			2	(2)		(2) A				(I18)
	City Dresden				2		2 A			4	(I16) (I17)
	Community			2						2	(I13)
Thuringia	Thüringer Landgesellschaft			2 3	2 3			2 3 A	2	2 4	(I49)
	City Erfurt	2		2	(2) 3					3 4	(I43)
	City Blankenhain	2 3		3 4 *	3					3	(I47)
	GUV Harzvorland			3 **	3 (2)				1	3 4	(I54)
	LPV Thüringer Grabfeld			3	3		(3) A	1	1 2	3	(I48)
Hesse	City Wiesbaden	X					X As	X P	X		(I25)
	City Taunusstein			2	2						(I31)
	Community in general	2		2	2	2 As	2 P	2 PAs	2	2 4	(I26) (I21)
	Abwasserverband Main-Taunus	2 ***		2 3	(3)				2 3		(I30)
North Rhine-Westphalia	BR Arnsberg		2		2	2 As uA	2 LAs	2 A PAs P	2	2	(I40) (I42)
	Lippeverband								2	2	(I36)
	County Soest		2	2 4	2	2 P	2 L	(4) A		2–4	(I34)
	City Hamm		3	2	2	2 As				2 4	(I37)
	Water and soil associations with County Coesfeld			2	2			1	1		(I41)

Phase of integration attempts: 1 organizational structure; 2 PAG, idea stage, planning start consultation; 3 preliminary reconcilement (restrictions), 4 approval procedure, X incidences for integration but phase unclear; Actor specifications: A (Authority), u (upper), L (Leisure), P (Professional), As (Association), initiator of the process; Regulatory requirements: * by lower water authority on WFD issues, ** by lower nature conservation authority, *** by financial authority on WFD issues.

References

1. Fichter, H.; Moss, T. *Regionaler Institutionenwandel durch die EU-Wasserrahmenrichtlinie. Ausgewählte Beispiele zum Umgang mit, Problems of fit"–Ergebnisse aus der raumwissenschaftlichen Institutionenforschung des IRS, Proceedings of Institutionen in Naturschutz und Ressourcenmanagement–Beiträge der Neuen Institutionenökonomik, Leipzig, Germany, 26–27 June 2003*; Dombrowsky, I., Wittmer, H., Rauschmayer, F., Eds.; UFZ: Leipzig, Germany, 2003; pp. 72–80. (In Germany)
2. European Environment Agency. *European Waters—Assessment of Status and Pressures 2018*. Available online: https://www.eea.europa.eu/publications/state-of-water (accessed on 8 May 2019).
3. Bund-/Länderarbeitsgemeinschaft Wasser (LAWA). *Weitere Vorschläge an die UMK zur Erreichung der Ziele der WRRL*. beschlossen auf der LAWA-Sondersitzung am 17.10.2018. Available online: https://www.umweltministerkonferenz.de/documents/top_25_lawa-wasserrahmenrichtlinie_anlage_1545313820.pdf (accessed on 8 May 2019).
4. Biswas, A.K. Integrated Water Resources Management: Is It Working? *Int. J. Water Resour. Dev.* **2008**, *24*, 5–22. [CrossRef]
5. Watson, N.; Walker, G.; Medd, W. Critical perspectives on integrated water management: Editorial. *Geogr. J.* **2007**, *173*, 297–299. [CrossRef]
6. Grigg, N.S. Integrated water resources management: Balancing views and improving practice. *Water Int.* **2008**, *33*, 279–292. [CrossRef]
7. Gallego-Ayala, J. Trends in integrated water resources management research: A literature review. *Water Policy* **2013**, *15*, 628–647. [CrossRef]
8. Waylen, K.; Blackstock, K.; Tindale, S.; Juárez-Bourke, A. Governing Integration: Insights from Integrating Implementation of European Water Policies. *Water* **2019**, *11*, 598. [CrossRef]
9. Junier, S.J.; Mostert, E. The implementation of the Water Framework Directive in The Netherlands: Does it promote integrated management? *Phys. Chem. Earth Parts A/B/C* **2012**, *47–48*, 2–10. [CrossRef]
10. Boeuf, B.; Fritsch, O. Studying the implementation of the Water Framework Directive in Europe: A meta-analysis of 89 journal articles. *Ecol. Soc.* **2016**, *21*. [CrossRef]
11. Richter, S.; Völker, J.; Borchardt, D.; Mohaupt, V. The Water Framework Directive as an approach for Integrated Water Resources Management: Results from the experiences in Germany on implementation, and future perspectives. *Environ. Earth Sci.* **2013**, *69*, 719–728. [CrossRef]
12. Theesfeld, I.; Schleyer, C. Germany's Light Version of Integrated Water Resources Management. *Environ. Policy Gov.* **2013**, *23*, 130–144. [CrossRef]
13. Beveridge, R.; Monsees, J. Bridging parallel discourses of Integrated Water Resources Management (IWRM): Institutional and political challenges in developing and developed countries. *Water Int.* **2012**, *37*, 727–743. [CrossRef]
14. Schröder, N.J.S. The lens of polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance. *Environ. Policy Gov.* **2018**, *28*, 236–251. [CrossRef]
15. Schröder, N.J.S. Die Umsetzung der Wasserrahmenrichtlinie in Berlin und Hamburg. 2014. Available online: https://edoc.hu-berlin.de/handle/18452/14879 (accessed on 5 April 2019). (In Germany).
16. Watson, N.; Shrubsole, D.; Mitchell, B. Governance Arrangements for Integrated Water Resources Management in Ontario, Canada, and Oregon, USA: Evolution and Lessons. *Water* **2019**, *11*, 663. [CrossRef]
17. Cardwell, H.E.; Cole, R.A.; Cartwright, L.A.; Martin, L.A. Integrated Water Resources Management: Definitions and Conceptual Musings. *J. Contemp. Water Res. Educ.* **2006**, *135*, 8–18. [CrossRef]
18. Marshall, G.R. Polycentricity and Adaptive Governance. A Paper Presented to the Panel 'The New Polycentricity? In Proceedings of the Conceptual Basis and Operationalisation for the Study of the Commons' Convened during the 15th Biennial Global Conference of the International Association for the Study of the Commons, Edmonton, AB, Canada, 25–29 May 2015.
19. Aligică, P.D. *Institutional Diversity and Political Economy: The Ostroms and Beyond*; Oxford University Press: Oxford, UK, 2014; ISBN 978-0-19-984390-9.
20. Marshall, G.R.; Connell, D.; Taylor, B.M. Australia's Murray-Darling Basin: A Century of Polycentric Experiments in Cross-Border Integration of Water Resources Management. *Int. J. Water Gov.* **2013**, *1*, 197–218. [CrossRef]

21. Butterworth, J.; Warner, J.; Moriarty, P.; Smits, S.; Batchelor, C. Finding Practical Approaches to Integrated Water Resources Management. *Water Alternatives* **2010**, *3*, 68–81.
22. Lubell, M.; Edelenbos, J. Integrated Water Resources Management: A Comparative Laboratory for Water Governance. *Int. J. Water Gov.* **2013**, *1*, 177–196. [CrossRef]
23. Monsees, J. *Governancestrukturen für Fließgewässer. Eine vergleichende Institutionenanalyse gewässerunterhaltender Verbände und Behörden*; 1. Aufl. 2008; Nomos: Baden-Baden, Germany, 2008; ISBN 978-3-8329-2903-9. (In Germany)
24. Sevä, M.; Sandström, A. Decisions at Street Level: Assessing and Explaining the Implementation of the European Water Framework Directive in Sweden. *Environ. Policy Gov.* 2016. [CrossRef]
25. Watson, N. IWRM in England: Bridging the gap between top-down and bottom-up implementation. *Int. J. Water Resour. Dev.* **2014**, *30*, 445–459. [CrossRef]
26. Lundin, M. When Does Cooperation Improve Public Policy Implementation? *Policy Stud. J.* **2007**, *35*, 629–652. [CrossRef]
27. Lautze, J.; de Silva, S.; Giordano, M.; Sanford, L. Putting the cart before the horse: Water governance and IWRM. *Nat. Resour. Forum* **2011**, *35*, 1–8. [CrossRef]

www.water-alternatives.org Volume 13 | Issue 3

Schröder, N.J.S.; Newig, J. and Watson, N. 2020.
Bright spots for local WFD implementation through
collaboration with nature conservation authorities?
Water Alternatives 13(3): 582-617

Bright Spots for Local WFD Implementation Through Collaboration with Nature Conservation Authorities?

Nadine Jenny Shirin Schröder

Research Group Governance and Sustainability, Leuphana University Lüneburg, Lüneburg, Germany; nadine.schroeder@stud.leuphana.de

Jens Newig

Research Group Governance and Sustainability, Leuphana University Lüneburg, Lüneburg, Germany; newig@uni.leuphana.de

Nigel Watson

Lancaster Environment Centre, Lancaster University, Lancaster, United Kingdom; n.watson1@lancaster.ac.uk

ABSTRACT: Twenty years after the EU Water Framework Directive (WFD) came into force, much remains to be done by member states in order to achieve the Directive's ambitious aims. In Germany, far fewer measures have been realised or even planned that are needed for the achievement of WFD goals. There are, however, a number of local cases across the country where WFD measures are being realised. A key question can thus be asked as to what are the key characteristics of WFD processes and arrangements in those 'bright spots'? In order to answer this question, we investigated pathways of local WFD implementation in six federal states of Germany; we used data from semi-structured interviews with WFD-related actors at all administrative levels; we also used participatory observation as well as analyses of policy documents and official websites. Our cases are local-level actors realising measures related to hydromorphology and connectivity. Although local actors face common barriers, some have progressed with implementation of WFD measures while others have not. We found that our bright spots of WFD implementation are characterised by the presence of highly dedicated individuals and, often, collaboration between the WFD and nature conservation authorities, although we found the relationship between the two actors was ambivalent. Such collaboration provided those realising WFD measures with access to the instruments of nature conservation law. Although the WFD prescribes sectoral integration, such cooperation did not evolve everywhere; among our cases, collaborating actors showed low independence, meaning no or only few alternative means to cope with implementation barriers, and physical proximity between WFD actors and nature conservation authorities. Finally, we explored the opportunities for, and constraints on, transferring this collaborative approach to other situations where WFD implementation continues to stagnate.

KEYWORDS: Water Framework Directive implementation, nature conservation, water governance, cooperation, polycentricity, Germany

INTRODUCTION

Twenty years after the EU Water Framework Directive (WFD) came into force, the ambitious aims of good ecological and chemical status in all European waters are far from being achieved (EEA, 2018). The rules of the WFD required transposition into national law by 2003, the characterisation of waters by 2004, and the establishment of water monitoring programmes by 2006. This initial phase was then to be followed by three six-year management cycles ending in 2015, 2021 and 2027, respectively. The EU member states

were also required to designate competent authorities to produce River Basin Management Plans (RBMPs) and to develop Programmes of Measures (PoMs) at the start of each cycle. Measures were to be taken, evaluated, and reported on by the end of each cycle. In all member states, the ultimate goals of good ecological and chemical status were to be achieved by 2027, at the latest.

In Germany, far fewer measures were realised, or even planned, in the first cycle than are believed to be necessary to satisfy WFD aims (LAWA, 2018). By 2015, only 8.2% of Germany's surface waters attained the stated ecological goals and none met the chemical goals (84% met the chemical goals if ubiquitous compounds are not considered) (ibid). The LAWA report reveals that the implementation of many measures has not even started. The largest gap between identified, but not yet implemented, measures occurs in relation to hydromorphology and connectivity measures in addition to measures regarding nutrient pollution from agriculture and toxic substances (ibid). Local-level actors have been found to be key to decisions on whether action is taken for WFD implementation and on what measures to take (Koontz and Newig, 2014a).

In this paper, we investigated the decision-making processes of local-level actors with regard to the realisation of hydromorphology and connectivity measures. We did this as part of a larger in-depth comparative study of how polycentricity affects WFD implementation in Germany and of which implementation features can be found across federal states and among actor types. We refer here to these local-level actors as 'WFD addressees' and, in our analysis, a WFD addressee constitutes an individual case.

With regard to measures on hydromorphology and connectivity, we found a cascade of barriers to local WFD implementation; these included lack of motivation, lack of human resources and know-how, funding constraints, limited availability of land and lack of agreement over its allocation, institutional interplay, and unsupportive organisational structures (Schröder and Chaudhary, 2020; Reese et al., 2018). These barriers are not uncommon in policy implementation (Mitchell, 2018) and are among the main reasons for the modest realisation of WFD measures.

The barriers are so numerous, however, that we asked – as did Pressman and Wildavsky (1984) in *Implementation: How Great Expectations in Washington Are Dashed in Oakland* – how it is that in some instances measures were actually realised? Despite a generally poor track record, there are a number of local cases across Germany where WFD implementation is progressing well; in those cases, which we call 'bright spots', measures are being identified, planned and realised. A key question for both research and policy concerns how WFD addressees at those bright spots have been able to avoid or overcome implementation barriers.

One feature that is common across our cases is the ambivalent relationship between WFD implementation and nature conservation; this ambivalence creates barriers to WFD implementation but also appears to provide mechanisms for coping with implementation barriers through varying intensities of cooperation. Studies of the relationship between WFD and nature conservation have often stated that synergies outweigh conflicts (Janauer et al., 2015; Mußbach and Evers, 2013; von Andrian-Werburg, 2014), that the latter are singular cases, and that these conflicts are solvable at the planning stage (Rehklau et al., 2017; Kraier, 2014; Drüke, 2014; Peters and Schackers, 2014; Fuchs, 2010); studies, however, have rarely focused on the actual level of measure realisation.

The WFD, furthermore, prescribes cooperation across sectors as a way of solving conflicts and finding synergies, though this prescription is not detailed and allows for discretion regarding how to nurture and organise cooperation. Schröder (2019) found that the kind of attempts at cross-sectoral cooperation vary greatly among local-level WFD implementers and that their attempts at cooperation were rarely driven by WFD requirements.

Building on these findings, this paper examines how the relationship between WFD addressees and nature conservation authorities influences and contributes to successful WFD implementation. Specifically, we ask:

1. What kinds of conflicts arise at the local level and through what mechanisms does cooperation support WFD addressees in coping with implementation barriers?
2. As coordination and collaboration are not omnipresent among our cases, what supports the emergence of such relationships? Specifically, what is the role in those relationships of the independence of WFD addressees and their physical proximity to nature conservation authorities?
3. Are these case-specific characteristics unique or are they transferable as 'solutions' to other situations where WFD addressees have not been able to make the same kind of progress with WFD implementation?

In the next section of this paper, we provide background on the concepts and terms that we use; we then give the rationale for analysing independence and physical proximity as factors in the emergence of collaboration; we follow this with details on the methods used, an overview of our cases, and the barriers to WFD implementation that we found. In the subsequent section, using existing studies of the relationship between WFD and nature conservation, we summarise the known dimensions of conflicts and synergies and the strategies for overcoming/creating them. We present research on cooperation and integration behaviour, because there is a gap here in that there are few studies of local-level cooperation published in English or German. After that, we present and discuss the results pertaining to the three research questions outlined above; we pay attention to what may be learned from these findings and insights, particularly to things that may help improve WFD implementation in the future and especially in the run-up to the 2027 target date for full implementation. We conclude with some broader reflections on what has been learned from the research with regard to interorganisational relationships and their importance to policy implementation.

CONCEPTS, METHODS AND CASES

This section provides an overview of 1) the conceptual background for the study, 2) the methods used, including study design, data collection and data analysis, and 3) the cases, including their multi-level and multi-actor settings, the reasons for which they are identified as bright spots, and their implementation barriers.

Conceptual background

Many of the challenges of implementing the WFD relate to the polycentric nature of water governance itself (Thiel et al., 2019) and relations among water and other spheres of governance, including the governance of nature conservation. According to Ostrom et al. (1961: 831), "'Polycentric' connotes many centres of decision-making which are formally independent of each other", and yet, in practice, they may be highly interdependent.

Polycentricity as a phenomenon is particularly prevalent in Germany's WFD implementation processes and procedures, with various settings of multiple decision makers at multiple levels being responsible for water management. Other settings of multiple decision makers add to water management actors because WFD goals closely interact with other water and land uses and their related interests. Various laws further shape the competition among different interests, such as flood protection, renewable energies, agricultural policy and nature conservation. This effect is called 'institutional interplay', a "phenomenon where one institution intentionally or unintentionally affects another" (Young et al., 2010: 3; Young, 2002). Institutional interplay leads to synergies and contradictions between goals and instruments; it also adds a level of complexity regarding the actors and interests that must be considered and the decision-making arenas that affect good water status. The relations between these multiple actors determine the functioning of the whole system and the measurable environmental outcomes.

Cooperation is one important aspect of the shaping of how systems function and it can take various forms and intensities. We use the term 'cooperation' here to include all forms of coordination and collaboration, with coordination marking a lower intensity than collaboration. Following Koontz (2019), we understand collaboration to involve multiple parties working together to achieve a joint goal and it is taken to mean sharing resources and instruments. We also follow Tetsch's (2015) definition of coordination as being the consideration by actors of the interests and goals of other actors in their decision-making in order to avoid or reduce negative external effects; the achievement of synergies as positive external effects is a subordinated goal of coordination (ibid). Coordination may help to reduce the negative effects of institutional interplay, while collaboration offers the potential for using institutional interplay to produce positive effects and impacts which cannot be realised by the parties when acting alone.

Polycentricity – a phenomenon involving multiple decision makers – offers a seemingly infinite number of opportunities for cooperation between different pairs or groups of actors. Insights can potentially emerge from comparisons between cases where cooperation actually did occur and similar cases where such links and relationships did not emerge.

In some of our cases, it was explicitly stated that the collaboration between a WFD addressee and a nature conservation authority emerged due to difficulties experienced by the WFD addressee in unilaterally reaching its goals. Examples include situations were all actors have ideas but only the nature conservation authority has money; in other cases, cooperation works because organisations are physically closer together in an urban setting than they are in rural areas. We therefore decided to analyse our data to specifically look for a correlation between cooperation intensity and the two key factors of 1) 'independence/dependence' and 2) 'physical proximity'.

Previous research supports the hypothesis that strong independence lowers the chances for collaboration in a polycentric system while dependence and physical proximity may raise the chances for collaboration. This hypothesis is supported by research findings regarding the limited capacities of political – administrative systems, transaction costs, incentives, and spontaneity:

(1) According to Jager (2016: 289), every cooperation involves transaction costs, a "fundamental mediating factor" for cooperation, and actors of a political – administrative system are also characterised by limited awareness and information processing capacities (Scharpf, 1973), which leads to limited capacities for cooperation (Schröder, 2019); especially in polycentric governance systems, it also leads to the necessity of selecting cooperation partners in situations where not every thinkable cooperative relationship can be realised (Fischer and Sciarini, 2016). This results in a need for incentives, what Jager (2016: 289) calls an "incentivizing impulse", for cooperating with particular actors. These incentives may be provided by the prospect of improved goal achievement through conflict resolution/prevention, coping with barriers through additional instruments and the improvement of decision-making processes (Schröder, 2019). This prospect may be a stronger incentive if decision-making centres are characterised by a limited capacity for unilateral goal achievement – low independence – and if the cooperation improves the prospects for goal achievement. In contrast, a more independent centre may not perceive options offered through cooperation to be incentives if it feels it can achieve its goals unilaterally; its independence may thus hamper cooperation (Schröder, 2019). (We refrain here from calling actors 'dependent', as a centre may be less independent but not necessarily dependent on a particular other actor.)

(2) In the step that precedes striving towards cooperation, there is some 'spontaneity', as the phenomenon is discussed by Blomquist and Schröder (2019): "[s]cholars have used terms such as 'spontaneity' (…) to try to capture and convey the idea that even though there may be identifiable patterns in a dynamic structure, they do not necessarily reflect or result from an act or a process of design" (ibid: 59). The question may be asked, how do WFD addressees get to know other actors who are offering worthwhile incentives for cooperation? Due to the plurality of actors, we need to assume that

WFD addressees possess limited knowledge about other actors, their interests and instruments (Simon, 1959). Schröder (2019) found "knowing each other" and "organisational structure" (institutionalised integration of different sectors) to be drivers for cooperation. Both of these drivers point to opportunity structures (Fischer and Sciarini, 2016). We assume that actors are more likely to develop cooperative relationships with other actors if conditions allow them to 'spontaneously' get in touch and have opportunities to meet without pursuing cooperation and if they can in this way get to know possible partners who can enable their goal achievement through the contribution of additional instruments. This may easily happen if actors are related through organisational structures or their networks (Fischer and Sciarini, 2016), as both of these raise the 'physical proximity' (Schröder, 2018) between potential cooperation partners.

In summary, a system with a multiplicity of centres, on the one hand, increases the possible variances of cooperation but, on the other hand, can make it more difficult to consider cooperation strategically due to the limited capacities of actors. At this point, spontaneity that occurs as a result of physical proximity may drive the initialisation of cooperation and low independence may incentivise cooperation.

Methods

Data analysed here were collected as part of a larger in-depth comparative study of WFD implementation in the six German federal states of Saxony, Saxony-Anhalt, Hesse, North Rhine-Westphalia, Thuringia and Lower Saxony. The larger study looked at the overall implementation situation and processes, the degree of participation and sectoral integration and river basin management approaches according to polycentricity characteristics; it took a 'bird's-eye view' in identifying cross-cutting features among the selected states.

In order to enhance the manageability and comparability, our analysis focused on actors who were related to the achievement of WFD goals regarding hydromorphology and connectivity. This focus reduced the number and types of actors to be analysed, making the research more manageable; it also allowed for greater comparability among the selected governance settings. Independent from the different governance settings, these types of measures are associated with similar ecological (for example, ecological deficits resulting from existing uses), technical (such as which measures address deficits), and social (in terms of usage interests) challenges, allowing for a reliable comparison of measure realisation processes.

Aiming for diversity within the study, we chose federal states that represent different overarching administration structures in Germany. In order to capture the diversity of independent decision-making, we also tried within each state to interview at least one representative of every type of actor that is actively realising measures on hydromorphology and connectivity. In three states, we did not find interviewees for very small-scale actors[1] such as municipalities (*Gemeinden*) or water and soil associations. Additionally, some actors were interviewed because they had realised WFD measures despite they were not explicitly addressed for WFD implementation by higher administrative levels. Table 1 provides an overview of actor types envisaged as WFD addressees in each state and of the additional actors found to be taking measures; it also indicates which actor types were covered by at least one interview.

[1] Those actors are generally weak WFD implementers in Germany as they often have no staff capacity for covering WFD implementation to any real degree and sometimes lack the capacity even for water maintenance as a task. This made it more difficult to find individuals who were willing to be interviewed.

Table 1. Types of local WFD addressees for realising hydromorphology and connectivity measures in each selected federal state, and coverage of those with interviews.

Actor type	Federal states					
	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
District governments			◊	◊		
State agencies	◊	◊			◊	◊
Counties				◊		
Free cities	◊		◊	◊	◊	◊
Municipalities			◊		◊	
Maintenance associations		◊				◊
Water and soil associations						
Special-law water associations				◊		
Special purpose associations			◊		◊	◊
Nature conservation associations					◊	
Landscape planning associations	◊				◊	

Note: Dark grey = the state-level administration expects this actor type to realise WFD measures; light grey = actor type generally not expected to realise WFD measures but single actors found to be taking measures; ◊ = at least one representative WFD addressee was interviewed.

This paper is a result of the bird's-eye view analysis; it recognises as a cross-cutting feature of our cases the ambivalent relationships and varied collaborations among WFD addressees and nature conservation authorities (see Appendix A, Table A1 for cooperation characteristics of our interviewed WFD addressees). Not all interviews with WFD addressees generated useful data such as information on cooperation and the specific handling of barriers; we were not able to, for example, interview the actual planner of such a WFD addressee organisation, but could only speak to a person with a different position and who had less knowledge about details. In terms of this analysis, we produced 19 full cases based on one interview per case; however, we used all data for understanding the WFD addressees' overall implementation barriers, independence, interdependencies, and the institutional setting especially for the regulation of nature conservation.

For each state, official websites, policy documents and recorded information from participatory processes were analysed in order to identify relevant decision makers and potential interviewees at higher levels. Interviewees representing small-scale actors were identified using a snowballing approach; higher-level authorities were asked to name active implementers, or active implementers were identified locally during observation of participation processes that took place between 2016 and 2019.

Most of the data were drawn from semi-structured interviews with WFD addressees as well as with lower-, middle- and upper-level authorities that have steering functions with regard to measures on hydromorphology and connectivity. The selection was complemented by interviews with non-state actors who had related responsibilities and aims or who were in a position to give a detailed overview of the implementation situation in the states; the latter particularly included nature conservation associations that take the position of critical observers and environmental advocates in political processes. The 70 conducted interviews lasted about two hours on average (see Appendix B for a complete and numbered list of interviewed actors and observed processes). In the remainder of the paper, we use the interview number '[Ix]' and the process observation number '[Ox]' for referring to

aspects of cooperation and implementation barriers that were mentioned in interviews or, respectively, that were observed in participatory processes.

Interviewees were asked how they plan measures, how they generate ideas for measures, with whom they cooperate or which participation/cooperation processes they use and participate in, or what role they play in WFD implementation. This was complemented by questions on barriers and conflicts and on their relevance, and on possibilities for improvement. The questions were open-ended so as to avoid the risk of prompting interviewees with regard to their reasons for acting in particular ways and in order to allow unexpected or unusual factors to be revealed. Further questions were asked to make sure that all basic aspects were covered, and for clarification of statements especially those addressing aspects which had not come up in earlier interviews. This formula allowed more specific questions to be included in later interviews.

Interviewees provided details, explanations and their own rationales regarding different aspects. In some cases, further questions did not lead to clearer statements because some interviewees were not sure what kinds of things they could share and speak about. We therefore analysed the narratives iteratively in three rounds. In the first round, we looked for direct and explicit statements in which interviewees provided mechanisms and causal links themselves; in the second round, we looked for more indirect and implicit statements and for statements in which interviewees, for example, used only some of the key terms that others did in direct statements about the same issues; the third round was used to review and check the categorisations made in the first and second rounds.

Cases and implementation barriers

Germany's administration is characterised by a federal (16 states), multi-level (3 to 4 levels per state (Bogumil and Jann, 2009)), multi-actor structure. The ministries at the state level were designated as competent authorities for the WFD. The German states have different types of levels below the ministries; these include 1) government districts such as in Hesse and North Rhine-Westphalia (NRW), 2) a middle authority, as has Saxony-Anhalt and Thuringia, 3) no government districts or middle authority, which is the case in Saxony[2] and Lower Saxony, and 4) city-states, which are not covered here, but are examined in Schröder (2014). Below, we examine the level of counties or free cities (*Kreise* or *Kreisfreie Städte*)[3] and the municipality level. Lower water and nature conservation authorities are located at the county/free city level, and upper authorities are at the level of district governments and middle authorities.

Germany's overall water governance structure reflects these general administrative structures but is more complex. Pertinent to the implementation of hydromorphology and connectivity measures are the many actors who have water maintenance tasks related to the drainage of fields, flood protection and shipping. The main task of these actors is to keep the watercourse free of things like vegetation and river wood in order to maintain and guarantee a riskless runoff; maintenance tasks may also include maintaining constructions such as weirs, dams and shoreline stabilisations within and along watercourses.

The German federal states assigned water maintenance tasks according to the importance of the waters themselves. Waters of national importance such as those used for shipping are managed by a national agency called the *Bundeswasserstraßenverwaltung*. (For reasons of comparability, we did not include this agency in the larger study.) The state laws distinguish two to three orders of waters (Monsees, 2008). Maintenance and management tasks on first-order waters are usually assigned to state

[2] Saxony had government districts only until 2012. In that state, planning of WFD measures does not appear to be done at the district level – in contrast to what occurs in the states of Hesse and North Rhine-Westphalia – but basic organisational structures of former districts still prevail and may induce additional institutional variety within Saxony.

[3] Large cities are not part of a county; rather, they are themselves counties at the same time as being municipalities, which allows them to combine municipal and county administrative tasks.

entities; tasks on higher-order waters are assigned to other types of organisational entities such as associations that have different combinations of water management tasks, and municipalities of varying sizes and capacities. Maintenance and management tasks thus are mainly related to the lowest administrative level (that is, municipalities); non-municipality actors, however, fulfil these tasks often by cutting across administrative boundaries.

Across the general types of administrative structures of the federal states, several WFD addressees have similar organisational characteristics; district governments or state agencies (*Landesbetriebe*), for example, are expected to adopt measures for waters that are of state-wide importance. In five out of the six covered states, municipalities and free cities are expected to pursue WFD measures. In Saxony-Anhalt and Lower Saxony, water maintenance associations which cover the whole state area are mainly envisaged; similarly, different types of maintenance associations[4] can also be found in NRW and Thuringia, where they only cover parts of the state.

The chosen states apply the 'voluntariness principle' (*Freiwilligkeitsprinzip*), calling on local-level actors with water maintenance tasks to voluntarily take measures on hydromorphology and connectivity. The competent authorities address water maintenance actors by using instruments – such as funding programmes – that are intended to set incentives or by installing, for example, 'coordinators' that are intended to support and motivate WFD addressees; they cannot, however, command actors to take WFD measures and we therefore refer to these actors as WFD addressees.

Because independent decision-making regarding measure realisation happens at the local level, it is important to analyse cases at that level – rather than state level – in order to learn about implementation gaps. The voluntariness principle maintains the independence of WFD addressees in their decisions as to whether or not to realise measures in favour of the WFD. WFD addressees are also quite independent from higher levels in terms of what measures to realise, as RBMPs and PoMs are rarely the main basis for decisions in that regard (Koontz and Newig, 2014b; Schröder, 2019); furthermore, the ability of WFD addressees to independently decide with whom, and how, to cooperate is indicated by the variances among WFD addressees in terms of their cooperation with other sectors (Schröder, 2019) and the vagueness of WFD prescriptions on coordination. We therefore treated every WFD addressee as a single case.

Table 2 describes the types of WFD addressees we covered. Some specificities on case delineation should be highlighted. First, in Lower Saxony we included three actors as examples of maintenance associations because they differ in their organisational structures. Second, although we could not interview a water and soil association in North Rhine-Westphalia, we made a case there based on the interview with a representative of the county of Coesfeld; the lower water authority there reported about its collaboration with the nature conservation authority which facilitated the realisation of WFD measures by water and soil associations.

We refer to our cases here as 'bright spots' because they represent situations where the actors have actively realised WFD measures. We consciously decided to not use the term 'best practice' because we do not evaluate whether those measures are locally sufficient or whether they can lead effectively to the expected ecological outcomes; this is due to three main reasons: The first reason is that outcomes can only be achieved if other actors, which are not analysed here, also take measures concerning other pressures such as pollution; second, it would need a much longer time horizon to wait for the natural response and we lack the data to evaluate bright spots based purely on ecological outcomes; the third reason is that interviewees mentioned that they themselves are sometimes not sure if the measures they have taken are effective, or they recognised that, due to constraints, they could not implement better or more measures. A further factor for not using the term best practice is that in this paper we do not compare the possible advantages for WFD implementation of cooperation between WFD addressees and

[4] The specific governance structure and names of associations may vary among and within states, compare with Monsees (2008).

nature conservation with the possible advantages of cooperation between other types of actors or cooperation at other levels.

Table 2. Cases and the degree of their collaboration with nature conservation authorities on local WFD implementation which was described as necessary.

Actor type	Federal states					
	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
District governments			—	BR Arnsberg		
State agencies	—	—			Thüringer Landgesell-schaft	—
Counties				Soest		
Free cities	Dresden		Wiesbaden	Hamm	Erfurt	Braunschweig
Municipalities	—		City Taunusstein	—	City Blankenhain	—
Maintenance associations		UHV Ehle-Ihle				Aller-Ohre-Verband UHV Oker SE BS
Water and soil associations				County Coesfeld with WuB		—
Special-law water associations				—		
Special purpose associations			Abwasser-verband Main-Taunus		GUV Harzvorland	Wasserverband Mittlere Oker
Nature conservation associations					—	
Landscape planning associations	—				LPV Thüringer Grabfeld	

Note: Full actor names and translations or descriptions can be found in Appendix B; dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities; — = not a case, due to insufficient data (for example, the interviewee is not a WFD planner in the respective organisation but the interview data supports the analysis of barriers and rules-in-use; alternatively, no representative WFD addressee has been interviewed).

Our bright spots are identified as such because the WFD addressees were motivated to implement WFD measures and found the means to overcome implementation barriers. Our WFD addressees were often highly dedicated individuals; due to the voluntariness principle, however, many WFD addressees did not understand WFD implementation as being their primary task and felt themselves only responsible for maintenance and various other tasks such as drinking water provision and wastewater treatment. Actors

from our cases found themselves to be motivated by synergies with flood protection, recreation, and nature conservation (especially of particular species like salmon) (Schröder and Chaudhary, 2020; Schröder, 2019, see Table 3: Measure implementation incentive). While motivation is not our main focus, it is a precondition for realising WFD measures; motivation can, however, be reduced by barriers that hamper the realisation of WFD measures.

Table 3 describes the barriers to WFD implementation which we used for the subsequent analysis of coping mechanisms, cooperation intensity and the degree of independence.

Table 3. Barriers for WFD implementation found across federal states.

Barrier	Description
Human resources and motivation	Actors may lack personnel in overall numbers; for example, some maintenance associations are led by one volunteer who would need to invest time in WFD measures on top of that already being spent in completing the primary tasks of the organisation. Actors may also lack know-how, with training and experience varying with the actor's previous tasks as well as with the size of the organisational unit. Some units are highly specialised and hold a good command of different water management practices, while others are general purpose units where a decision maker needs (theoretically) to attend to water-related – among many other – tasks.
Main or full financing	State entities are fully financed by the states. Other WFD addressees may apply for funding from WFD funding programmes set up by the states to incentivise WFD measure realisation, but only Saxony-Anhalt offers a 100% funding programme. Financial barriers in the cases analysed here were less an issue regarding the overall size of funds. Difficulties in using these programmes rather resulted from eligibility criteria. Certain measure types and areas were excluded because they were not defined as targeted, and certain actor types were excluded as applicants. Difficulties also arose from the requirements for co-payments and from the organisation of application and processing procedures.
Co-payments in funding programmes	Most WFD funding programmes require co-payments by WFD addressees and sometimes regulations allow them to cover these by their own work. Often, however, WFD addressees have difficulty covering these co-payments because, for instance, their organisational regulations do not allow them to use their own money or because they can simply not afford the co-payments. Regulations sometimes restrict the sources of co-payments, making it even more difficult to obtain external funding to cover these costs.
Application procedures for funding programmes	The application and approval procedures for receiving WFD funds require, for instance, a lot of effort, an initial plan with a degree of detail which cannot be provided by WFD addressees (because they lack know-how or man-power), or pre-financing (which especially prevents small actors from realising measures); WFD funding bodies may also impose high sanctions for contracting mistakes. Furthermore, funding decision-making processes may allow the influence of other actors on local decisions, something which is seen as problematic in some cases. (Schröder and Chaudhary, 2020)
Land acquisition	The acquisition of necessary land along rivers for larger measures, such as renaturation, is difficult due to very high market prices and the low willingness to sell land, especially agricultural land. Buying, leasing, transforming, or swapping land, even if possible, takes long. (Schröder and Chaudhary, 2020)
Institutional interplay	Institutional interplay may arise either through goal conflicts or through contradicting instruments for reaching those goals. Apart from agricultural policy, the most frequently mentioned institutional interplay here concerned nature conservation law (Natura 2000/Flora Fauna Habitat Directive). (Schröder and Chaudhary, 2020)
Political will	WFD addressees may lack political support to realise measures (Schröder and Chaudhary, 2020) from, for example, mayors or members of their organisations; this can affect the financing of measures, the provision of public land, and the approval by public veto players.

Institutional interplay deserves further attention here as a barrier because it is especially relevant to cooperation intensity. Even before the WFD was put in place, Germany prescribed plan approval procedures in order to ensure the integration of stakeholders' interests; the selection of stakeholders, however, depends on the size of the measure or plan. The requirement for plan approvals itself depends on the categorisation of a planned measure as a construction; this categorisation is itself, to a certain extent, a matter of discretion in that WFD addressees with maintenance tasks have some discretion to define WFD measures as a 'construction' or as 'maintenance' in order to avoid such procedures. This discretion is used more extensively in trustful relationships with authorities. Plan approval procedures are conducted by water authorities here and involve others such as nature conservation authorities; this gives the latter the opportunity to assess a planned measure in terms of its own goals and then signal agreement or disagreement. The conducting authority weighs up the various actors' interests, which potentially results in a requirement to adjust or stop a plan. Due to this procedural prescription, several WFD addressees engage in advanced coordination (Schröder, 2019), when plans are still more easily adjustable or when not so much money and time has already been invested in planning.

In the larger study, we analysed our cases regarding the necessity of cooperation for the realisation of measures; we noted whether interviewees described cooperation with a particular actor as 1) necessary, 2) a precondition to implementing their measures, or 3) addressing implementation barriers. This analysis led us to recognise the cross-case and cross-state importance of collaboration with nature conservation authorities and to analyse it in greater depth in this paper.

Table 2 summarises the results of this analysis of cooperation; it shows the local collaboration with nature conservation authorities, coding the necessity for regular collaboration in dark green and sporadic collaboration in light green. The only other pathway where a particular cooperation was found necessary for WFD measure realisation was the cooperation with flood protection: In the case of the city of Blankenhain, the water authority, with its steering and control function, used approval procedures to impose WFD measures on the primary flood protection actor. WFD measures were, furthermore, attractive because of their flood protection effects, but also because intended measures were not eligible for flood protection funding programmes, and thus the funding made available by the WFD was appreciated. The GUV Harzvorland also focuses on flood protection; its WFD measures are a by-product, and prompted by the nature conservation authority in approval procedures.

In this section, we laid out the basis for analysing our cases with regard to mechanisms for coping with barriers, cooperation intensity, independence and physical proximity. The next section summarises what is already known and published on the relationship between the WFD and nature conservation.

RELATIONSHIPS BETWEEN WFD AND NATURE CONSERVATION

This section provides an overview and summary of key papers examining relationships between the WFD and nature conservation actors; it includes descriptions of their conflicts, institutional interplay, integration, cooperation, and the practical implementation of their goals. The studies are from the fields of ecology, engineering, land use planning, water management, environmental policy, law sciences and environmental practice.

Laws for nature conservation include goals which exist in parallel to the Water Framework Directive, with neither WFD nor nature conservation goals having priority. The Conservation of Nature and of Landscapes Act (*Bundesnaturschutzgesetz*), to which we refer as national nature conservation law, transposes various directives into national law; this includes, among others, the EU Birds and Habitats Directives (BHDs). The national nature conservation law was enacted in 1976 and then substantially amended in 2010 [I46]. This law aims to protect species and their habitats and, applying the principle of 'no deterioration', regulates the compensation of interventions in nature and landscape. The implementation of nature conservation law is the responsibility of the federal states, which regulate details and may allow deviations from national law. Nature conservation authorities are tasked with

implementation at the level of counties and free cities (Sachverständigenrat für Umweltfragen, 2020: 214; compare with actor types in Table 2).

This section examines: 1) five different dimensions of synergies and conflicts between the WFD and nature conservation; 2) instruments and strategies for cooperation and integration which were suggested by the studies; and 3) how actual cooperation and integration has been researched.

(1) Studies have described primarily three different dimensions of contact between the WFD and nature conservation: ecological, legal and practical. In terms of ecological relations, evidence points to both[5] synergies and conflicts, with conflicts appearing to be primarily a result of differences in guiding principles; specifically, the WFD has a process orientation, whereas nature conservation is more concerned with the conservational protection of cultural landscapes (Fuchs, 2010; Kraier, 2014; Janauer et al., 2015). Conflicts between WFD and nature conservation therefore tend to arise in relation to, for example, former river beds such as oxbows which host rare species due to their disconnection from flowing water; in situations such as this, the WFD requires connectivity while nature conservation aims to conserve such sites (EC DG Environment, 2011; Janauer et al., 2015).

The legal perspective shows that neither the WFD nor the BHDs have overall priority in terms of objectives (Fuchs, 2010; Janauer et al., 2015). There are, however, legal instruments to solve conflicts that may arise; these include compensation – under nature conservation law – for WFD measures that are assessed to negatively impact nature, and exemptions or less stringent environmental objectives according to the WFD (EC DG Environment, 2011; von Andrian-Werburg, 2014; Janauer et al., 2015; Connor, 2016). Such instruments do not, however, address the difficulties that local actors may experience when searching for consensus in such situations (Jessel, 2014; Galler, 2015).

From a practical point of view, potential synergies include: 1) the efficient use of land though multifunctional measures and different measure options (Galler, 2015); 2) increased support for measures (Peters and Schackers, 2014); 3) finding different funding sources (Galler, 2015); and 4) time savings in the form of, for example, early conflict resolution (Rehklau et al., 2017). Conflicts may practically be solved by 1) limiting construction times, 2) regulating the execution of construction works, 3) imposing compensation measures prior to WFD-related construction projects, 4) transferring species to new habitats (von Andrian-Werburg, 2014) or 5) by improving strategic approaches through, for example, the consideration of sufficiently sized areas, the separation of sites to avoid conflicting aims, and the formulation of focal points for particular goals (Kraier, 2014).

In addition to these three dimensions of contact, Kraier pointed towards cost and emotion as two further dimensions (ibid). The cost dimension refers to the defence of funding the extensive use and the maintenance of habitats by farmers – an important source of their income – and also of departmental budgets. The emotional dimension includes actors' preferences for certain species, as well as traditions, misunderstandings, the exercise of power, and the lack of shared priorities (ibid). According to Kraier (ibid), the relevance of emotional aspects should not be underestimated with regard to other factors such as common or contradicting guiding principles. This observation fits with Connor's (2016: 334) statement that, in the Irish context, it is likely that, "the perceived conflicts in objectives between the WFD and the Nature Directives have been overstated".

(2) With regard to creating synergies and avoiding conflicts between the WFD and nature conservation, studies have also suggested various cooperation and integration strategies. These include:

- The use of planning instruments: These exist at the regional level (landscape framework plans and regional planning) and the municipal level (open space plans, landscape conservation plans which

[5] Hübner (2007), among others (Janauer et al., 2015; Mußbach and Evers, 2013; von Andrian-Werburg, 2014), states that synergies outweigh conflicts; although he found, that for the state of North Rhine-Westphalia, more than one-third of species and habitat types related goals are conflicting with WFD goals compared to less than half which are conforming and the rest being only partially conforming with WFD goals.

accompany construction plans, land pools for compensation, plans to connect biotope systems), and also include management or development plans specific to protected areas such as Natura 2000 sites (Peters and Schackers, 2014); other instruments include basin-level plans (RBMPs and PoMs) (EC DG Environment, 2011; Galler, 2015; Janauer et al., 2015);

- Cooperation at all levels: The willingness to cooperate is necessary on both sides (Fuchs, 2010; Drüke, 2014); communication structures are needed to establish relations on the interpersonal level (Fuchs, 2010), providing a basis for trust and for understanding of each actor's practical constraints (Kraier, 2014);
- Coordination of tasks: These tasks include environmental information (Galler, 2015), standards for monitoring (Hübner, 2007; Frederiksen et al., 2008), and spatial distribution of measures through plans or funding programmes (Frederiksen et al., 2008; Galler, 2015);
- Nature conservation actors may also realise WFD measures: The water sector may motivate and incentivise others in, for example, the use of WFD funding programmes (Drüke, 2014; Peters and Schackers, 2014);
- Joint use of sector-wide instruments: Both sectors should plan jointly in favour of shared objectives by using instruments such as the intervention regulation under nature conservation law (Jessel, 2007; Kraier, 2014; Peters and Schackers, 2014; Schröder, 2014; Galler, 2015), market-based instruments such as funding programmes from, for example, agricultural policy and contract-based nature conservation), regulatory instruments such as the designation of nature conservation or water protection areas, and usage fees according to water law (Galler, 2015).

The studies mentioned above, however, also identified factors that hamper the use of these strategies. Through the WFD, the water management planning system became incompatible with existing landscape planning methods (ibid); this led to mismatching time schedules, different spatial references and scales, varied degrees of detail (Fuchs, 2010), and fragmentation among the planning and coordination levels of the German federal states (Harms and Dister, 2018). Similarly, differentiated environmental data were produced from various monitoring programmes; this data tends to be spread across numerous authorities and entities and administrative borders, to be sectoral and spatial as well as vertical (Galler, 2015) and, according to van Apeldoorn (2007), may also be outdated, all of which can lead to isolated planning decisions which lack synergies (Galler, 2015). Additionally, local nature conservation authorities in Germany lack funding and personnel for writing their own management plans (van Apeldoorn, 2007).

(3) Few studies examine actual integration and local-level cooperation between the WFD and nature conservation sectors. Some studies looked at the objectives level; an example of this, in the Baltic Sea region, is Frederiksen and Maenpaa's (2007) study of how other directives were integrated in the transposition of the WFD into national law; another study considered the level at which ecological goals related to the Birds and Habitats Directives were formulated (which, in the Netherlands, is at the national level and in France and Germany is at the site level) (van Apeldoorn, 2007); still other studies analysed cooperation around RBMPs (van Apeldoorn, 2007; Janauer et al., 2015; Stratmann and Albrecht, 2015). Strong variances between the plans on the one hand and the actual cooperation on the other hand are a commonplace (van Apeldoorn, 2007; Janauer et al., 2015). Janauer et al. (2015: 24) identified a clear knowledge gap on "whether possible conflicts between Natura 2000 and WFD were already solved during the preparation of the programmes of measures or whether they are rather passed on to the subsequent planning levels". Galler (2015) found for Germany, that coordination between the sectors in the implementation of measures does currently not happen; existing coordination mechanisms are only partially effective, integrating landscape planning is not used, and specific measures are regularly realised without coordination. Beunen et al. (2009), similarly, found that for the Netherlands the implementation processes of both directives are "largely autonomous and independent" due to the organisational separation of water management and nature conservation.

Studies from practitioners have nevertheless mentioned examples of cooperation, for example that by Jessel (2014) in Lower Saxony. In North Rhine-Westphalia, various types of nature conservation actors were observed to participate in round tables and in the creation of implementation roadmaps, although rarely in the development of projects. On occasion, they did realise WFD measures themselves and a few small water and soil associations realised WFD measures in collaboration with nature conservation authorities, including the refinancing of co-payments required by WFD funding programmes through compensation measures (Drüke, 2014). It has been argued that WFD aims are in some cases not achievable without using compensation measures (Jessel, 2007). In Bavaria, the higher nature conservation authority, together with the water management authority, elaborated ecological development concepts in an effort to integrate Natura 2000 management plans and WFD implementation concepts; this was called the '*Landshuter Modell*' (Rehklau et al., 2017).

Summarising the key findings, we can expect to find synergies between WFD and nature conservation actors but relations are also unlikely to be free of tension. Synergies will not necessarily be created as win-win situations and can require political decisions as to what goals to prioritise locally. Furthermore, cooperation between WFD addressees and nature conservation actors at the local level seems to lack systematic analysis in the scientific literature. This leaves unanswered questions with regard to how joint approaches and instruments are used strategically, and by whom and for which purposes (Galler, 2015). This paper offers a way to fill this gap in knowledge and understanding.

RESULTS

The results presented here contribute to knowledge regarding local-level cooperation between WFD addressees and nature conservation authorities. In our cases, we first illustrate the actual relations between WFD addressees and nature conservation authorities by highlighting the conflicts which hamper WFD implementation and by analysing the mechanisms available through cooperation which support WFD implementation. Second, we analyse the patterns of (in)dependence and physical proximity as potentially critical factors driving the emergence of collaboration. Third, we consider opportunities and constraints in transferring the collaboration solutions to other WFD addressees.

Institutional interplay between the WFD and nature conservation in local-level implementation: Causing and reducing barriers

In this section, we illustrate the practical, positive, and negative effects of the institutional interplay with nature conservation law on WFD implementation. Negative effects and tensions are caused by policy incoherencies regarding the protection of particular species and habitats. Positive effects result from the cooperation between WFD addressees and nature conservation authorities, which make mechanisms available that help to cope with implementation barriers.

Both types of effects are caused by the intervention regulation (*Eingriffsregelung*) of nature conservation law and related instruments. This regulation allows nature conservation authorities to assess plans regarding their effects on nature, protected habitats and species, and to make prescriptions regarding whether and how to realise those planned measures. The prescriptions are intended to help avoid, or at least minimise, negative effects on nature (which are referred to as 'interventions'). Unavoidable interventions must be compensated for (Peters and Schackers, 2014) and details regarding the assessment of compensation can be regulated by the federal states. A national directive on such assessments failed to be passed due to opposition from the federal states [O2]; as a result, regulations on assessment vary across the states [I33].

State-level compensation decrees may regulate where the nature needs to be compensated (for example, how close to the intervention), who conducts compensation measures, what qualifies as compensation, how to assess that a compensation measure is appropriate to the intervention, and who decides all of this. In order to allow a spatial and especially temporal separation between intervention

and compensation measures, states may regulate whether and how intervention and compensation measures can be quantified, using what formulas; some of these formulas offset the possible positive and negative effects of plans [I33], and often the size of the claimed land is decisive for calculations (Galler, 2015). Planned measures with positive effects may be credited with 'eco-points' which can be then saved to compensate for future intervening measures or which may be pooled from various projects (Peters and Schackers, 2014). Compensation requirements may also be monetised; 'compensation money' is paid by the intervener into a fund that can be used for other nature conservation projects.

The perception of conflicts with nature conservation varies strongly among the cases examined. In some cases, nature conservation is perceived as an increasing barrier for WFD implementation because of blocking particular measures [I50]. Conflicts arise on the typical species inventory [I27], for example, the beaver needs to be weighed up against the common river mussel [I50]. Nature conservation authorities assess WFD measures as interventions and require compensation measures (for an example from Hamburg, see Schröder, 2014) [I49]; an example of this are unfavourable calculation formulas that give higher negative values for cutting trees and removing soil than the positive values given for habitat improvements through river renaturation which involves cutting and removing trees (Schröder, 2014) [I33]. Nature conservation authorities also restrict construction times in order to protect species [I36, I51]; the time limitations constituted by breeding and spawning seasons of various species can add up [I27] and, in combination with funding schedules, may leave only two months a year for the construction of WFD measures [I67]. As some WFD addressees (depending on the actual time of construction) also faced reduced availability of engineering consultants [I51], construction companies, and financial resources [I56, I67], some interviewees perceived the restriction of construction times as a strong barrier to WFD implementation [I27]; others, however, perceived this as a minor problem [I33, I49].

Except for three of our cases, all have drawn attention to the need for coordination of planning with lower nature conservation authorities in order to prevent or solve goal conflicts. Such coordination happens at various planning stages during, or prior to, the prescribed plan approval procedures (see Schröder, 2019). In the three exceptional cases, interviewees explained that they carry out the WFD measures that can mostly be considered maintenance measures and therefore do not require plan approval procedures or coordination. Cooperation intensity, however, has more variations than we can illustrate here. In practice, the absence of coordination within plan approval procedures does not necessarily mean that there is no coordination at all; for instance, those responsible for maintenance plans may coordinate with, and seek agreement from, nature conservation authorities [I70].

Although the papers on the relations between the WFD and nature conservation suggest various other possibilities for cooperation between the two sectors, we found that the instruments related to the intervention regulation were the main basis for collaboration. In contrast to the assessment of WFD measures as 'constructions', in collaboration with nature conservation authorities WFD measures may also be deemed 'compensation' measures, a designation which allows a different assessment (Schröder, 2014). Overall, barriers to WFD implementation can be addressed by different mechanisms, with the understanding that not all mechanisms can be applied everywhere. The various mechanisms are summarised below.

Regarding the financing of measures:

1. Compensation measures are directed from private or public interventions to the water bodies [I17, I33, I48, I50, I56, I66] if, for example, flood protection measures require compensation; measures need to be financed by the intervener;
2. Compensation money is used to fund WFD measures fully or partially, as, for example, the co-payments required from WFD addressees in several funding programmes for WFD implementation [I39, I43, I67];

3. WFD measures are fully or partially credited with eco-points; these are saved on an eco-point account to spend on later compensation requirements or may be sold in order to refund measures fully or partially [I51, I56, I50, I32].

Other mechanisms address the (perceived) pitfalls of WFD funding programmes:

4. Compensation instruments allow the realisation of measures of a specific type [I50] or at specific water bodies [I17] which are not targeted by existing funding programmes because, for example, these programmes intend to set (other) priorities;
5. The realisation of measures by designating them as compensation avoids time-consuming applications to WFD funding programmes [I33];
6. The realisation of measures as 'compensation' precludes the influence of other actors on measure design and realisation such as the upper water authority that needed to be involved in funding approval procedures for WFD implementation [I39].

Additional mechanisms address land resources and political will:

7. A compensation requirement may be used to oblige a private investor to buy the costly land around a water body that is necessary for a WFD measure. If public actors buy land, they are restricted by rules regarding the prices they are allowed to pay; often these payment limitations are low compared to the actual market prices for a piece of land. Private actors, on the other hand, are not restricted in the prices they pay for land and may be willing to pay the higher market price in order to realise their main project [I66]. Additionally, measures can be combined into land pools in order to allow larger-scale measures (Jessel, 2007; Peters and Schackers, 2014);
8. Compensation requirements can add pressure for the realisation of WFD measures and can in this way help to overcome unwillingness. Requirements that have been put in place for construction plans constitute a good argument for political support; the funding of WFD measures needs to be planned and argued together with the construction itself. Construction is not allowed to start without fulfilling the schedule for compensation [I17].

It is plausible that collaboration might be pursued in order to also address barriers such as lack of human resources and motivation. Nature conservation authorities may, for example, become active in taking over motivational activities, as well as idea generation and planning or organising tasks; this partially occurred in one of our cases [I62, I65, I69]. We have not, however, found such a mechanism to be at play across our cases.

Table 4 summarises the WFD implementation barriers that are addressed through cooperation with nature conservation authorities; this, along with the associated mechanisms, led to our classification of the cooperation intensity. We classified cases as showing 'medium' cooperation intensity[6] if WFD addressees at least coordinated regarding institutional interplay, and 'low' if they cooperated less than this; a 'high' cooperation intensity indicates situations where WFD addressees collaborated with nature conservation authorities. We did not consider it to be collaboration when it consisted solely of crediting eco-points to measures; therefore, two cases which used eco-points to refinance co-payments were not classified as having high cooperation intensity. We also distinguished between 'regular' implementation behaviour and 'sporadic' behaviour for single measures and recorded it in two lines. We maintained the distinction between regular and sporadic behaviour for the further analysis of our cases.

[6] The Stadtentwässerung Braunschweig (SE BS) is a special case because it only realises WFD measures that are considered to be maintenance and has not clearly stated coordinating mechanisms with regard to institutional interplay [I70]. We classified it, however, as having medium cooperation intensity because it cooperates with the local water and nature conservation authority on annual funds for small measures provided by the SE BS [I70].

Table 4. Cooperation intensity of WFD addressees operationalised as implementation barriers that are addressed through cooperation.

Cases		Implementation barriers						
State	WFD addressee	Main or full financing	Co-payment in funding programmes	Application procedures for funding programmes	Land acquisition	Political will	Institutional interplay	Cooperation intensity
Saxony-Anhalt	UHV Ehle-Ihle						✓	M
Saxony	Free city Dresden	✓	✓	✓	✓	✓	✓	H
Thuringia	Thüringer Landgesellschaft						✓	M
					(✓)		✓	(H)
	Free city Erfurt						✓	M
		(✓)					✓	(H)
	City Blankenhain						✓	M
	GUV Harzvorland						✓	M
					(✓)	✓	✓	(H)
	LPV Thüringer Grabfeld		✓				✓	M
		(✓)					✓	(H)
Hesse	Free city Wiesbaden							L
	City Taunusstein	✓		✓	✓	✓	✓	H
	Abwasserverband Main-Taunus		✓					L
							(✓)	(M)
North Rhine-Westphalia	BR Arnsberg						✓	M
	County Soest						✓	M
	Free city Hamm	✓	✓	✓			✓	H
	Water and soil associations with County Coesfeld		✓				✓	H
Lower Saxony	Free city Braunschweig				✓		✓	H
	Wasserverband Mittlere Oker				✓		✓	H
	SE BS							M
	UHV Oker		✓				✓	H
	Aller-Ohre-Verband						✓	M

Note: ✓ = barrier is regularly addressed; (✓) = barrier is sporadically addressed; H = high cooperation (collaboration); M = some cooperation (coordination); L = low cooperation; ( ) = deviation from regular planning behaviour; dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities.

Our findings illustrate the practical effects of institutional interplay between nature conservation and WFD implementation. We found eight mechanisms in total that supported WFD addressees in dealing with implementation barriers when collaborating with nature conservation authorities. However, WFD addressees also stated that collaborating partners needed to step back from their highest aims. Policy incoherencies precluded win-win situations. In our cases where there was collaboration, solutions were found, but any species needed to suffer, the space for developing a river was restricted [I50] or nature conservation goals receded behind WFD goals [I51]. Finding mutually acceptable compromises may very much depend on the individuals involved on both sides [I51, I69]. This underlying tension between the two types of actors illustrates that collaboration might not always be in the interest of either of them; furthermore, the variation in collaboration among our cases implies that collaboration, despite its potential benefits, does not automatically emerge or endure. In the following section, therefore, we analyse (in)dependence and physical proximity as potential factors leading to the emergence of collaboration among our cases.

Cooperation intensity driven by (in)dependence and physical proximity?

We have illustrated and explained above how collaboration aided with particular mechanisms in coping with barriers to WFD implementation. In the following, we analyse potential factors that may have driven the emergence of collaboration; we ask whether the independence of decision makers and the physical proximity between WFD addressees and nature conservation authorities is related to the degree of cooperation intensity between them.

Table 5 shows the independence of decision makers from nature conservation authorities; this is based on the availability of coping mechanisms other than those identified in the previous section. Columns relate to barriers where cooperation might have provided useful coping mechanisms; blank cells indicate barriers for which no alternative coping mechanisms were reported by interviewees. We classified WFD addressees as 'highly independent' if implementation barriers mainly do not apply or are not perceived as barriers, or if there are regular alternative coping mechanisms. We placed cases in the 'medium independence' category if regular alternative coping mechanisms exist but not for solving institutional interplay. The category of 'low independence' applies to cases where there was only sporadic use of alternative coping mechanisms, especially for financing measures.

Alternative coping mechanisms as well as barrier characteristics were found to be very diverse. Barriers were considered to be only sporadically addressed if, for example, WFD funding programmes, or alternatives such as flood protection funding programmes, were reported as being not applicable to every planned measure [I49], or if interviewees named numerous different funding sources which they had found for single measures [I17, I66]. Financial alternatives included funding for flood protection [I12, I18, I27, I44 I50, I51, I56] and maintenance [I12, I17, I32, I70] as well as support by foundations [I11, I52, I66], and, for co-payments, municipal budget funds [I17, I27, I48, I50]. Land acquisition was often avoided by, for example, planning only in-stream measures which do not require additional land [I3, I32, I44, I48, I49, I50, I51, I67, I68]; this was done if there was no option of buying land [I17, I44] or of land consolidation [I36, I39, I51, I63] – in a few cases specialised actors buy land strategically [I32, I33, I70]. Political will was mostly generated through promises of increased flood protection [I17, I27, I44, I50, I51, I70] or reduced future costs of water maintenance [I51, I68, I70] and improved recreation areas [I17, I44]. A specific way, what we identified, to realise WFD measures was that they served as compensation for flood protection measures [I56]. No alternatives to approval procedures were identified, apart from avoiding those procedures altogether by planning very small-scale measures.

Table 5. Independence of WFD addressees operationalised as the availability of alternative mechanisms to cope with implementation barriers.

Cases		Implementation barriers						Independence
State	WFD addressee	Main or full financing	Co-payment in funding programmes	Application procedures for funding programmes	Land acquisition	Political will	Institutional interplay	
Saxony-Anhalt	UHV Ehle-Ihle	–	–		↝			M
Saxony	Free city Dresden	(–)	(✓)		(✓)	✓		L
Thuringia	Thüringer Landgesellschaft	–	–	–	↝ ✓	✓		M (M)
	Free city Erfurt	–	✓		✓ ↝	✓		M
						✓		(L)
	City Blankenhain	✓ –	(✓)	–	↝	✓		M
	GUV Harzvorland	✓		–	✓	✓		M
	LPV Thüringer Grabfeld	–	✓	–		✓		(M)
		(✓) (–)	(✓)	✓	↝	(✓)	↝	M
								(L)
Hesse	Free city Wiesbaden	✓ –	✓			✓	↝	H
	City Taunusstein	(–)			(✓)		↝	L
	Abwasserverband Main-Taunus	–			(✓) ↝		↝	H
		–						(M)
North Rhine-Westphalia	BR Arnsberg	–	–	–	✓ ↝	✓		M
	County Soest	–	✓		✓			M
	Free city Hamm	(–)			✓	✓		L
	Water and soil associations with County Coesfeld	(–)						L
Lower Saxony	Free city Braunschweig	(✓) (–)	(✓)		(✓) ↝		–	L
	Wasserverband Mittlere Oker	(–)	✓					L
	SE BS	–	–	–	↝	✓	↝	H
	UHV Oker	(–)	(✓)		✓ ↝			L
	Aller-Ohre-Verband	–	(✓)		(✓) ↝	✓		M

Note: ✓ = barrier is regularly addressed; – = barrier does not apply for this case or is not perceived as a barrier by the interviewee; (✓/–) = barrier is sporadically addressed or sporadically does not apply; ↝ = avoiding land requirements or plannings which require approvals to address institutional interplay; H = high independence; M = some independence, for example, preliminary reconcilement prior to approval procedures is still necessary; L = low independence, for example, actors cannot realise WFD measures without additional strategies to cope with barriers; ( ) = deviation from regular planning behaviour; dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities.

In three of the four cases that showed sporadic collaboration behaviour, interviewees stated that certain, single measures could not have been realised without using the coping mechanisms provided by this collaboration; these cases were, additionally to their regular behaviour, classified in 'low independence'. The planner in the fourth case recognised implementation of the WFD measure as being a compensation measure beneficial to reduce the overall amount of land that was taken from actors such as farmers, but not as something for coping with a barrier [I51]. We therefore classified this sporadic behaviour in the same way as the regular behaviour.

We also classified our cases regarding the physical proximity of decision makers to nature conservation authorities. Seven cases show high physical proximity through working in the same building [I16, I17, I12, I36, I39, I43, I63, I66], regular meetings independent from WFD measures [I48], or a single person who is not a nature conservation authority but who is responsible for water management and nature protection [I33]. Five cases show medium physical proximity through alternative close connections to nature conservation; these include a close collaboration during former employment at the forestry authority [I67], close ties due to the constant initiative of the nature conservation authority [I70], and through tasks related to nature conservation handled by the same organisation [I51, I50]. We classified seven cases as showing low physical proximity because interviewees[7] did not mention any of the types of ties described for medium and high proximity.

We then grouped the cases according to independence, physical proximity and cooperation intensity; the results are shown in Table 6 (Appendix A, Table A2 indicates case names for each group).

Although many of our cases made use of compensation instruments, the specific mechanisms applied and the barriers which were being addressed varied considerably; in an aggregated form, nevertheless, patterns of independence became visible. More independent WFD addressees (medium and high), facing fewer barriers or having alternative means to cope with barriers, showed only a low or medium cooperation intensity with nature conservation authorities; they coordinated only as much as was necessary to gain agreement for their measures. Low independence, on the other hand, tended to be associated with high cooperation intensity. Collaboration allowed barriers to be addressed and supported goal achievement by WFD addressees.

Physical proximity and cooperation intensity showed a less clear relation; cases characterised by collaboration did, however, show mainly either high or medium physical proximity. Five cases where we found high or medium proximity did not display regular collaboration, but rather coordination. Three of these were cases with only sporadic collaboration; they were sporadically, but not regularly, characterised by low independence, what incentivised collaboration. One exceptional case, which implemented only measures under the heading of 'maintenance tasks', was highly independent but still demonstrated a medium cooperation intensity that coincided with medium proximity [I63, I66, I70]. Overall, for those interviewees who experienced it, physical proximity was described as very conducive to, and supportive of, collaboration.

[7] While other interviewees reported physical proximity without being explicitly asked about it and their reports match with organisational charts, the website of Wiesbaden indicates that WFD planners occupy the same (very large) building as the responsible nature conservation authority. However, the interviewee mentioned conflicts with nature conservation goals but did not mention forming closer ties, despite a direct question.

Table 6. Cases' cooperation intensity in relation to independence and physical proximity.

Cooperation intensity	Degree of independence	Physical proximity	Number of cases
Low	High	Low	2
Medium	Medium	Low	6*
		Medium	2
		High	2
	High	Medium	1
High	Low	High	6*
		Medium	3*
	Medium	Medium	1*
		Low	1*

Note: Cooperation intensity/degree of independence: High = high independence/cooperation; Medium = some independence/cooperation (such as preliminary reconcilement prior to approval procedures); Low = low independence/ cooperation. Physical proximity: High = actors are related to each other through organisational structures; Medium = actors are related through a network to nature conservation; Low = actors have no, or only formal, relations to nature conservation authorities. * = includes one case with sporadic planning behaviour because five cases were sorted into two lines each with regard to their independence and cooperation intensity.

These findings indicate that high physical proximity can be an important supporting factor for the emergence of collaborative relations but that it does not necessarily lead to collaboration if actors are highly independent from possible collaboration partners. The findings further indicate that low independence is a driver for the emergence of collaboration. The implementation deficit and the overarching barriers to WFD implementation that we found in our study suggest that many WFD addressees are rarely entirely independent in the achievement of WFD goals. The question remains, however, as to whether collaboration with nature conservation serves as a transferable solution for overcoming implementation deficits elsewhere. In the following section, we elaborate on this issue based on our data.

Exceptional cases of, or transferable solutions for, WFD implementation?

We now analyse the possibilities for, and restrictions on, making use of the identified mechanisms beyond our cases. We ask whether we have found some very exceptional, or possibly unique, cases of bright spots, or whether these solutions are in fact transferable and thus can help improve overall WFD implementation in Germany. In order to answer this question, we analyse the distribution of our bright spot cases across the selected federal states and across actor types. We then compile the details of practical constraints and summarise the regulatory constraints for collaboration.

First, is it likely that the coping mechanisms can be used across 1) federal states and/or 2) actor types?

(1) Table 2 shows collaborating WFD addressees in five of the six examined states. This incidence indicates that state-level regulations of the five states generally allow, or at least do not restrict, the use of the identified mechanisms.

(2) Table 2 also shows a predominance of collaborating WFD addressees on the municipality/free city level and on the county level in the selected federal states. This points to the shared independence and physical proximity characteristics of this group of actors compared to other actor types. First of all, district governments and state agencies are fully financed by the states while all other actors, if not obtaining alternative financial resources or using their own money (independence characteristics), need to use WFD funding programmes that require applications and co-payments and which cause those implementation barriers which can be addressed by the identified mechanisms. As the exceptional cases

above indicate, high independence neither precludes nor fosters collaboration. In county administrations and administrations of free cities, furthermore, water authorities and/or WFD addressees and nature conservation authorities often act under one roof, which increases the physical proximity of these actors; other collaborators are characterised by more personal (non-transferable) ties.

We therefore argue that this collaboration solution is transferable to federal states other than the selected ones; however, it is more likely to be used by WFD addressees if they face similar barriers to those found in this study and thus show similar (in)dependence characteristics and incentives. Use of the identified mechanisms must also not be hampered by practical or regulatory constraints and getting the potential collaborators to be in contact with each other may need external support.

Second, for transferability to be possible, the practical settings need to allow the use of compensation instruments. There can, however, be constraints or conditions:

1. The described instruments can only be used in areas where constructions require compensation measures (so mainly in growth regions) [I49];
2. A temporal misfit may prevent the use of compensation instruments especially if compensation measures are not a daily occurrence; compensation requirements come up on an ad hoc basis whereas the regular funding approvals need to be done one year in advance of a measure [I50];
3. Spontaneity and/or chance may determine whether WFD addressees get to know early enough that there is a compensation measure that could be planned, especially if non-municipal actors put the compensation requirements on the agenda [I50].

Third, compensation decrees vary from state to state [I33]; these regulations may constrain the use of compensation instruments to different degrees. For Thuringia [I46] and Hesse [I23], interviewees mentioned that the use of compensation instruments was difficult before regulations were adjusted to support WFD implementation, the reason being that calculation formulas based on the size of the area were disadvantageous [I23, I54]; an example is that connectivity measures are expensive but get a low number of eco-points because these measures require less land than the intervening construction project claims. Additionally, WFD measures were not accepted as compensation because WFD implementation is a mandatory task [I46]. Thuringia completely revised its assessment directive; it developed a guidance document to assess compensation measures for flowing water bodies and, since 2014, municipalities can more easily cover their co-payments through compensators [I46]. The state of Hesse acknowledged that river renaturation is desirable in itself [I23] and thus proclaimed that renaturation measures should not be classified as interventions, not like it also often happened in Thuringia before the assessment revision [I46]).

We grouped the following regulatory constraints according to the mechanisms for financing measures that were described above. It should be noted that these issues are highly interrelated as, for example, compensation measures directed to water bodies may also be assessed for qualifying as equivalent compensating interventions:

1) Directing compensation measures:

- Qualification as compensation measure: Despite Hesse's 'desirable in itself' decision, according to the state's compensation decree a renaturation project is still not worthwhile when assessed through an eco-points calculation. However, this calculation is not mandatory and if the assessment does not need to hold up in court, the decision maker can argue verbally [I33];
- Transfer of compensation duties: In Thuringia, an actor may generate many eco-points from the measures adopted, but the actor is not allowed to sell them to other actors (such as the wind industry) who would prefer to make such a payment rather than conducting and maintaining a compensation measure themselves [I51]. In 2011, Saxony-Anhalt addressed this issue through a decree on transferring compensation duties, which followed a decree on the acknowledgement

of compensation measures realised prior to intervention (eco-points account) in 2005. Interestingly, the Land Society Saxony-Anhalt is now organising so-called 'eco-pool projects' in which measures are directed to water bodies and compensation duties are transferred to the Land Society [O2].

2) Co-payments:

- Unreachable compensation money: A municipality may contract with an actor who is producing compensation requirements but, as soon as the compensation is monetised, the money needs to be transferred to a nature conservation fund which will then decide on its use. The money therefore becomes unreachable for the WFD implementers [I47];
- Decrees on the county level may regulate the use of compensation money for specific purposes [I43] (not necessarily in favour of WFD measures).

3) Eco-points:

- A weak guidance document for calculating eco-points is a constraint [I54];
- The use of eco-point accounts may not be allowed if the project requiring compensation is itself a public asset [I47];
- Responsibilities are unclear in some cases regarding who should record the eco-points account [I50];
- There are time limits regarding how long eco-points can be saved in an eco-points account [I50].

The compensation regulations show shortcomings and are criticised for not offering sufficient incentives for compensation measures at water bodies. The existence of compensation regulations is nevertheless looked upon favourably compared to the situation for federal states that are without such regulations, such as Lower Saxony and Brandenburg [O2].

DISCUSSION AND CONCLUSION

This paper contributes to the understanding of what water governance actually *is* – in terms of everyday practices – rather than what it should be (Zwarteveen et al., 2017). In this section, we first summarise and discuss the implications the found practices have for WFD implementation in Germany and then offer what can be learned for policy implementation in general.

Germany is unlikely to achieve the WFD goals by 2027 because a cascade of governance-related barriers hampers the initiation of measures, including the institutional interplay with nature conservation law. Nevertheless, we found cases – which we call 'bright spots' – where WFD implementation has progressed because the local WFD addressees have found individual solutions for coping with the governance-related barriers and have therefore been able to realise WFD measures. One solution pathway that we found to be relevant across the selected federal states and across different actor types is the collaboration with nature conservation authorities.

Overall, we found the relationship with nature conservation to be ambivalent, being both conflictive as well as cooperative. Nilsson et al. (2012) distinguish three levels on which policy incoherencies may arise, specifically the levels of policy objectives, policy instruments and implementation practices. Although these are analysed in different studies and from various disciplinary perspectives, the studies on the relationship between WFD and nature conservation reflect this distinction in what we identified as the ecological, legal and practical dimensions. While focusing on implementation practices, we found incoherencies at all three levels; furthermore, we found institutional interplay which showed positive effects, constituting the basis for collaboration. Restricting our examination to 'policy incoherence' would have led us to miss these positive effects. Mirumachi and Allan (2007: 1) stated it was misleading to

assume that, "transboundary water relations exist on a single axis from undesirable conflict to desirable cooperation"; similarly, our cases cannot, and should not, be described as being either conflictive or cooperative. Less cooperative cases, however, tended to perceive constraints on WFD implementation that were set by nature conservation regulations as being more conflictive.

We found that collaboration provided eight different mechanisms which supported WFD addressees in coping with implementation barriers, especially regarding the financing of measures, the pitfalls of funding programmes for WFD implementation, the provision of land, and the generation of political will. Despite the plurality of suggested cooperation strategies, collaboration in our cases was moulded by instruments related to the intervention regulation. On the one hand, we can trace this back to its practical implications for incentive generation. On the other hand, it may be owing to our study design which looks from the perspective of WFD addressees. The actors on which we focused, for example, are simply not responsible for the planning instruments and monitoring standards which are suggested for cooperation. This holds potential for research on the actual use of further cooperation and integration strategies and the interaction between cooperation attempts at different levels.

The coping mechanisms depend on specific regulatory settings, including the compensation regulation of nature conservation law and its local interpretation. Despite the practical constraints, these mechanisms may be used to address similar implementation barriers at other places in Germany if the regulatory settings for WFD and nature conservation actors offer similar options. Identifying these mechanisms, we show options and do not sell best practices in the sense of Molle (2008), who argues that, "sanctioned concepts allow the diffusion of general principles and the identification of common problems and solutions at a generic level; (…) they sometimes encourage dialogues between segments of the administration or ministries that share responsibilities on water issues but fail to coordinate their actions" (ibid: 148), but that the best practices approach "tends to 'freeze' the range of arrangements and site-specific mixes of municipalities, state and private management" which "must be defined endogenously" (ibid: 149). Constructed solutions would "mask the associated 'politics', but politics are integral to such interventions and their uneven outcomes" (Wilson et al., 2019: 8).

We have not studied the regulatory settings explicitly; they do appear, however, to be very specific to Germany. Therefore, we expect no direct transfer from Germany to other regulatory contexts of our insights on how coping mechanisms can arise out of collaboration between WFD actors and nature conservation. Comparisons across member states are nevertheless still promising at higher levels, such as the integration at the objectives level, and across levels for learning with regard to alternative integration options and in terms of another common ground for collaboration – besides the intervention regulation – between WFD and nature conservation actors.

Furthermore, due to our study design we have not explicitly studied the perspective of nature conservation actors; they also need to be willing to engage in political negotiations on prioritising contradictory goals locally, in cases where WFD addressees are interested in collaboration. Indirect assessment through the statements of interviewees indicates that nature conservation authorities have had their own incentives for collaboration, particularly in cases where their landscape plans are implemented through WFD measure realisation [I36] or in situations where they were dissatisfied with common compensation measures[8] and where WFD measures offered alternatives [I33, I54, O2]. In other situations, nature conservation authorities may have no incentive, such as when they have other, or their own, plans on how to spend the available money [I68]. Prior studies on WFD and nature conservation show that these actors are often still alien to each other (Drüke, 2014) and that they need to get closer for integration and coordination (Galler, 2015). Moreover, from an overall environmental perspective,

[8] The – often used – creation of traditional, mixed orchard meadows has been described as unproductive as they were not maintained adequately, used up a lot of land [I33], and were probably not typical at the chosen location [I54]. A study from the 1990s found that many small compensation measures were not identifiable later because of a lack of responsible persons maintaining them [O2].

we may ask whether we want the sectors working in parallel, assuming that there is thus more space dedicated to an ecological environment, or whether we want collaborative settings, assuming that then existing uses will be less restricted.

What does this mean for the environment at large? Realistically, it can be questioned whether parallel implementation by the two sectors would lead to an added value for the environment because both sectors face implementation barriers. The local WFD addressees in our cases were mainly inspired by the spirit of the WFD. Mismatches between motivated actors and the priorities of funding programmes, however, suggest that the pursuit of steering instruments without collaboration may even reduce the adoption of WFD measures. Ignar and Grygoruk (2015) did not anticipate a bright future for WFD implementation without an appropriate funding background. The observed collaboration promises to at least partially brighten up the future of WFD implementation because it enables to cope with financial implementation barriers as long as the German states do not introduce improved funding options.

Even the collaboration found here is not able to address all barriers, making additional coping strategies necessary; particularly, the lack of human resources and motivation in German WFD implementation cannot be solved by this collaboration. We could observe in our cases what Mitchell (2018) put in a nutshell, namely that, "highly committed and enthusiastic resource and environmental managers are often capable of implementing even poorly crafted or designed policies (…). In contrast, unmotivated or incompetent people may be unable to implement the most sophisticated and carefully designed policy" (ibid: 274). The capacities of WFD addressees vary widely across and within actor types, from specialised personnel to situations where there is no personnel at all dedicated to WFD tasks (Schröder, 2019). Collaboration probably aligns with the willingness and capacity to implement WFD measures. Nature conservation authorities might drive the collaboration by taking over tasks, but they also lack human resources [I69]. This explains in addition to their incentive structures and the emotional dimension (Kraier, 2014), why we rarely found them playing a more active role in WFD implementation.

Beyond the implications for WFD implementation in Germany, our findings are also relevant for policy implementation in general. As our findings suggest, collaboration is a positive phenomenon or attribute that can improve the effectiveness of policy implementation (Fischer and Sciarini, 2016). The multiplicity of studies on positive effects of collaboration (Ansell and Gash, 2007) boost the call for integrated water resources management (IWRM) as *THE* solution to implementation gaps (Schröder, 2019). IWRM is an approach which has also found its way into the WFD (Junier and Mostert, 2012; Richter et al., 2013; Theesfeld and Schleyer, 2013). However, as Molle tellingly described it, "nirvana concepts, such as IWRM, are 'photographic negatives' of prevailing chaotic situations and embodiments of a consensual reconciliation of antagonistic worldviews and interests" (Molle, 2008: 150).

Although the WFD prescribes sector integration, cooperation has not evolved into a general phenomenon. Due to limited capacities and highly complex systems, actors from the water sector (or any other sector) cannot be expected to be familiar with the interests and institutions of (all) other sectors, or to stay current on all their changes such that they are able to coordinate or to strategically use them (Fischer and Sciarini, 2016); this left it to chance between which actors cooperation evolves. We contribute to the knowledge on drivers of collaboration across sectors (ibid) and at the policy implementation level by analysing two factors, independence and physical proximity, that reduce spontaneity in the emergence of cooperation. Low independence was found to foster collaboration by setting incentives. Physical proximity supported the collaborators in getting to know the potential synergistic effects of each other's goals and interests but did not necessarily lead to collaboration when there were no incentives.

Steering authorities may expect synergies or may see the need for solving conflicts at lower levels; they may want to instigate cooperation between particular sets of actors and for that influence both factors. This sounds simple, but in practice it is not. Both factors may only support the establishment of collaboration if actors are characterised by low independence and are thus not able to achieve their goals

unilaterally. Independence may differ from goal to goal and low independence does not necessarily mean a dependence on a specific other actor. Further research is also deserved on the overall explanatory power of both factors in relation to possible other drivers for collaboration such as beliefs, norms, traditions (Watson et al., 2019), and opportunity structures (Fischer and Sciarini, 2016). Research that includes more cases and that examines both progressing and non-progressing implementation cases will be particularly useful.

Physical proximity may be created by the three types of opportunity structures (relational, social, institutional); these were analysed by Fischer and Sciarini (2016) as being drivers of collaboration. Physical proximity in our cases mainly stems from organisational structures or from the personal background such as a former employment. The personal background cannot be steered at all, however, it is also not necessarily beneficial to change organisational structures, as every organisational distribution of tasks has its advantages and disadvantages (Schröder, 2014). Proximity might therefore be strategically generated by forums or seminars – referred to by Fischer and Sciarini (2016) as "institutional opportunity structures" – which promise incentives for participation to both groups of actors. Meetings may foster the establishment of networks. Potential distrust needs to be reduced. Fischer and Sciarini (ibid) found that social and institutional opportunity structures did not always lead to collaboration, similarly, the participatory processes we observed, which were established to fulfil WFD prescriptions, rarely seemed to instigate collaboration. This was probably because participants were gathered e.g. for being provided with information on implementation progress or for discussing their positions on suggested measures. Participants as well as organisers were more prone to defending their positions than seeking common interests, even though the latter is deemed necessary by Mitchell (2018: 286):

> By working to find the common interest of all stakeholders, you will establish a strong foundation for an effective plan. One way to do this is to get past opposing positions by asking why stakeholders have taken a particular position. (…) It usually takes seven layers of 'whys' to uncover the interest that is common to other stakeholders.

Steering authorities may set incentives which tackle implementation barriers; in cases of collaboration, funding programmes, for example, might offer additional advantages for both collaborating parties. Incentives need to be real, but identifying what is really incentivising[9] is not a trivial task, especially because this is a matter of perception. What is perceived as a barrier varies among actors; one person may perceive the influence of other actors as a barrier, while another person may regard the bureaucratic effort as crucial. What is perceived as a viable alternative also varies, for example, in answering the question of whether the bureaucratic effort required by WFD funding programmes is lower or higher than the effort to implement measures as compensation measures. The response depends on what actors are used to, on individual preferences, and on their knowledge of alternatives.

While collaborating during practical implementation, actors need to find consensus and synergies on both objectives and policy mechanisms. As no order of priority is defined by the policy maker, decisions on prioritisations at the local level inevitably become political in nature (Molle, 2009) and some goals need to take a back seat if no win-win solution can otherwise be found. Water goals are not necessarily prioritised and the lack of initiated WFD measures in Germany indicates that actually barriers still outweigh the priority given to WFD goals.

Considered at the level of individual policies, moving political decisions to the local level will inevitably lead to implementation gaps. A policy is in the understanding of administrative rationalism (Dryzek, 2013), a clearly defined public interest which needs to be fulfilled locally. With that in mind, it is questionable whether it is in the overall public interest if local actors avoid funding approval procedures

[9] WFD funding programmes are thought to be incentives for WFD addressees to realise WFD measures, but the required co-payments are not incentivising.

which are intended to steer the quality of measures or the measure realisation at priority water bodies or by envisaged actors.

In contrast, in line with democratic pragmatism (ibid), street-level bureaucrats need to negotiate local policy compliance, because "policies made centrally are rarely sensitive to the local circumstances in which street-level bureaucrats operate" (ibid: 96). Policy, by this understanding, is facilitated but not controlled by higher levels (ibid). This leaves discretion to negotiate, here with nature conservation authorities, the objectives to be prioritised. On the one hand, this contradicts the considerable EU requirements for WFD reporting. On the other, in general the German WFD addressees cannot be regarded as street-level bureaucrats or simply WFD advocates who negotiate compliance; they must, rather, be regarded as actors with whom compliance needs to be negotiated. This leads us to the two fundamental questions of where contradicting policy goals should be addressed and resolved politically, and how environmental and local priorities should be set and recognised outside the local and environmental realms. It also leaves a further question of how we should decide who should make decisions regarding compliance with policies.

Fundamentally, political decisions at the local level may be simultaneously boon and bane. Negotiating compliance locally allows for adjustments to measures to reflect local necessities but it also makes decision-making susceptible to local power imbalances. We found that strategic collaboration may offer individual solutions to varied local implementation barriers but also that this collaboration cannot be programmed. We nevertheless found factors conducive to the emergence of collaboration, factors which may to some extent help instigate collaboration between specific actors.

ACKNOWLEDGEMENTS

This research was enabled by a PhD scholarship from the Hans-Böckler Foundation awarded to the first author. The field work expenses of the first author were supported by the IRI THESYS GRADUATE PROGRAM (Integrative Research Institute on Transformations of Human-Environment Systems at Humboldt-Universität zu Berlin). We would like to thank all interviewees for their openness and for spending numerous hours of their limited time answering questions. We would also like to thank the three anonymous reviewers for their valuable comments.

REFERENCES

Ansell, C. and Gash, A. 2007. Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory* 18(4): 543-571.

Beunen, R.; van der Knaap, W.G.M. and Biesbroek, G.R. 2009. Implementation and integration of EU environmental directives. Experiences from The Netherlands. *Environmental Policy and Governance* 19(1): 57-69.

Blomquist, W.A. and Schröder, N.J.S. 2019. Seeing polycentrically: Examining governance situations using a polycentricity lens. In Thiel, A.; Blomquist, W.A. and Garrick, D. (Eds), *Governing complexity: Analyzing and applying polycentricity*, pp. 45-64. Cambridge University Press.

Bogumil, J. and Jann, W. 2009. Verwaltung und Verwaltungswissenschaft in Deutschland: Einführung in die Verwaltungswissenschaft. Wiesbaden: VS Verl. für Sozialwiss.

Connor, Á.O. 2016. Incorporating nature conservation objectives and measures into the Water Framework Directive. *Biology and Environment: Proceedings of the Royal Irish Academy* 116B(3): 329-337, www.jstor.org/stable/10.3318/bioe.2016.29

Drüke, J. 2014. Die WRRL – Maßnahmenprogramme und ihre Umsetzung in NRW. In Albrecht, J. (Ed), *Naturschutz und Wasserrahmenrichtlinie in der Praxis: Tagungsdokumentation der BfN-Fachtagung am 26.11.2013 in Bonn*, pp. 13-19. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

Dryzek, J.S. 2013. *The politics of the earth: Environmental discourses*. Oxford: Oxford Univ. Press.

EC DG Environment (European Commission, Directorate-General for the Environment). 2011. Links between the Water Framework Directive (WFD 2000/60/EC) and Nature Directives (Birds Directive 2009/147/EC and Habitats Directive 92/43/EEC): Frequently asked questions. EC DG Environment.

EEA (European Environment Agency). 2018. European waters – Assessment of status and pressures 2018. EEA Report No. 7. Luxembourg.

Fischer, M. and Sciarini, P. 2016. Drivers of collaboration in political decision making: A cross-sector perspective. *The Journal of Politics* 78(1): 63-74.

Frederiksen, P. and Maenpaa, M. 2007. Analysing and synthesising European legislation in relation to water: A watersketch report under WP1. NERI Technical Report No. 603. Denmark: National Environmental Research Institute, Denmark.

Frederiksen, P.; Mäenpää, M. and Hokka, V. 2008. The Water Framework Directive: Spatial and institutional integration. *Management of Environmental Quality: An International Journal* 19(1): 100-117.

Fuchs, M. (Ed). 2010. Wasserrahmenrichtlinie und Natura 2000: Gemeinsame Umsetzung in Deutschland und Österreich am Beispiel der Grenzflüsse Salzach und Inn; Ergebnisse des F+E Vorhabens 806 82 220 des Bundesamtes für Naturschutz. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

Galler, C. 2015. Koordinationsbedarf in der Umweltplanung zur Optimierung multifunktionaler Maßnahmeneffekte. In Karl, H. (Ed), *Koordination raumwirksamer Politik: Mehr Effizienz und Wirksamkeit von Politik durch abgestimmte Arbeitsteilung*, pp. 152-173. Hannover: Akad. für Raumforschung und Landesplanung.

Harms, O. and Dister, E. 2018. Potenziale zur naturnahen Auenentwicklung: Bundesweiter Überblick und methodische Empfehlungen für die Herleitung von Entwicklungszielen. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

Hübner, T. 2007. Zur Umsetzung der FFH-Richtlinie und Wasserrahmenrichtlinie aus Sicht des Naturschutzes. In Alfred Töpfer Akademie für Naturschutz (Ed), *Integration von Wasserrahmenrichtlinie und Naturschutz – Bilanz der Umsetzung, Konfliktpotenziale und Lösungsansätze*, pp. 7-13.

Ignar, S. and Grygoruk, M. 2015. Wetlands and water framework directive: Protection, management and climate change. In Ignar, S. and Grygoruk, M. (Eds), *Wetlands and Water Framework Directive: Protection, management and climate change*, pp. 1-7. Cham: Springer International Publishing.

Jager, N.W. 2016. Transboundary cooperation in European water governance – A set-theoretic analysis of international river basins. *Environmental Policy and Governance* 26(4): 278-291.

Janauer, G.A.; Albrecht, J. and Stratmann, L. 2015. Synergies and conflicts between Water Framework Directive and Natura 2000: Legal requirements, technical guidance and experiences from practice. In Ignar, S. and Grygoruk, M. (Eds), *Wetlands and Water Framework Directive: Protection, management and climate change*, pp. 9-29. Cham: Springer International Publishing.

Jessel, B. 2007. Beeinträchtigungen an Gewässern – Künftige Anforderungen an Folgenprüfungen im Kontext von Wasserrahmenrichtlinie und Naturschutz. In Alfred Töpfer Akademie für Naturschutz (Ed), *Integration von Wasserrahmenrichtlinie und Naturschutz – Bilanz der Umsetzung, Konfliktpotenziale und Lösungsansätze*, pp. 45-51.

Jessel, B. 2014. Naturschutz und Wasserwirtschaft auf dem Weg zu partnerschaftlichem Handeln!? In Albrecht, J. (Ed), *Naturschutz und Wasserrahmenrichtlinie in der Praxis: Tagungsdokumentation der BfN-Fachtagung am 26.11.2013 in Bonn*, pp. 8-12. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

Junier, S.J. and Mostert, E. 2012. The implementation of the Water Framework Directive in The Netherlands: Does it promote integrated management? *Physics and Chemistry of the Earth* Parts A/B/C 47-48: 2-10.

Koontz, T.M. 2019. Cooperation in polycentric governance systems. In Thiel, A.; Blomquist, W.A. and Garrick, D. (Eds), *Governing complexity: Analyzing and applying polycentricity*, pp. 115-132. Cambridge University Press.

Koontz, T.M. and Newig, J. 2014a. Cross-level information and influence in mandated participatory planning: Alternative pathways to sustainable water management in Germany's implementation of the EU Water Framework Directive. *Land Use Policy* 38: 594-604.

Koontz, T.M. and Newig, J. 2014b. From planning to implementation: Top-down and bottom-up approaches for collaborative watershed management. *Policy Studies Journal* 42(3): 416-442.

Kraier, W. 2014. Leitbildkollision: Kulturlandschaftsschutz contra Prozessschutz in Auen. In Albrecht, J. (Ed), *Naturschutz und Wasserrahmenrichtlinie in der Praxis: Tagungsdokumentation der BfN-Fachtagung am 26.11.2013 in Bonn*, pp. 20-23. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

LAWA (Bund/Länder-Arbeitsgemeinschaft Wasser). 2018. Umsetzungsstand der Maßnahmen nach Wasserrahmenrichtlinie: Zwischenbilanz 2018.

Mirumachi, N. and Allan, J.A. 2007. Revisiting transboundary water governance: Power, conflict, cooperation and the political economy. Proceedings from CAIWA international conference on adaptive and integrated water management: Coping with scarcity. Basel, Switzerland. Vol. 1215.

Mitchell, B. 2018. *Resource and environmental management*. New York, NY: Oxford University Press.

Molle, F. 2008. Nirvana concepts, narratives and policy models: Insights from the water sector. *Water Alternatives* 1(1): 131-156, www.water-alternatives.org/index.php/volume1/v1issue1/20-a-1-1-8/file

Molle, F. 2009. Water, politics and river basin governance: Repoliticizing approaches to river basin management. *Water International* 34(1): 62-70.

Monsees, J. 2008. Governancestrukturen für Fließgewässer: Eine vergleichende Institutionenanalyse gewässerunterhaltender Verbände und Behörden. Baden-Baden: Nomos.

Mußbach, J. and Evers, M. 2013. Naturschutz und Wasserwirtschaft in einem Boot? *Standort* 37(4): 199-203.

Nilsson, M.; Zamparutti, T.; Petersen, J.E.; Nykvist, B.; Rudberg, P. and McGuinn, J. 2012. Understanding policy coherence: Analytical framework and examples of sector-environment policy interactions in the EU. *Environmental Policy and Governance* 22(6): 395-423.

Ostrom, V.; Tiebout, C.M. and Warren, R. 1961. The organization of government in metropolitan areas: A theoretical inquiry. *The American Political Science Review* 55(4): 831-842, www.jstor.org/stable/1952530

Peters, A. and Schackers, B. 2014. Tagungsfazit. In Albrecht, J. (Ed), *Naturschutz und Wasserrahmenrichtlinie in der Praxis: Tagungsdokumentation der BfN-Fachtagung am 26.11.2013 in Bonn*, pp. 48-57. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

Pressman, J.L. and Wildavsky, A. 1984. *Implementation: How great expectations in Washington are dashed in Oakland*. Berkeley: Univ. of California Press.

Reese, M.; Bedtke, N.; Gawel, E.; Klauer, B.; Köck, W. and Möckel, S. 2018. Wasserrahmenrichtlinie – Wege aus der Umsetzungskrise: Rechtliche, organisatorische und fiskalische Wege zu einer richtlinienkonformen Gewässerentwicklung am Beispiel Niedersachsens. Baden-Baden: Nomos Verlagsgesellschaft.

Rehklau, W.; Kraier, W. and Hendreschke, M. 2017. Gewässer- und Auenentwicklung in Bayern: Synergien von Natura 2000 und Wasserrahmenrichtlinie. *ANLiegen Natur* 39(2): 137-142, www.anl.bayern.de/publikationen

Richter, S.; Völker, J.; Borchardt, D. and Mohaupt, V. 2013. The Water Framework Directive as an approach for Integrated Water Resources Management: Results from the experiences in Germany on implementation, and future perspectives. *Environmental Earth Sciences* 69(2): 719-728.

Sachverständigenrat für Umweltfragen. 2020. Für eine entschlossene Umweltpolitik in Deutschland und Europa: Umweltgutachten 2020. Berlin: Sachverständigenrat für Umweltfragen.

Scharpf, F.W. 1973. *Planung als politischer Prozeß: Aufsätze zur Theorie der planenden Demokratie*. Frankfurt am Main: Suhrkamp.

Schröder, N.J.S. 2014. Die Umsetzung der Wasserrahmenrichtlinie in Berlin und Hamburg. MSc Thesis. Humboldt-Universität zu Berlin, Berlin, Germany.

Schröder, N.J.S. 2018. The lens of polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance. *Environmental Policy and Governance* 28(4): 236-251.

Schröder, N.J.S. 2019. IWRM through WFD Implementation? Drivers for integration in polycentric water governance systems. *Water* 11(5): 27, www.mdpi.com/2073-4441/11/5/1063

Schröder, N.J.S. and Chaudhary, N. 2020. Trapped between barriers OR Flowing despite barriers? THESys Discussion Papers 2020-1. Berlin: Humboldt-Universität zu Berlin.

Simon, H.A. 1959. Theories of decision-making in economics and behavioral science. *The American Economic Review* 49(3): 253-283, www.jstor.org/stable/1809901

Stratmann, L. and Albrecht, J. 2015. Can Natura 2000 sites benefit from river basin management planning under a changing climate? Lessons from Germany. In Ignar, S. and Grygoruk, M. (Eds), *Wetlands and water framework directive: Protection, management and climate change*, pp. 31-51. Cham: Springer International Publishing.

Tetsch, F. 2015. Koordinierung in der regionalen Strukturpolitik – Erfahrungen aus der Praxis. In Karl, H. (Ed), *Koordination raumwirksamer Politik: Mehr Effizienz und Wirksamkeit von Politik durch abgestimmte Arbeitsteilung*, pp. 50-66. Hannover: Akad. für Raumforschung und Landesplanung.

Theesfeld, I. and Schleyer, C. 2013. Germany's light version of integrated water resources management. *Environmental Policy and Governance* 23(2): 130-144.

Thiel, A.; Blomquist, W.A. and Garrick, D. (Eds). 2019. *Governing complexity: Analyzing and applying polycentricity*. Cambridge University Press.

van Apeldoorn, R.C. 2007. Working with biodiversity goals in European directives: A comparison of the implementation of the Birds and Habitats Directives and the Water Framework Directive in the Netherlands, Belgium, France and Germany. Working Documents Series No. 77. Wageningen: Statutory Research Tasks Unit for Nature & the Environment.

von Andrian-Werburg, F. 2014. Artenschutzrechtliche Probleme und deren Lösungsmöglichkeiten bei Gewässerrenaturierungen. In Albrecht, J. (Ed), *Naturschutz und Wasserrahmenrichtlinie in der Praxis: Tagungsdokumentation der BfN-Fachtagung am 26.11.2013 in Bonn*, pp. 24-27. Bonn-Bad Godesberg: Bundesamt für Naturschutz.

Watson, N.; Shrubsole, D. and Mitchell, B. 2019. Governance arrangements for integrated water resources management in Ontario, Canada, and Oregon, USA: Evolution and Lessons. *Water* 11(4): 663.

Wilson, N.J.; Harris, L.M.; Nelson, J. and Shah, S.H. 2019. Re-theorizing politics in water governance. *Water* 11(7): 1470, www.mdpi.com/2073-4441/11/7/1470

Young, O.R. 2002. *The institutional dimensions of environmental change: Fit, interplay, and scale*. Cambridge, Massachusetts, London, England: The MIT Press.

Young, O.R.; Chambers, W.B.; Kim, J.A. and Have, C. ten (Eds). 2010. *Institutional interplay: Biosafety and trade*. Tokyo, Japan: United Nations University.

Zwarteveen, M.; Kemerink-Seyoum, J.S.; Kooy, M.; Evers, J.; Guerrero, T.A.; Batubara, B.; Biza, A.; Boakye-Ansah, A.; Faber, S.; Cabrera Flamini, A.; Cuadrado-Quesada, G.; Fantini, E.; Gupta, J.; Hasan, S.; ter Horst, R.; Jamali, H.; Jaspers, F.; Obani, P.; Schwartz, K.; Shubber, Z.; Smit, H.; Torio, P.; Tutusaus, M. and Wesselink, A. 2017. Engaging with the politics of water governance. *Wiley Interdisciplinary Reviews: Water* 4(6): e1245.

APPENDIX A

Table A1. Interviewed WFD addressees and the cooperation necessary for their WFD implementation to progress.

Actor type	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
District governments			RP Darmstadt	BR Arnsberg NC		
State agencies	LTV	LHW			Thüringer Landgesell-schaft NC	NLWKN
Counties				Soest NC		
Free cities	Dresden NC		Wiesbaden	Hamm NC	Erfurt, Gera NC	Braunschweig NC/ F
Municipalities	—		City Taunusstein NC	—	City Blankenhain F	—
Maintenance associations		UHV Ehle-Ihle NC				Aller-Ohre-Verband UHV Oker NC SE BS NC/ F
Water and soil associations				County Coesfeld with WuB NC		—
Special-law water associations				Lippeverband		
Special purpose associations			Abwasser-verband Main-Taunus		GUV Harzvorland F/ NC	Wasserverband Mittlere Oker NC/ F
Nature conservation associations					Natura 2000-Station NC	
Landscape planning associations	LPV Osterz-gebirge NC				LPV Thüringer Grabfeld NC	

Note: Dark green = necessity for regular collaboration with nature conservation authorities; light green = necessity for sporadic collaboration with nature conservation authorities; blue = necessity for cooperation between WFD and flood protection; grey = not a case due to insufficient data (for example, interviewee is not a WFD planner in the respective organisation), but data supports the analysis of barriers and rules-in-use; no colour code = cooperation does not go beyond solving institutional interplay; F = early cooperation with flood protection; NC = early cooperation with nature conservation; – = actor type is WFD addressee but no organisation was interviewed.

Table A2. Cases' cooperation intensity in relation to independence and physical proximity.

Cooperation intensity	Degree of independence	Physical proximity	Number of cases	WFD addressee	Interviews
L	H	L	2	Free city Wiesbaden, Abwasserverband Main-Taunus	[I27], [I32]
M	M	L	6	UHV Ehle-Ihle, BR Arnsberg, City Blankenhain, GUV Harzvorland, Aller-Ohre-Verband, (Abwasserverband Main-Taunus)	[I3], [I42], [I44], [I49], [I56], [I68], [I32]
		M	2	Thüringer Landgesellschaft, LPV Thüringer Grabfeld	[I51], [I50]
		H	2	County Soest, Free city Erfurt	[I36], [I48]
	H	M	1	SE BS	[I70]
H	L	H	6	Free city Dresden, City Taunusstein, Free city Hamm, Water and soil associations with County Coesfeld, Free city Braunschweig, (Free city Erfurt)	[I16], [I17], [I33], [I39], [I43], [I63], [I66], [I48]
		M	2	Wasserverband Mittlere Oker, UHV Oker, (LPV Thüringer Grabfeld)	[I70], [I67], [I50]
	M	M	1	(Thüringer Landgesellschaft)	[I51]
		L	1	(GUV Harzvorland)	[I56]

Note: Cooperation intensity/Degree of independence: H = high independence/cooperation; M = some independence/ cooperation (such as preliminary reconcilement prior to approval procedures); L = low independence/cooperation. Physical proximity: H = high (actors are related to each other through organisational structures); M = medium (actors are related through a network to nature conservation); L = low (actors have no, or only formal, relations to nature conservation authorities). ( ) = a case with sporadic planning behaviour indicating the five cases which were sorted into two lines each with regard to their independence and cooperation intensity.

APPENDIX B

Actor acronyms and translations

Acronym/name	Full name	Translation/description
Abwasserverband Main-Taunus		Wastewater association at Main-Taunus
Aller-Ohre-Verband (Gewässerallianz)		Water maintenance association having smaller associations as members with a transfer of tasks for the Aller and Ohre Rivers; part of the Lower Saxon water alliances project
BR Arnsberg	Bezirksregierung	District Government of Arnsberg
GUV Harzvorland	Gewässerunterhaltungsverband	Water maintenance association at Harzvorland
LHW	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft	State agency for flood protection and water management
Lippeverband		Special purpose association for the Lippe River

LPV Thüringer Grabfeld/ Sächsische Schweiz-Osterzgebirge	Landschaftspflegeverband	Landscape conservation association at Thüringer Grabfeld/ Sächsische Schweiz-Osterzgebirge
LTV	Landestalsperrenverwaltung	State dam administration
Natura 2000-Station	Natura 2000-Station Auen, Moore, Feuchtgebiete	Task to protect and develop water-related habitats by initiating projects
NLWKN	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz	Lower Saxon state agency for water management, coast and nature conservation
RP Darmstadt	Regierungspräsidium	Government District of Darmstadt
SE BS	Stadtentwässerung Braunschweig	Company for wastewater treatment of the free city Braunschweig
Thüringer Landgesellschaft		Thuringia Land Society
UHV Ehle-Ihle/ Oker	Unterhaltungsverband	Water maintenance association for the Ehle and Ihle/Oker Rivers
Wasserverband Mittlere Oker		Special purpose association for constructions for the middle part of the Oker River
WuB	Wasser- und Bodenverband	Water and soil association

The following tables show the actors interviewed and the processes observed for the case study analysis for each German federal state. They are numbered for referencing in the text. The time frame for interviews is indicated.

Interviews:

Saxony-Anhalt: January 2017, March-June/August 2018

No.	Actor
I1	Landesverwaltungsamt: water
I2	Free city Magdeburg: lower water authority
I3	Unterhaltungsverband Ehle-Ihle a
I4	Unterhaltungsverband Ehle-Ihle b
I5	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology a
I6	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology b
I7	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology c
I8	Wasserstraßen- und Schifffahrtsamt Magdeburg, Burg
I9	BUND Saxony-Anhalt (Friends of the Earth Germany)
I10	Ministry for Environment, Agriculture and Energy of the state of Saxony-Anhalt: wastewater treatment, facilities for handling water-polluting substances, water provision, water protection, Water Framework Directive
I11	NABU Saxony-Anhalt (Nature and Biodiversity Conservation Union) + County Börde: lower nature conservation authority

Saxony: January/April/May 2017, December 2018, January 2019

No.	Organisation
I12	Free city Dresden: environment
I13	Landesdirektion Sachsen, Dresden a
I14	Landesdirektion Sachsen, Dresden b
I15	Wasser- und Schifffahrtsverwaltung des Bundes, WSA Dresden
I16	Free city Dresden: lower water authority
I17	Municipality Dresden: water and soil maintenance
I18	Landestalsperrenverwaltung: EU directives, nature conservation

I19	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie (technical authority): surface waters, Water Framework Directive
I20	Landschaftspflegeverband Sächsische Schweiz-Osterzgebirge e.V.: landscape development, flood protection, WFD public relations project
I21	County Meißen: lower water authority

Hesse: September, November 2018

No.	Organisation
I22	Hessisches Landesamt für Naturschutz, Umwelt und Geologie (HLNUG): water ecology
I23	Regierungspräsidium Darmstadt, Wiesbaden: surface waters
I24	Hesse Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection: surface water protection/ water ecology
I25	Hesse Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection: questions of principle, state-crossing and international cooperation, coordination of Water Framework Directive, public relations a
I26	Hesse Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection: questions of principle, state-crossing and international cooperation, coordination of Water Framework Directive, public relations b
I27	Free city Wiesbaden: protection and management of waters, water maintenance/lower water authority for non-WFD issues
I28	Rheingau-Taunus-County: lower water authority
I29	Main-Taunus-County: lower water authority
I30	Gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung GmbH (organises water neighborhoods for the exchange of experiences)
I31	NABU Hesse (Nature and Biodiversity Conservation Union)
I32	Abwasserverband Main-Taunus: water maintenance
I33	City Taunusstein: city development, technical environmental protection, nature conservation, water protection

North Rhine-Westphalia (NRW): October-December 2018, February 2019

No.	Organisation
I34	Water Network NRW (by nature conservation associations)
I35	Bezirksregierung Arnsberg: water management including facility-related environmental protection, water advisor
I36	County Soest: water maintenance
I37	Kommunalagentur NRW (municipality agency): water advisor
I38	Lippeverband: river area development, central department EU directives, nature conservation
I39	Free city Hamm: lower water authority
I40	Arbeitsgemeinschaft der Wasserwirtschaftsverbände in Nordrhein-Westfalen (AGW): umbrella organisation of special water law associations
I41	Ministry of the Environment, Agriculture, Nature and Consumer Protection of the state of North Rhine-Westphalia: river area management, water ecology, flood protection
I42	Bezirksregierung Arnsberg: funding approvals, conceptual work
I43	County Coesfeld: lower water authority
I44	Bezirksregierung Arnsberg: building authority, water maintenance

Thuringia: January – March 2019

No.	Organisation
I45	Free city Erfurt: lower water authority, surface waters
I46	Thüringer Landesamt für Umwelt, Bergbau und Naturschutz: river area management

I47	Thüringer Aufbaubank: agricultural advancement, infrastructure, environment, regional water advisor
I48	Municipality Erfurt: garden and graveyard authority, water maintenance
I49	City Blankenhain: building authority
I50	Landschaftspflegeverband "Thüringer Grabfeld" e.V.: landscape development, water maintenance
I51	Thüringer Landgesellschaft: water construction
I52	Natura2000-Station
I53	Free city Gera: lower water authority, water maintenance
I54	Flussbüro Erfurt (engineering office): representative of nature conservation associations in the Thuringian Water Advisory Council
I55	Thuringian Ministry of the Environment, Energy and Nature conservation: water protection, flood protection
I56	GUV "Harzvorland": water maintenance
I57	Thüringer Gemeinde und Städtebund: rural area, nature protection, agriculture, forestry and water law

Lower Saxony: January, June, July 2017, September 2019

No.	Organisation
I58	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Verden: river basin management
I59	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Braunschweig: river basin management and biological monitoring
I60	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Lüneburg
I61	River Basin Commission Weser
I62	Lower Saxon Ministry for Environment, Energy, Construction and Climate Protection: surface and coastal waters, marine protection
I63	Free city Braunschweig: lower water authority
I64	Kommunale Umwelt-Aktion UAN (Municipal Environmental Campaign)
I65	BUND Lower Saxony (Friends of the Earth Germany)
I66	Free city Braunschweig: lower nature conservation authority
I67	Unterhaltungsverband Oker
I68	Aller-Ohre-Verband: water alliance coordinator
I69	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Hannover: nature conservation
I70	Wasserverband Mittlere Oker + Stadtentwässerung Braunschweig: water maintenance

Participatory observation:

No.	Time	Process
Saxony-Anhalt		
O1	June 2018	Second project accompanying working group for the water development concept of the Aller River
O2	October 2018	Water Advisory Council
O3	November 2019	Water Forum North (Elbe-Havel-Weser)
Saxony		
O4	April 2017	Regional working group for the Elbe River
O5	May 2019	Water forum
Hesse		
O6	September 2018	Water Advisory Council
O7	November 2018	Water forum
NRW		
O8	September 2018	WFD symposium

O9	December 2018	Informing WFD addressees which have maintenance and construction duties of measure overviews to be compiled
Thuringia		
O10	February 2019	Discussion forum for WFD addressees to establish water maintenance associations at the entire area of Thuringia by 2020
O11	March 2019	Water workshop to determine measures for the water body Middle of Unstrut
Lower Saxony		
O12	June 2017	Area Cooperation for the Oker River

Received: 16 January 2023 | Revised: 26 August 2023 | Accepted: 17 October 2023

DOI: 10.1111/ropr.12588

RPR REVIEW OF POLICY RESEARCH

ORIGINAL ARTICLE

Assessing participatory process-system linkages in polycentric water governance: Insights from WFD implementation in Germany

Nadine Jenny Shirin Schröder[1,2] | **Nigel Watson**[3]

[1]Department for Environmentally Sound Urban and Infrastructure Planning, HafenCity University Hamburg, Hamburg, Germany

[2]IRI THESys Graduate Program (Integrative Research Institute on Transformations of Human-Environment Systems), Humboldt-Universität zu Berlin, Berlin, Germany

[3]Faculty of Science and Technology, Lancaster Environment Centre (LEC), Lancaster University, Lancaster, UK

Correspondence
Nadine Jenny Shirin Schröder, Department for Environmentally Sound Urban and Infrastructure Planning, HafenCity University Hamburg, Henning-Voscherau-Platz 1, 20457 Hamburg, Germany.
Email: nadine.schroeder@hcu-hamburg.de; nadinejennyshirin.schroeder@alumni.hu-berlin.de

Funding information
Hans Böckler Stiftung; Integrative Research Institute on Transformations of Human-Environment Systems

Abstract

An important, although insufficiently answered, environmental governance research question concerns how exactly participation improves policy implementation at different scales. Numerous studies have highlighted important variables influencing the effectiveness of participatory processes. However, studies of participation tend to be strongly process-oriented rather than system-oriented and often overlook the reality that participatory processes are part of increasingly complex and broader decision-making systems. By analyzing particular process-system linkages, this paper contributes new knowledge regarding how participatory processes can influence decision-making in polycentric governance systems. This study focuses on the implementation of the EU Water Framework Directive, which aims for good ecological and chemical status in all European waters, in six German states with varied polycentric decision-making structures. No direct decision-making power was found to be associated with any of the participatory processes themselves. Rather, the power remained embedded within the other established institutional structures. Nevertheless, the participatory processes did still intend to influence decision-making within those established structures through the aggregation

and multiplication of information. The findings show that only a few representatives or a small proportion of the total number of decision-makers are involved in participatory processes. Therefore, those processes may either affect decisions directly due to the binding nature of the decisions taken within participatory processes or alternatively have effects through more complex and nuanced multiplication routes following the conclusion of each participatory process. Moreover, all of the participatory processes examined in this study were reliant to some extent on such multiplication mechanisms to amplify the effects on decisions throughout the overall polycentric governance system.

KEYWORDS

EU water framework directive, Germany, participation, polycentricity, water governance

INTRODUCTION

A common, but so far insufficiently answered, research question concerns how participatory approaches for governance improve policy implementation. "(P)articipation can have a twofold impact on effective policy delivery. The first is that it influences the decision itself (otherwise it would not be participation). (...) The second is that participation can lead to a more complete implementation of decisions" (Fritsch & Newig, 2007, p. 4). This definition reflects a common, but narrow, understanding of participation. One criticism of the literature is that accounts of public participation are predominantly normative and virtue-laden instead of assessing the actual mechanics of participation as they are practised (Heijden & Heuvelhof, 2012). Such mechanics are, in part, related to the governance systems in which participatory processes are embedded in. While participation is expected to fit well with the philosophy of polycentricity, its actual implementation is assumed to be easier in monocentric systems because a single actor could interact with and provide feedback to the public (Huitema et al., 2009).

However, at present, little is known about the interactions among implementation structures, the governance system, and different instrument types (Steinebach, 2022) both generally and specifically with regards to participatory processes. Over time, governance systems tend to become increasingly complex because a multiplicity of diverse actors pursue an increasing number of aims (Adam et al., 2019) as a consequence of changes to environmental regulations and economic development. All of this complexity and change results in various place- and context-specific decision-making structures in terms of the actor types and decisions to be taken. Significant system-related research gaps persist concerning participation and scale dependency (Stringer et al., 2006), scale and level of collaboration (Margerum & Robinson, 2016), multi-level governance (Newig & Fritsch, 2009; Niles & Lubell, 2012), decision-making context (Speer, 2012), the nature of linkages among processes in polycentric governance systems (Pattberg et al., 2018), the role of network variables (Niles & Lubell, 2012), and the nesting of collaborative efforts at

different scales (Margerum & Robinson, 2016). Acknowledging this, this paper offers some fresh insights and knowledge by assessing the embeddedness of participation and responding to the question of: What mechanisms provide linkage and enable influence between participatory processes and wider governance systems? This paper examines this question using the example of WFD implementation in Germany where the federal states' decision-making arrangements include polycentric governance structures.

The European Union (EU) Water Framework Directive (WFD) has led to a tremendous increase in participatory processes in various decision-making settings, pursuing, in general, similar ecological outcomes—the protection of all EU waters. The WFD (Article 14) prescribes the encouragement of public participation with the expectation that this would improve the overall achievement of its key goals (Preamble 14). The CIS guidance document No. 8 (European Communities, 2003, p. iv) defines public participation generally "as allowing people to influence the outcome of plans and working processes" and as "a means of improving decision-making, to create awareness of environmental issues and to help increase acceptance and commitment towards intended plans. Public participation for the implementation of the Directive is recommended at any stage in the planning process". However, apart from public consultations for river basin management plans (RBMPs) and associated programs of measures (PoMs), the WFD leaves open the matter of how exactly participation should be encouraged. This situation has resulted in a huge diversity of participatory processes among and within the member states (e.g., Liefferink et al., 2011)—including Germany with its federal state structure.

By recognizing institutional complexity, the idea of polycentric governance has increasingly attracted attention from researchers (Jordan et al., 2018; Thiel et al., 2019; Van Zeben & Bobić, 2019). The term ""Polycentric" connotes many centers of decision-making which are formally independent of each other. Whether they actually function independently, or instead constitute an interdependent system of relations, is an empirical question in particular cases" (Ostrom et al., 1961, p. 831). Polycentricity as a lens (Blomquist & Schröder, 2019) allows an open analysis of any kind of decision-making structure without restricting the view to federal structures, market structures, or networks or the presence of multiple levels. Thus, this lens helps us shed light on Germany's high degree of diversity. While being characterized by a similar cultural and regulatory (transposition into the National Water Law) background, the federal states vary in their decision-making structures—that is, levels, types, and multiplicity of actors and decision-making power—as well as in their approaches toward public participation. This diversity allows us to compare the processes' and systems' characteristics individually as well as combinations of these characteristics regarding processes and actors.

Premising that participatory processes are embedded in polycentric governance systems, we could expect a multiplicity of varying participatory processes to develop (Angst et al., 2022). While participation is only loosely regulated, the multiplicity and independence of decision-making centers in polycentric systems allow actors to actively exercise their autonomy in designing processes according to their own visions. Nevertheless, following a narrow understanding of participation, we expected organizers of participatory processes to at least allow participants to participate in their decision-making and for those processes also to potentially lead to joint decision-making. However, the analysis of the collected data showed that this was often not the case, despite the organizers being convinced they were doing something good. Therefore, we posed the following research questions:

- How is decision-making regarding WFD implementation structured?
- How are participation and its outputs understood and what is participation designed or intended for by organizers?

- How are linking mechanisms influenced by dimensions of participation and polycentricity? Do expectations on participation need to be adjusted to its abilities?

Contrasting intended process purposes and characteristics of the decision-making systems with theoretical considerations on polycentricity allowed us to identify mechanisms linking participatory processes and governance systems. In doing so, we applied an explorative approach which looked for commonalities and differences in data. Data were collected through semi-structured interviews with a cross-level selection of actors for each governance system, combined with participatory observation of processes and document analysis.

PARTICIPATORY GOVERNANCE IN POLYCENTRIC SYSTEMS

The performance of polycentric governance systems is widely debated (Aligică & Tarko, 2012; Huitema et al., 2009; McGinnis, 1999; Morrison et al., 2023; Pahl-Wostl et al., 2012; Schlüter et al., 2010). Questions regarding performance relate to the debate whether resources are better governed by a central government or decentralized and self-organized by rather local actors (Andersson & Ostrom, 2008). Compared to monocentric governance systems, polycentric systems are expected to better adapt to problems of different scales and local needs but also to miss scale-effects and to face difficulties in achieving and sustaining agreements (Huitema et al., 2009; Ostrom & Parks, 1999).

Similarly, it is often asked whether participation is worth the effort? Are there correlations between process design or process outputs and social or environmental outcomes (Ansell & Gash, 2007; Blackstock et al., 2007, 2012; Newig et al., 2018; Özerol & Newig, 2008; Rauschmayer et al., 2009; Rowe & Frewer, 2000, 2004; Ulibarri, 2015)?: Does participation contribute to effectiveness, beyond emancipation and legitimacy (Albrecht, 2016; Newig, 2007), or to a substantive or instrumental effect beyond normative or legalistic rationales (Blackstock et al., 2007; Wesselink et al., 2011)? Or might participation be even disadvantageous when leading to a non-adoption of environmentally favorable plans (Heijden & Heuvelhof, 2012)? As such, participatory processes require a more systematic analysis of causal mechanisms (Trein et al., 2021), especially on how to leverage benefits and on understanding pathologies associated with power asymmetries (Carlisle & Gruby, 2017).

We take the view here that the phenomena of polycentricity and participation are neither necessarily good nor bad. We seek to assess how polycentricity characteristics affect the functioning of the overall governance system and how some of those characterizing variables, especially the multiplicity and independence of decision-making centers (Schröder, 2018), interact with participatory governance.

The literature conceptualizes rationales regarding the role played by participatory processes (or their organizers) in wider governance systems, including:

- emancipation, effectiveness (quality of decision/quality of implementation), and legitimacy (Albrecht, 2016; Newig, 2007),
- normative, substantive, and instrumental (Blackstock et al., 2007), complemented by legalistic rationales (Wesselink et al., 2011),
- political and substantive (Beierle, 2000),

- the rationales of improving the governance of service provision, making decision-making more democratic, overcoming structural conditions for underdevelopment, and leading to tailored solutions in public service provision (Speer, 2012),
- one-way communication (information dissemination or consultation) and two-way communication between all participants and process organizers (participation) (Rowe & Frewer, 2000; Vente et al., 2016).

However, only a few case studies have analyzed the rationales for participation and choices regarding process design. The question of 'why' is ignored in most literature (Wesselink et al., 2011).

Numerous studies, in contrast, have nevertheless highlighted important variables influencing the effectiveness of participatory processes and their environmental outcomes, including process design characteristics, the previous experiences of participants and power asymmetries (Ansell & Gash, 2007). To date, research has concentrated on the participatory process itself, meaning that participatory processes were analyzed separately from the systems' decision-making structures. This process orientation manifests itself by focusing on inclusiveness/representativeness, effects on representatives and decisions taken by a process, and how decisions are characterized regarding innovation, cost-effectiveness, environmental standards, etc. (e.g. Beierle, 2000; Holley, 2010; Newig et al., 2018; Vente et al., 2016; Wright & Fritsch, 2011).

However, it is also critical to know what happens outside and after the immediate participatory process (Bull et al., 2008), particularly since the context may determine outcomes (Vente et al., 2016). The context is set, in part, by the distribution of power (Speer, 2012; Vente et al., 2016) and the institutional set-up, the degree of political decentralization, the relation between the executive and the legislative, government resource endowments, and the size of the jurisdiction (Speer, 2012). Thus, expanding the analysis to the level of the governance system and its characteristics allows to identify mechanisms which link processes to their systems. This can help understand the challenges for participation resulting from scaling up (Stringer et al., 2006).

In general, more centralized systems may achieve enhanced adaptive capacity and good institutional fit by creating sub-units, while more decentralized systems may achieve them by coordination (Ostrom et al., 1961). In particular, decision-making centers need linkages which allow for deliberation and learning (Carlisle & Gruby, 2017). Such linkages can be provided by cooperative or participatory processes which allow decision-making centers to consider interdependencies (Morrison et al., 2023) and which may facilitate the processes of convergence and divergence (Pattberg et al., 2018). These linkages may be generated through joint memberships, which bridge participatory processes and different organizations (Pattberg et al., 2018), and joint decision-making.

Joint membership reflects dimensions of polycentricity as well as participation, particularly the importance of a multiplicity of actors (Blomquist & Schröder, 2019) and the breadth of involvement (Newig et al., 2018). Nevertheless, membership can only link processes and wider governance systems if actors are involved. Hence, it is crucial to investigate participation and non-participation jointly (Angst et al., 2022). A link to those not involved may occur due to cascading events which are described in network science as knock-on effects on neighborhood nodes after an initial change in one node leading to large-scale effects (Pattberg et al., 2018). However, the effects of processes on constituencies were rarely studied (e.g., Campbell et al., 2011).

Joint decision-making is a form of power delegation and is another dimension of participation (Newig et al., 2018). Following Lubell and Robbins (2022), joint decision-making through participation might be understood as a form of decision-related centralisation, if the decisions

are binding. If the decisions are binding, the independence of decision-making centers in the respective polycentric system is reduced through participation.

Both joint membership as well as joint decision-making are a matter of process design and often viewed and analyzed as involvement or representation and power delegation in process-oriented studies. However, joint membership and decision-making also deserve attention beyond individual processes because process-focused studies already pointed to the importance of independence in polycentric decision-making in the aftermath of participatory processes: for example, explanations for why public managers encourage collaborative governance (Scott & Thomas, 2017) include the importance of external decision-making for providing resources and taking actions. Furthermore, there are often uncertainties regarding whether environmental outcomes result from a sound management plan or an imperfectly implemented poor management plan (Rauschmayer et al., 2009).

Thus, in this paper, our goal is to contribute to assessing the functional quality of polycentric systems (Morrison et al., 2023) more systematically (Carlisle & Gruby, 2017) and especially regarding the role of cooperative and participatory processes (Lubell & Robbins, 2022; Morrison et al., 2023) by reflecting on the system-theoretical assumptions of polycentricity (Pattberg et al., 2018). The paper empirically analyzes the "why" question in addition to exploring the nature of joint membership and joint-decision-making. The findings and insights shed fresh light on how processes are embedded into wider governance systems.

CASES AND METHODS

The WFD aims to bring about good ecological and chemical status in all European Waters by 2027 at the very latest (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit [BMU], 2010). This includes a requirement to establish monitoring programs and management cycles which include the preparation of river basin management plans (RBMPs) and associated programs of measures (PoMs) which are to be implemented during each 6-year cycle.

Nevertheless, it appears highly unlikely that the Member States will achieve their ambitious aims by 2027 (European Environment Agency, 2018). Only 8.2% of the German surface waters reached the stated ecological goals by 2018 (Bund/Länder-Arbeitsgemeinschaft Wasser [LAWA], 2018). Therefore, a larger in-depth comparative study of WFD implementation in the six German federal states of Saxony, Saxony-Anhalt, Hesse, North Rhine-Westphalia, Thuringia, and Lower Saxony was conducted to investigate the influences on implementation decisions in polycentric governance systems. Among these influences are participatory processes which are the focus of the research presented here. To address the complexity of polycentric governance, the study adopts an exploratory approach and focuses on decision-making related to the achievement of WFD goals regarding hydromorphology and connectivity.

This focus was selected because, additional to measures addressing nutrient pollution from agriculture and toxic substances, measures addressing hydromorphology and connectivity (e.g., re-meandering rivers and diversifying shorelines with river wood and gravel) showed the largest gap between identified but not yet implemented measures (LAWA, 2018).

The German states are characterized by complex decision-making structures of three to four (Bogumil & Jann, 2009) general purpose administrative levels (municipalities, counties, district governments/middle authorities (state-wide responsibility below ministries)/none, and ministries) and in addition various special purpose authorities as well as public and private entities. The study covers a diversity of the structures of the territorial federal states, which were expected

to face cooperation and participation challenges differing from city-states due to the scales which need to be recognized. The selected states, three from the former East and three from the former West of Germany, represent the different general-purpose administrative level structures (macro-organizational structures). They are all further characterized by a multiplicity of independent decision-making centers implementing WFD goals regarding hydromorphology and connectivity, but they vary in the degree of multiplicity, the independence of actors, and actor-types (micro-organizational structures). This allows the identification of cross-cutting patterns among varying polycentric governance systems.

In order to assess the various roles and functions related to WFD implementation, semi-structured interviews were conducted between January 2017 and November 2019 with actors (see Table 1) from the water sector at all levels within the federal states and especially different types of local level actors actively realizing WFD measures (public and private actors, associations). This was complemented by non-state actors, who were in a position to give a detailed overview of the implementation situation in the states, and particularly included nature conservation associations due to their roles as critical observers and environmental advocates.

Interviewees were identified through the analysis of policy documents, participation in WFD-related exchange formats (e.g., organized by nature conservation associations or professional organizations across Germany), the observation of participatory processes, and a snowballing approach which involved asking contacts to recommend further contacts. The listed actor types in Table 1 are not all relevant as WFD decision-makers for all states (compare with Table 2) due to state-specific arrangements, and some types do not exist at all in some states (e.g., the aforementioned level structures or special-law water associations which only exist in North Rhine-Westphalia). In a few cases, no contact could be made with a few actors (especially small actor-types without WFD implementation capacities) or no interview agreement could be achieved: There was however a brief conversation with the staff of the Saxonian Ministry during a participatory observation. In North Rhine-Westphalia, water and soil associations were examined through an interview with the county's water authority, in Lower Saxony through interviews with other actors, which are specified in the interview list. Similarly, municipalities were captured. “Other” actor-types were relevant especially when tasks had been transferred, e.g., to counties, landscape planning associations, umbrella organizations, or any organizational solution which is not covered by the overview in Table 1. The applied explorative approach adopted for the study made it possible to identify such structures.

The 70 interviews each lasted approximately 2 hours and used open-ended questions to explore pertinent issues such as how WFD implementation happens in each state, the roles interviewees played in WFD implementation, their responsibilities, which participation/cooperation processes they utilize and/or participate in, their expectations for the processes, and how they perceive the overall processes and other actors.

To see how German WFD implementers understand participation, we looked for processes which the federal states had themselves named as “participatory” or “collaborative” with regards to complying with the WFD on official websites, in documents, and in statements by steering level authorities. As process names changed over time and interviewees sometimes recalled process names only partially, tracing some participatory processes proved difficult (see the Supplementary Material for a list of all processes found). Overall, the states rarely explicitly distinguished between coordination, collaboration, and participation processes or between participation of the wider or interested public or participation of the water sector and other sectors. Thus, the processes which we found are placed all along the steps of Arnstein's ladder of participation (Arnstein, 1969).

TABLE 1 Types of actors related to WFD implementation which were interviewed in each selected federal state (◊).

Actor type	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
Ministry		◊	◊	◊	◊	◊
Middle authority		◊			◊	
Supporting technical authority	◊		◊			
District governments	◊		◊	◊		
State agency	◊	◊			◊	◊
Counties (water authorities)	◊	◊	◊	◊	◊	◊
Counties (nature conservation authorities)		◊				◊
County-free cities	◊		◊	◊	◊	◊
Municipalities			◊		◊	
Maintenance associations		◊				◊
Water and soil associations						
Special–law water associations				◊		
Special purpose associations			◊		◊	◊
Nature conservation associations		◊	◊	◊	◊	◊
Landscape planning associations	◊				◊	
Others	◊	◊	◊	◊	◊	◊
Number of interviews	10	11	12	11	13	13

TABLE 2 Actor types which fulfill steering tasks and those which are expected to or actually do realize WFD measures on hydromorphology and connectivity in the German federal states.

Actor type	Saxony	Saxony-Anhalt	Hesse	North Rhine-Westphalia	Thuringia	Lower Saxony
Ministry						
Middle authority						
Supporting technical authority						
District governments						
State agency						
Counties (water authorities)						
Counties (nature conservation authorities)						
County-free cities						
Municipalities						
Maintenance associations						
Water and soil associations						
Special-law water associations						
Special purpose associations						
Nature conservation associations						
Landscape planning associations						

Note: Light orange: actor with steering tasks; Dark blue: the state level expects this actor type to realize WFD measures; Light blue: actor type generally not expected to realize WFD measures but single actors found taking measures.

The inclusion of processes from the long list in the subsequent analysis was determined by data availability. Re-occurring processes were often better documented and could be more easily recalled by interviewees than single events that occurred some time ago. We therefore mostly included repetitive processes in addition to single events happening throughout the data collection period. We excluded from the analysis:

- Early single-event processes lacking data.
- Despite the diversity of participatory processes, participatory processes which accompany specific WFD measures have only been mentioned by one state (Saxony-Anhalt) as a building block for complying with WFD prescriptions, resulting in little documentation and limited chances for observation.
- Official hearings for RBMPs and PoMs, despite these being considered to be participation by practitioners, due to their different nature, involving written statements analyzed by the authorities.

Regarding process observation, potential dates were identified through public announcements and by approaching interviewees. Whenever possible, the first author here sought permission to participate and, when granted, joined the meeting. Some process organizers were reluctant in disclosing dates and allowing research observation, while others were very open to the idea, even though participation was only formally possible by invitation. Thus, 12 processes were observed (between April 2017 and November 2019) out of 21 processes which were included in this analysis.

Additionally, we analyzed policy documents, such as interim reports, decrees, state-level contributions to RBMPs, programs for water protection and working papers, as well as recorded information from participatory processes (see the Supplementary Material for lists of documents providing information on each process). This data source reflects the overall diversity of the states: Some processes have their statutes, while others are only briefly described in WFD-related administrative documents. For some processes, meeting minutes were recorded and published on a dedicated website, while others made them only internally available to participants or not at all. For some, but not all, processes, intended or actual participants' lists could be found. Their level of detail varied for individual events associated with the same process. For example, names for representatives of particular organizations appeared in some but not all documentation, or only changes of representatives were documented. Due to the variation in data quality of the open data collection process, the study is partially constrained by a lack of data comparability. Nevertheless, this approach allows some general and interesting insights.

Data were coded in MAXQDA 2022 (VERBI Software, 2021) to identify cross-cutting patterns among the selected states, processes, settings, and rationales. First, statements or information on tasks and responsibilities, structures, and the actual decision-making behavior and in- and interdependencies were identified, as well as on process purposes, participants, non-participants, and organizers. Afterward, the data were coded in greater detail, e.g., intended vs. actual participants, and clustered: process purposes regarding their kind and participation in relation to the overall number of decision-makers. Details on the process of clustering are provided linked to the results in the respective results' sections.

In the remainder of the paper, we use the interview number '[Ix]' and the process observation number '[Ox]' to refer to interview statements or, respectively, particular aspects that were observed in participatory processes (see the references for a complete and numbered list of interviewed actors and observed processes).

DISENTANGLING THE SCENE: PROCESSES AND ACTORS

This part of the analysis disentangles process elements from system elements, allowing cross-case comparisons regarding the following questions: Who takes decisions in WFD implementation systems? Who organizes participatory processes and how many of systems' decision-makers are involved in the processes? How do the processes themselves and their organizers seek to influence WFD implementation?

Actual decision-making structures

Pressman and Wildavsky (1984) illustrated the length and importance of decision-making chains for the implementation success of policies as well as the discretion at each point of decision-making along these chains. In the German federal states, parallel decision-making structures determined the WFD implementation success. In this and subsequent sections, we characterize the different decision-makers regarding operational levels, WFD-related tasks, and original tasks as well as their multiplicity and independence in their decision-making.

Regarding measures on hydromorphology and connectivity, we distinguish two levels of decision-making (see Schröder et al. (2020) for further details): (A) the steering level and (B) the level of measure realization (see Table 2).

A Decisions at the steering level involve drafting new laws, compiling RBMPs and MPs, and developing lower-level policies and actions. Furthermore, at this level, decision makers develop funding schemes (partially final decision-making by other entities), produce guidelines and strategies, conduct pilot projects, designate roles, allocate funds to supporting entities, investigate or assign researchers to particular topics, and have coordination roles. Although some of the pilot projects include the realization of ecological measures, overall, the steering level only has indirect effects on environmental outcomes through supporting and regulating local actions. The 'steering level' refers here particularly to state ministries as well as middle authorities or district governments of the respective states. Thus, this level involves just a small number of organizations per state.

B Actors at the local level (similarly found by Koontz and Newig (2014)) decide whether and what WFD measures to realize, how to fund those measures, and who they should coordinate with. This huge discretion and independence in measure realization is related to the 'voluntariness principle' (*Freiwilligkeitsprinzip*) which the states decided to apply for measures regarding hydromorphology and connectivity. According to this approach, actions at this level shall be incentivized (the implementation deficit, though, proved the incentive-setting to be insufficient) because the steering level has no basis to command and enforce WFD measure realization. Steering instruments such as funding schemes address actors to realize voluntarily measures, primarily local-level actors with water maintenance tasks. Therefore, we refer to these actors here as 'WFD addressees'.

The water maintenance actors maintain waters to allow the drainage of fields, flood protection, and shipping. Addressing them instead of other existing actors or instead of establishing new actors suggested itself to the steering level: Water maintenance actors already work on water issues and through that they are an established part of the water governance systems in all of the states. However, water maintenance is organized very differently across

and within the states. Water maintenance actors vary in terms of task-combinations in their responsibilities, in their staff number, in the size of their area of control or jurisdiction or sphere of influence (their share of waters), in their funding, in their institutionalization (public, private, company, association, authority, etc.), and their organizational structure (voluntary or full-time officers, members' influence, etc.). Therefore, their capacities for realizing measures vary strongly.

Furthermore, states vary tremendously in terms of the multiplicity of water maintenance actors, which ranges from 28 (Saxony-Anhalt) to more than 500 (North Rhine-Westphalia with five district governments, 396 municipalities/county-free cities, 11 special-law water associations, and more than 100 water and soil associations). Additionally, some actors (e.g., county authorities, special purpose associations, landscape planning associations, and nature conservation associations) have been found to be developing and implementing WFD measures despite not being addressed by the steering level, demonstrating a particularly strong degree of voluntary behavior.

Further roles complement the decision-making structures related to implementation: water authorities and nature conservation authorities prevent the further deterioration of waters through approving various requested water usages with obligations; funding bodies (state banks or authorities) administer and prioritize funded measures; supporting technical authorities fulfill scientific tasks especially for the ministries. Some of the actors use their discretion to act beyond their primary areas of responsibility and thus fulfill multiple roles in the governance system. These actors can be engaged individuals or organizations which historically have developed special organizational solutions (e.g., through task transfers). They take up tasks of realizing measures, supporting funding, and coordinating or motivating WFD addressees. The expansion of roles and the use of discretion further enlarge the plurality and multiplicity of actors to be influenced in their decision-making.

The number and diversity of these actors make polycentricity an exceptionally prevalent phenomenon in Germany's WFD implementation – especially at the local level in measure realization. Measure realization needs to be understood here as independent decision-making by a multiplicity of actors because the steering level has no enforcement power. Hence, WFD addressees are not only stakeholders for steering level decisions, but all actors within and across these polycentric systems are decision-makers and stakeholders in each other's decisions: In line with Lubell and Robbins (2022), the steering level's (regional actors) interest is to achieve WFD goals, while local level actors are interested in optimizing implementation arrangements and conditions. Further, local level actors may be affected as up-stream or down-stream neighbors of other actor's measures in their living conditions (e.g., flood protection) but also in the success of their WFD measures as WFD addressees: With their separate choices of measures (or decisions not to act), they contribute incrementally to the overall environmental decision-making and related outcomes. Thus, in principle, participation in each of these multiple decisions might improve WFD implementation overall.

Involvement in participatory processes

In this section, the analyzed processes are characterized generally regarding their format, geographical scope, and content, before analyzing the organizers of participatory processes and the share of direct involvement of the systems' decision-makers.

The participatory processes found in the six federal states are very diverse. They vary in terms of organizers and participants, rules of involvement, and also in terms of their geographical

scope, topics, and stated purposes. Process frequency can vary from one or two times per year, when processes occur in the RBMP/MP cycles or can be project-related.

Often the large-scale processes, such as advisory councils, consist of consecutive meetings of a defined group of participants or a group whose composition varies over time, including arrangements with open registration for each meeting. In contrast, the process formats at lower levels tend to consist of parallel participatory processes for groups of actors from different regions, basins, or catchments with sequences of meetings for each group: for example, area cooperations in Saxony-Anhalt and regional working groups in Saxony. Thus, the process names (in plural) refer to multiple parallel processes which may vary regarding the type of organizer, involvement, and design, although being initiated on the same basis, e.g., with support by a higher-level actor.

The geographical scope of processes often follows hybrid boundary systems, neither being clearly administrative nor clearly hydrological. Hybridity results from merging multiple sub-basins (named as 'basin region' in the following tables) or catchments ('catchment region') and limiting the scope to state or district boundaries. Enlarging the scope, some organizers invited actors beyond state borders [O1, O12], but not necessarily successfully [O12, O3]. Some processes followed administrative boundaries (e.g. advisory councils for whole states), while only a few processes came very close to matching hydrological boundaries (water body level: e.g., area cooperations in Lower Saxony and workshops in Thuringia). Also, parallel processes of the, initially, same type varied ('catchment/district') in scope because different districts exercised their autonomy to varied degrees. Over time, some fora were actually divided into several events or merged into a single event.

Most of the processes address multiple topics related to water and combine WFD and flood protection issues. A few states separated sub-topics by conducting different processes, e.g., point-sources and hydromorphology from diffuse agricultural pollution (e.g., Hesse platforms/workshops), or hydromorphological changes from pollution [O1]. Some processes changed the main topic from event to event or over a few events. Some of them discussed and deliberated laws or regulations or specific plans and concepts, such as RBMPs/MPs or lower-level concepts.

Actors organizing and hosting the selected participatory processes (see Table 3) were mainly steering level actors and more seldom WFD addressees (gray shaded in the table). This shows that processes undertaken by WFD addressees, although they do exist, have not been widely considered by the states for creating the public image of public participation.

Due to their different geographical scope, participatory processes include different numbers of WFD addressees (and other decision-makers) within their scope from which they, as the literature suggests, might expect compliance with decisions taken in the process and the implementation of measures (Newig et al., 2018). Direct involvement would enable processes to affect decision-makers immediately. We estimated what proportion of WFD addressees within the scope of a process was directly involved in that process. This estimation is based on the mix of available data (see the supplementary material for a list of data sources for each process and the legend of Table 4 for details on data coding and clustering), especially participant lists and interview statements.

We found that the share was low in most of the analyzed processes (see Table 4): Eight processes had a low share, mainly because these large-scale processes rely on representatives. For a further six processes, we categorized the processes as having a low to medium share. Often a larger process scope was associated with open registration. Only seven process formats had a higher share of directly involved WFD addressees. These had either a smaller scope, lower multiplicity of actors within their scope (water fora in Saxony-Anhalt), or did not invite actors other than WFD addressees (information events).

TABLE 3 Process organizers.

Process(es) (intended scope/scale of the process)	Ministry	Middle authority	Technical authority	District governments	State agency	Counties	County-free cities	Municipalities	Maintenance associations
Saxony									
Advisory council WFD (state)	x								
Water forum (state)			x						
Regional working groups (basin region)				x					
Saxony-Anhalt									
Water advisory council (state)	x								
2 Water fora (basin region)		x							
Project accompanying working groups (catchment region)					x				
Lower Saxony									
Enlarged professional groups on surface/subsurface waters (state)	x								
Area fora (basin region)	x								
Area cooperations (catchment)					x	(x)			
Hesse									
Advisory council (state)	x								
Water forum (state)	x								
Participation platforms [2008] (catchment)	x			x					
North Rhine-Westphalia									
WFD-Symposium (state)	x								
Area fora/conferences (catchment/district)				x					
Information events on measure overviews [2018] (district)				x					

TABLE 3 (Continued)

Process(es) (intended scope/scale of the process)	Ministry	Middle authority	Technical authority	District governments	State agency	Counties	County-free cities	Municipalities	Maintenance associations
Core working groups (catchment)				x					
Round Tables (regional)				x					(x)
Thuringia									
Water advisory council (state)	x								
3 Water fora (basin region)		x							
Water workshops (catchment)		x							
Information events on establishing water maintenance associations [2019] (catchment)	x						x		

Note: **Processes and actors:** x process organizers, (x) in a few cases alternative organizer in case of multiple parallel events, gray-shaded: WFD addressees, unshaded: steering level actors, [year] for non-repetitive events.

TABLE 4 Estimated share of involved WFD addressees in relation to the overall number of WFD addressees within the scope of a process.

Process(es) (intended scope/scale of the process)	Share of involvement
Saxony	
Advisory council WFD (state)	
Water forum (state)	
Regional working groups (basin region)	
Saxony-Anhalt	
Water advisory council (state)	
2 Water fora (basin region)	
Project accompanying working groups (catchment region)	
Lower Saxony	
Enlarged professional groups on surface/subsurface waters (state)	
Area fora (basin region)	
Area cooperations (catchment)	
Hesse	
Advisory council (state)	
Water forum (state)	
Participation platforms [2008] (catchment)	
North Rhine-Westphalia	
WFD-Symposium (state)	
Area fora/conferences (catchment/district)	
Information events on measure overviews [2018] (district)	
Core working groups (catchment)	
Round Tables (regional)	
Thuringia	
Water advisory council (state)	
3 Water fora (basin region)	
Water workshops (catchment)	
Information events on establishing water maintenance associations [2019] (catchment)	
Number of process formats with the respective share of involvement	**8 6 4 3**

Share of Involvement: Green-shaded: share of involved WFD addressees related to the overall number of WFD addressees in the scope of a process (light green: varying statements due to differing perceptions and variances among events of the same process format at different places).

One green bar represents a low share; this includes formats which mainly involve representatives (e.g., from umbrella organizations) and cover larger scales such as advisory councils. *Two green bars* signal a low-to-medium share; especially formats with open invitation (everybody is free to participate upon registration, but many are not showing up or participation varies from event to event), but large scales in target areas can be found here. A medium to high share of involved WFD addressees, *three green bars*, are achieved by some representative and open formats which target smaller scales—the lower number of not directly involved actors is there a result of the lower overall number of decision-makers at smaller areas. Despite an overall higher share of directly involved actors, data draw a heterogenous picture on involvement and non-participation. *Four green bars* represent a high share of involvement; we expect here non-participation being only a result of unavoidable reasons (e.g., illness). A homogenous picture of statements such as 'it participated much more actors than planned/invited/expected' or 'all of them' have been instances for categorizing processes with four green bars.

Apart from the process format determining the rule of involvement, the actual participant lists, participatory observation, and the interviews revealed sectoral, temporal, and spatial variation in (non-)participation for various reasons (find details in the Supplementary Material). Some WFD addressees frequently participated, others only sporadically or not at all. In some of the processes, WFD addressees were represented by employees of umbrella organizations or interest associations, while in others, addressees were represented by one or several individual decision-makers or in some cases not at all.

While in a few processes more actors (of particular groups) were engaged than originally intended ('overparticipation'), the analysis showed that *only a small-to-medium proportion of the total number of WFD addressees* falling within the scope of processes *were actually directly involved* in the processes. This is similar to the findings of Angst et al., which showed that a majority of actors in the Swiss water governance system did not participate in any kind of forum (Angst et al., 2022). One implication is that if processes aim to affect wider governance systems, links or relationships beyond the process itself need to be established.

Process intentions and decisiveness

All of the observed process meetings focussed on a top–down provision of information. We found that those processes shared a *common absence of decision-making power*. Crucially, the decision-making power remained with actors—and equally important also remained outside of the process—instead of being brought into or transferred to the processes as the deciding fora or nodes. Therefore, we focus here on how process organizers understand participation, what they expect from participatory processes, or what the processes are intended to achieve. We explain how we clustered process intentions while differentiating underlying communication directions. This provides the basis for analyzing the multi-functionality of processes and the incidence of intentions.

For identifying intentions associated with processes, we analyzed process descriptions on official websites and statements by interviewees (organizers, participants and other steering level actors), analyzed process statutes/policies, and observed participatory processes (also capturing statements of participants and organizers). Not all process purposes were named consistently in the sources of information, making it necessary to group them. In a first step, purposes with similar terms were grouped in one category, e.g., 'informing', 'information giving', and 'information provision', or 'finding', 'collecting' and 'prioritizing ideas', in addition to 'conflict solving', 'exploring' and 'solving conflicts', and 'carving out goal conflicts'. In a second step, we integrated similar purposes into broader categories under the name which was used most often: for example, the category advice also contains 'recommendations', 'influence on strategic decisions', 'bringing suggestions in', 'feeding knowledge into plannings' and 'supplementing suggestions'; the category information exchange also 'discussions' and 'dialogue related statements'; and the category information giving also 'enlarging knowledge', 'explaining plannings', 'enlarging transparency', 'taking participants along', 'presenting results', 'experts introduce', 'presentation event' and 'one-way meeting'; and checking also 'demanding information' and 'controlling'; and so forth.

We considered, from the organizers' point of view, the communication directions among organizers, process participants and the system, which underlie the different purposes. Therefore, the categories overlap to a degree and are not entirely mutually exclusive in content. For example, information exchange contains information giving as well as receiving, and therefore it is multidirectional. This process characterization was kept separate from 'information giving,' which

implies only a one-way communication flow. Similarly, both, 'advice' and 'checking' imply a flow from actors to organizers (or their organization), but are each distinctive. Furthermore, multiplication implies flows beyond participants, while the categories of conflict solving, coordination, and acceptance generation leave open the matter of whether flows beyond participants are intended. Interestingly, not only the terms, but the purpose statements taken as a whole are rarely linked to particular actors. Such statements often do not differentiate, for example, between participants and non-participants or which actors are expected to multiply process outputs and to whom outputs should be passed to and multiplied through.

Table 5 summarizes the process purposes which we identified. Official purposes, as from process descriptions on websites and process statutes, and unofficial purposes, as from interview statements from organizers, may differ. Furthermore, multiple statements regarding intentions often exist in one or more documents and in interview statements, and therefore we adopted multiple categories for each process. This helps showi the intended multi-functionality of processes but also points to unconsciousness or a lack of clarity in formulating process aims or even contradictions regarding what a participatory process is intended for.

As Table 5 shows, most often processes should facilitate 'information giving', 'information exchange' and should generate 'advice', but the latter is not dominating, although no power was transferred for joint decision-making within the processes. Purposes such as 'acceptance generation', 'conflict solving', 'multiplication', 'coordination', 'idea development', and 'checking' were named much less often.

LINKING PARTICIPATORY PROCESSES TO WIDER DECISION-MAKING SYSTEMS

This section links the analyzed processes to their wider decision-making systems by further elaborating and generalizing the process intentions. We conceptualize different influencing situations by distinguishing between whether power was transferred or not and whether decision-makers are directly involved or not.

The intention analysis showed that each process has multiple intended purposes. We can generalize process intentions further by disregarding the actual 'content'. Content means here any kind of information including any knowledge about or perception of data, perceptions, attitudes, and habits which contributes to achieve coordination, acceptance, advice, and so on. Thus, we can distinguish mechanisms of influencing decision-making through influencing information flows based on the direction of the linkage which is created among decision-makers and thus between processes and systems: (A) aggregation, (B) multiplication, and (C) multiplication and aggregation combined (see Figure 1). These mechanisms may occur within processes. However, if not all of the actors are directly involved in participatory processes, but only represented, the mechanisms are also needed among non-participants outside the processes. The general interpretations of influencing effects in relation to aggregation and multiplication are as follows:

A Through aggregation, one decision is influenced by several actors. One actor seeks to receive, e.g., information of several other actors for its own decision-making, or several actors seek to influence another actor's decision-making, such as in seeking advice and idea development. Thus, the mechanism of aggregation corresponds with the literal understanding of participation, meaning that some participate in someone else's decision.

TABLE 5 Processes' intentions derived from process descriptions on websites, statutes, interviews, and observation.

Process purposes (intended scope/scale of the process)	Advice	Information exchange	Information giving	Conflict solving	Coordination of WFD activities	Multiplication	Acceptance	Idea development	Checking
Saxony									
Advisory council WFD (state)	x							x	
Water forum (state)		x ◊	◊				x		
Regional working groups (basin region)		◊	x ◊	O	x O	x ◊	◊		x O
Saxony-Anhalt									
Water advisory council (state)	x ◊	x	x ◊ O			x O		O	◊
2 Water fora (basin region)	x	x							
Project accompanying working groups (catchment region)		◊	◊ O				x		
Lower Saxony									
Enlarged professional groups on surface/subsurface waters (state)			◊						
Area fora (basin region)	x	◊	x ◊	x			x		
Area cooperations (catchment)	x ◊	x ◊	x ◊	x	◊	x	x ◊	◊	
Hesse									
Advisory council (state)	◊	◊	x O						
Water forum (state)	x	◊	x ◊ O		◊			O	

(Continues)

TABLE 5 (Continued)

Process purposes (intended scope/scale of the process)	Advice	Information exchange	Information giving	Conflict solving	Coordination of WFD activities	Multiplication	Acceptance	Idea development	Checking
Participation platforms [2008] (catchment)	x		x				x		
North Rhine-Westphalia									
WFD-Symposium (state)		◊	x						
Area fora/conferences (catchment/district)		◊	x						
Information events on measure overviews [2018] (district)			O						
Core working groups (catchment)		◊	x ◊		◊	◊			
Round Tables (regional)	x		◊					◊	
Thuringia									
Water advisory council (state)	x ◊		x ◊	x	x	◊			
3 Water fora (basin region)		◊	x ◊	x ◊	x	x ◊	◊		
Water workshops (catchment)	x ◊		x ◊			◊	x	x ◊	
Information events on establishing water maintenance associations [2019] (catchment)			x ◊						

Note: x statement on/in process-related website/document, ◊ interview statement (black: organizer, gray: participant or another steering-level actor than the organizer), O statement during/observation in the process, [year] for non-repetitive events.

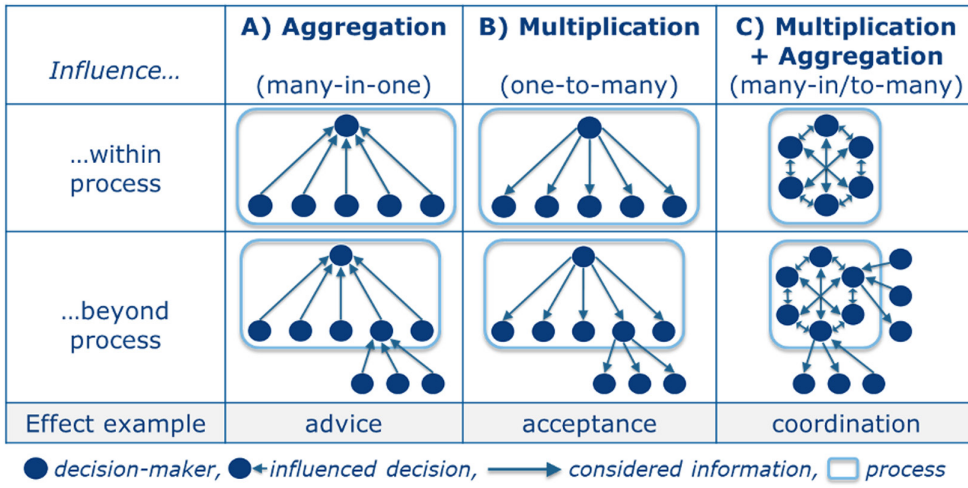


FIGURE 1 Three mechanisms of influencing decision-making through influencing information flows among organizers, participants, and non-participants within a governance system.

B In contrast, through multiplication, one actor seeks to influence decisions of several other actors, e.g., by spreading information to many others who ideally consider this information in the way intended by that one actor. For example, a ministry elaborates how important measures on hydromorphology and connectivity are for the reproduction of fishes and stakeholders accept or support the realization of such measures. The multiplication mechanism particularly dominates in our cases through the intention of 'information giving'. Further, actual intention statements sometimes named the effects to be achieved (e.g. acceptance) and sometimes the activities (e.g. information giving) which contribute to achieve effects. For some intentions, as in conflict solving and multiplication, the distinction between activity and effect remained unclear. Nevertheless, it is important to distinguish between effect (multiple decision-makers affected) and mechanism (multiplying from one to many)—especially when linking participatory processes to polycentric governance systems. Other mechanisms can also lead to a situation where multiple decision-makers are affected, such as cascading (Pattberg et al., 2018) and replication, but different actors need to be active to achieve the effect. While multiplication requires efforts by a participant (being a multiplication factor) toward non-participants, 'replication' requires one or multiple decision-maker(s) to copy, e.g., activities from another decision-maker (e.g., the participant) to their contexts. In 'cascading', decision-makers affect each other in a sequence in which the participant might be the starting point. Overall, multiplication is much more closely related to process characteristics and participants, while replication and cascading rely more on governance system characteristics (e.g., network connections) and may also occur when not intended by the participant or organizer.

C Some intentions combine both multiplication and aggregation mechanisms; exchange is required so that many decision-makers consider each other's information and provide others with information. Coordination and conflict solving would be examples from the studied processes. Below, we only refer to A and B since situation C is essentially a combination of A and B.

We also considered how power transfer and involvement determine the effect of aggregation and multiplication on decision-making.

Influence within processes means that decision-makers are directly involved (Figure 2). If binding decisions are taken within a process, the *decision-making rule* (e.g., majority voting) defines how information is aggregated into a decision, while *commitment and compulsion mechanisms* define how effects are multiplied. Through collectively binding outputs, follow-up decisions along the chain from the output of the process to the (environmental) outcome become less independent, and the system less polycentric. This effect depends on the effectiveness of commitment or compulsion mechanisms (e.g., enforcement mechanisms). In contrast, if processes take no decisions or non-binding decisions (decision-makers stay as independent as without the participatory process), the process becomes one out of many factors influencing their decision-making. In such cases, it does not matter whether decisions are taken by organizers or participants.

Influence beyond a process refers to situations in which decision-makers are not directly involved (Figure 3). Decision-makers can be represented or not considered at all. This adds *additional decision-making points* (consecutive and requiring clearance or processing to be passed) to the linkages between processes and governance systems. For aggregation, this is a representative's aggregation rule (e.g., how an interest association collects and relays its members' interests). For multiplication, the representative as well as the ultimate decision-maker decides how to consider processes' information for their decision-making. Binding decisions, though, may allow compulsion or sanctioning in cases of non-compliance.

Overall, due to the independence of decision-makers, we expect aggregation as well as multiplication to become increasingly difficult and challenging the more decision-makers are involved in a system—in other words, the more polycentric a system is. From our findings, we expect these

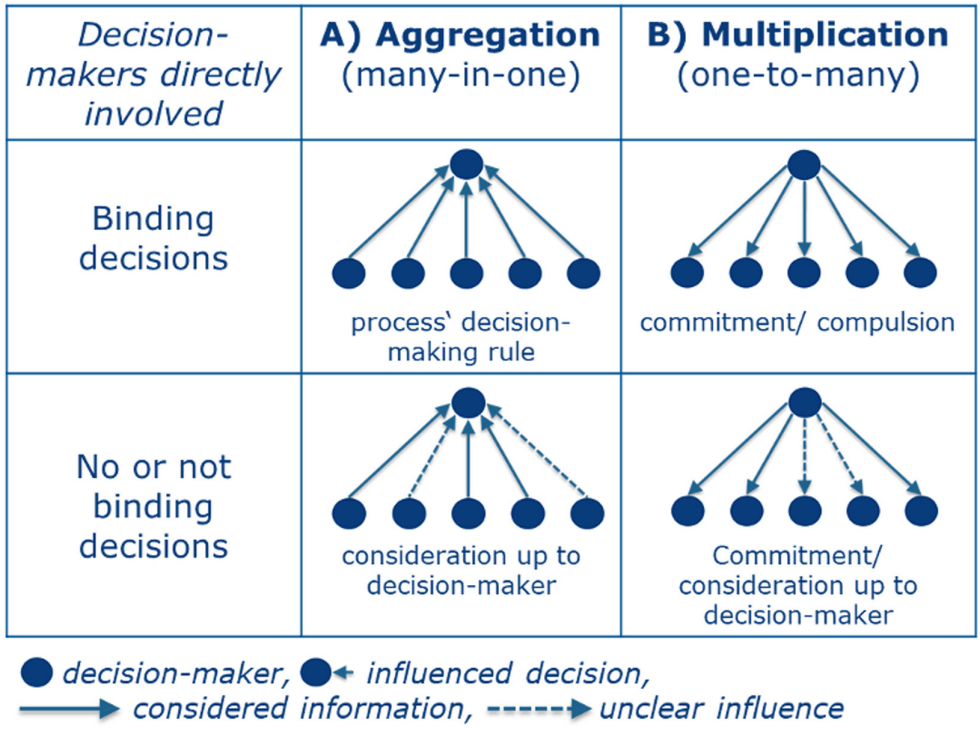


FIGURE 2 Aggregation and multiplication mechanisms within processes (decision-makers are directly involved).

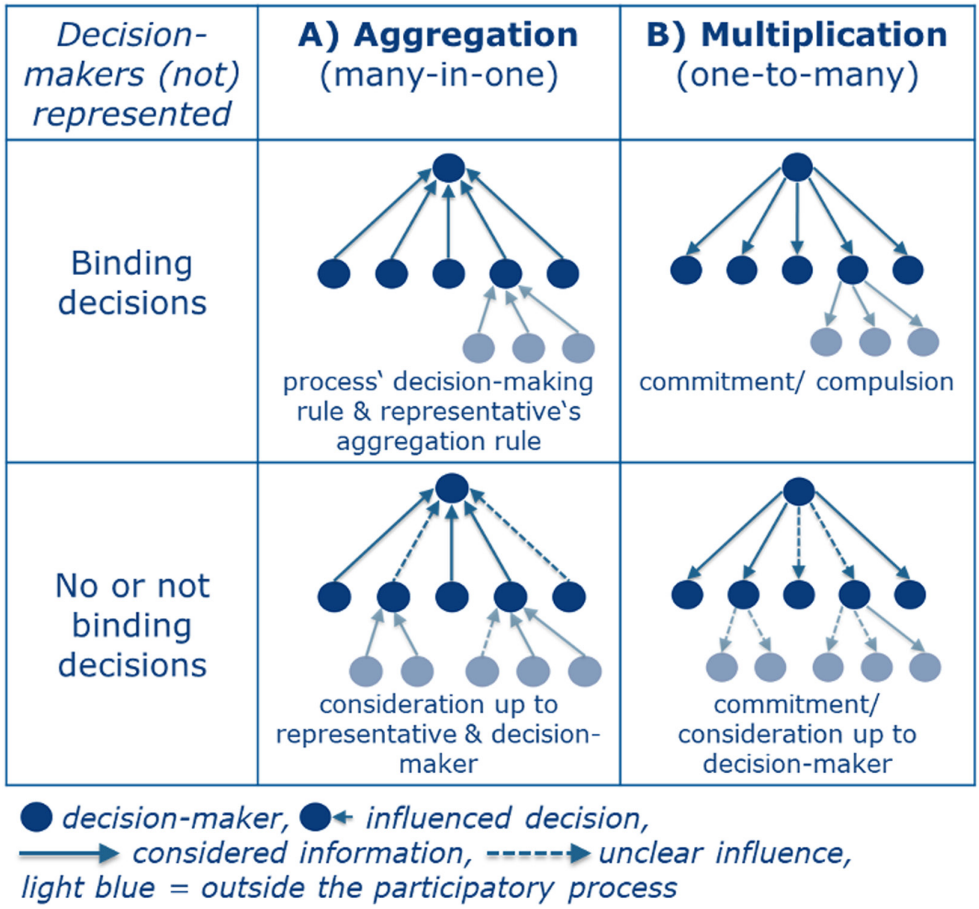


FIGURE 3 Aggregation and multiplication mechanisms beyond processes (decision-makers are (not) represented).

mechanisms also to show more imperfections (dotted lines in Figure 2 and Figure 3) in contrast to ideal conditions, as depicted in Figure 1: Some information is not aggregated into a decision, and not all information is multiplied to all decision-makers.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Considering the observed embeddedness of participatory processes in polycentric governance systems, these findings imply that our current understanding of decision-making and what we may or may not expect from participation need to change.

Researching participation in polycentric governance systems

How do the findings relate to existing research on participation? Newig et al. (2018) provided an overview of researched mechanisms linking participation to its outcomes, and thus to the wider governance system. They summarize three types of effects: the environmental standard

of the output, acceptance of the output by stakeholders, and the implementation of and compliance with the output. Every effect is positively or negatively related to various process design characteristics.

We may relate the mechanism of aggregation conceptually to the standard of the output. The related design characteristics, e.g., the involvement of knowledge holders and the openness of the dialogue, influence how aggregation is supported. Aggregation through participation and related imperfections resulting from real-life conditions are relatively well-researched: For example, difficulties and hybridity of representation may result in imperfect aggregation (Blackstock et al., 2014), which is expected to lead to less integrated decisions or a lower environmental standard of the output (Newig et al., 2018). In contrast, acceptance, implementation, compliance, and the respective influencing design characteristics may be related to the mechanism of multiplication. This process–system link needs more attention.

Newig et al. (2018) compiled variables conditioning the acceptance of the output which are 'stakeholder involvement', 'procedural fairness', and 'awareness raising and involvement in DMP'. Acceptance is related to the implementation of and compliance with the output, which in turn is also affected by 'involvement of (potential) addressees', 'collaborative DMP', and the incorporation of 'environmental and implementation-relevant knowledge' and the achievement of 'mutual gains' through 'communication and bargaining'. We subsume the influence of these conditioning variables in the following as 'supporting mechanisms'.

Noticeable is that these mechanisms are obviously capable of directly affecting directly involved decision-makers. However, it remains unclear how the variables affect non-participants: for example, what needs to be done in order for non-participants to perceive procedural fairness, that conflicts are solved, or, that they learn and network similarly to participants for acceptance and better implementation?

A matrix can help shed light on the research gap that exists regarding process–system linkages which this paper has addressed. Considering the aforementioned two dimensions (involvement and process decisiveness) as dichotomous variables characterizing participatory processes, we may distinguish among four distinct types of situations (matrix see Table 6): a process may take binding decisions and involves decision-makers directly (situation A), a process is not taking binding decisions and does not involve decision-makers directly (situation D), or a process is either characterized by direct involvement or binding decision-making (B, C). If decision-makers are directly part of the process, a participatory process may influence decision-makers through the supporting mechanisms. This is the case in the situations (A) and (C). In cases where binding decisions are taken within participatory processes, an effect of the process arises due to commitment and compulsion mechanisms. Those affected in their decision-making include actors who are directly involved and decision-makers of the wider governance system. This is the case in the

TABLE 6 Typology of mechanisms influencing wider governance systems based on process decisiveness and involvement.

		Involvement of decision-makers	
Decision-makers affected by ...		**Decisions-makers directly involved**	**Decision-makers (not) represented**
Process decisiveness	Binding decisions	(A) ... supporting mechanisms and commitment/compulsion	(B) ... commitment/compulsion
	No or not binding decisions	(C) ... supporting mechanisms	(D) ... multiplication

situations (A) and (B). Influence on decision-making implies a linkage between a participatory process and the governance system. While in situation (A) two sets of mechanisms, and in the situations (B) and (C) one set of mechanism each may link a process and the system, the mechanisms identified in the literature do not fully account for the links of influence for the situation (D). Processes and systems can be linked here through multiplication mechanisms beyond a process. Situation (D) and the associated multiplication effects have until now remained underexplored in the participation literature.

The linkages identified above which arise through supporting mechanisms, commitment and compulsion, or multiplication are formed under ideal conditions. In practice, process design determines the effects of supporting mechanisms. Furthermore, commitment and compulsion mechanisms also rely on the existence and effectiveness of control and sanctioning instruments. Little is known about the ideal and actual conditions to achieve indirect effects on non-participants through the multiplication activities of participants.

An ideal process design allows aggregation and multiplication within processes. Further, under ideal conditions, representatives or other gate-keepers fulfill functions of multiplication and aggregation between representatives and constituencies. Under ideal conditions, the main concern is that all stakeholders are represented. However, it is known that interest organizations do not exist for all kind of actors, and not all representatives are able to fulfill both functions equally or even be aware that they should fulfill these functions. Therefore, process-system linkages need intensified attention.

The aggregation mechanism may be effective (high standard of the decision), while the multiplication mechanism is ineffective within a process (Newig et al., 2018, p. 285). That needs to be considered also beyond processes. While imperfect aggregation links processes to polycentric governance systems at least weakly, an imperfect multiplication mechanism may cause that even no weak link is created between a participatory process and the wider governance system.

Finally, to provide further clarity, the developed typology (Table 6) is decision-centered rather than process-centered, meaning that not whole participatory processes may be categorized in situations A–D, but the decision-making for a specific issue by a particular actor-type. The same process may take binding decisions on some issues, while other decisions, which shall be nevertheless influenced by the process, are taken outside of the process. Furthermore, some kind of decision-makers might be directly involved, while others are only represented or not involved at all.

Practicing participation in polycentric systems

Many German WFD practitioners considered public participation to be generally useful for WFD implementation. However, many of the same practitioners also had very mixed views about participation being successfully implemented in their states (Schröder, 2022). This might (partially) result from a mismatch between what is expected and what participatory processes can accomplish in polycentric governance systems: What is expected stayed fuzzy despite our intention analysis considering that the addressees of the processes' intentions were rarely made explicit. However, our findings combined with the polycentricity lens can shed light on the limits and what participatory processes may accomplish in polycentric governance systems.

In polycentric systems, we are not only faced with multiple actors with multiple preferences leading to multiple goals (Rauschmayer et al., 2009) but also with multiple decision-making capacities. Decision-making happens everywhere, albeit varying in kind and scope as well as

importance for the overall governance system. Mirroring the spreading of decision-making power, most participatory processes here need to be categorized as type (D) regarding WFD measures improving the hydromorphology and connectivity of rivers. Narrow definitions of participation, as of Fritsch and Newig (2007) (see the introduction), however, assume Type A processes. This implies a very monocentric point of view, whereas the polycentricity lens revealed that this assumption is too simple to reproduce the complexity of decision-making.

According to narrow definitions, we might consider the large-scale processes which we analyzed here to be pseudo-participation (despite the perceived positive intent of organizers) because they do not center around one decision. Alternatively, we might reinterpret the definition that at least one of multiple decisions needs to be influenced in polycentric systems to call it participation: Who is participating in whose decision(s)?

In situation (A) participatory processes showed to have the greatest chances to affect the wider system's decision-making because commitment/ compulsion as well as supporting mechanisms apply. Considering that representatives may be no decision-makers themselves but employees of interest associations, as here often the case, we need to acknowledge that the influence solely relies on multiplication external to the process. Hence, our proposed typology suggests that type D processes should be changed into type A processes in order for a system's decision-making to be best affected by participation. However, doing so is limited by the polycentric nature of governance systems.

The multiplicity in decision-making, on the one hand, hampers *involving* (all) *implementers*/ managers as suggested by Vente et al. to improve implementation (2016). For larger-scale processes, the likelihood raises that the number of actors exceeds the number of participants, allowing effective communication. This makes selecting representatives necessary and complex (e.g., avoiding the usual suspects [Erkelens, 2013]). Thus, the transformation of B/D-processes to A/C-processes can only be achieved if the scope of a process would be limited, which allows to involve all decision-makers directly. Measure accompanying processes at the local level, which we could not include in our analysis, can be categorized in (A) or (C).[1] In contrast, downscaling processes related to large-scale decisions, e.g., revising a state water law, would require to conduct multiple participatory processes in parallel what then hampers the aggregation back into that one law.

On the other hand, polycentricity limits, especially due to the multiplicity and independence of actors in decision-making, the *delegation of power* to participatory processes as well as the *commitment to their decisions*. There is a reluctance to give up power (Thompson et al., 2005) and a misfit between public participation and routines of policymaking and planning (Wesselink et al., 2011). Nonetheless, we need to acknowledge that actors who only hold a share of the overall decision-making power cannot transfer the whole power to one process or may face tied hands when trying to commit to processes' decisions. Barriers to participation are imposed by, e.g., laws and regulations, internal contradictions, and the need for coordination and integration of policy areas (Wesselink et al., 2011). Also, if these barriers will be lowered, the problem of transferring power will persist as long as decision-making power is shared. Furthermore, transferring power to participatory processes without fully restricting actors' independence (retaining polycentricity), would indeed increase the number of clearance points (Newig et al., 2012) or veto players because participation adds up to existing decision-making.

Avoiding down-scaling of processes' scope and power transfer, the processes seemed to be rather used as instruments. This aligns with Neef's observation that participation has been depoliticized and increasingly approached as a technical or management solution (Neef, 2009) with the intention not only to aggregate information for their own decision-making but to influence the decision-making of other actors. Abbott calls this orchestration (Abbott, 2018). Because of

conflicting with the normative rationale, this instrumental or legalistic rationale of practitioners toward participation had been found neglected in scholarship (Wesselink et al., 2011).

The reality that no one actor has ultimate authority limits the effectiveness of traditional policy instruments and makes the mobilization of actors by the state necessary for successful implementation (Borowski-Maaser et al., 2010) but also difficult in any desired direction (Setzer & Nachmany, 2018). Therefore, "governors of all types typically orchestrate when they lack certain capabilities needed for stronger forms of governance" like "direct or mandatory action" (Abbott, 2018). They may lack resources and competences, power (Borowski-Maaser et al., 2010), or strong hierarchical authority (Abbott, 2018), of which the latter is generally not a characteristic of polycentric systems. Orchestration relies on effective multiplication to non-participants. It is thinkable that multiplication at least can be supported by the process design. However, unless knowing more about establishing effective multiplication, using participation as an instrument to influence wider governance systems seems to be at least debateable.

Nevertheless, any exchange process may lead to influences on decision-making in multiple directions, but this multi-directionality limits the *clarity of how a process influences decisions*. A lack of clarity hampers trust development (Petts, 2008) and affects the decision to participate (Fritsch & Newig, 2007). Hence, the complexity may lead to processes having a worth because of influencing decisions positively without a power transfer to the process. This worth, though, cannot be made clear and perceived by all actors. Moreover, participatory processes may be unsuccessful regarding their official purposes, but still have positive, although very random effects on other decisions. Focusing on own decisions and making use of processes' aggregation function instead of expecting effects from processes' multiplication function would allow organizers to increase clarity of how a process, or its participants, influence decisions. This clarity might improve the satisfaction with participatory processes.

CONCLUSIONS

By analyzing the implementation of the EU Water Framework Directive (WFD), this paper provides some fresh insights regarding the role of participatory processes in polycentric governance systems.

The decision-making power regarding measure implementation showed, even within the chosen sub-set of WFD implementers, to be widely spread across multiple actors. These multiple actors themselves had no ultimate planning power in their area of responsibility. The study revealed multiple small-scale, rather local-level, decisions regarding implementing measures, which contrasted with a few large-scale participatory processes organized by higher level authorities.

Although the processes reflected different strategies for coping with the multiplicity of decision-makers, such as plural parallel processes, representation or rather large events reduced to information giving, in most cases a large share of WFD implementers were not directly involved. The analyzed processes varied in both scope and the types of issues addressed, as well as process purposes. However, in none of the processes, decision-making power was transferred from actors to the process.

Nevertheless, the organizers of participatory processes intended to positively influence the wider governance system through influencing participating decision-makers, but also the represented constituencies. The intention analysis showed that the participatory processes and governance systems are linked through mechanisms with two directions: Through the mechanism of aggregation, the

information of many actors and decision-makers is aggregated into one decision, e.g., when advice is intended. Through the mechanisms of multiplication, many decision-makers shall be influenced by one or few other decision-makers, e.g., through the provision of information.

The nature of these links makes involvement and process decisiveness (power transfer) important variables for the effectiveness of these mechanisms. Based on this distinction, participatory processes may either affect the overall governance system through the binding character of decisions (commitment and compulsion), or, without power transfer, they solely rely on process design variables to affect directly involved decision-makers and on multiplication to affect the wider governance system.

The multiplicity and independence of the decision-makers in polycentric systems hamper the achievement of ideal aggregation and multiplication through participatory processes. The larger the scope of a process, the more polycentric a system can be within that scope, and the more difficulties can be caused by the multiplicity of actors. These difficulties are, for example, transferring power to processes, and, involving all actors within the scope of a process. The resulting imperfections in aggregation and multiplication may let effects of participatory processes on the wider governance system appear rather random.

Looking to the future, even if process effects become rather random in polycentric governance systems, the added value of participation should also be analyzed in the light of alternatives to its basic functions, aggregation and multiplication, for communication among multiple actors: Participation offers alternatives to multiple single processes and efforts with many actors individually. Thus, participation might tie communication. We should further ask how participatory processes change the system's communication patterns in the long run in polycentric systems. Processes might have fewer effects on ultimate decisions implemented in the environment. However, they certainly affect planning through selecting plans or ideas out when recognizing insurmountable obstacles for implementation. Hence, we may ask whether and under what conditions participation affects policy implementation (accelerates implementation processes or hampers pathways) through identifying the difficult or non-options and those ideas which get a chance (anticipated chance for success), especially if processes cannot be proofed to improve particular decisions.

ACKNOWLEDGMENTS

This research was enabled by a PhD scholarship from the Hans-Böckler Foundation awarded to the first author (2016-2020). The field work expenses of the first author were supported by the IRI THESYS GRADUATE PROGRAM (Integrative Research Institute on Transformations of Human-Environment Systems at Humboldt-Universität zu Berlin). We would like to thank all interviewees for their openness and for spending numerous hours of their limited time answering questions. We would also like to thank Barbara Schröter and the two anonymous reviewers for their valuable comments.

ORCID

Nadine Jenny Shirin Schröder https://orcid.org/0000-0003-1636-9497

ENDNOTE

[1] The first author participated in her non-academic professional life in two measure accompanying participatory processes (not completed yet) in Lower Saxony, which can be classified as (C) situations because no power was transferred to the processes.

REFERENCES

Abbott, K. W. (2018). Orchestration: Strategic ordering in polycentric governance. In A. Jordan, D. Huitema, H. van Asselt, & J. Forster (Eds.), *Governing climate change: Polycentricity in action?* (pp. 188–209). Cambridge University Press.

Adam, C., Hurka, S., Knill, C., & Steinebach, Y. (2019). *Policy accumulation and the democratic responsiveness trap* (first paperback edition). Cambridge studies in comparative public policy. Cambridge University Press.

Albrecht, J. (2016). Legal framework and criteria for effectively coordinating public participation under the Floods Directive and Water Framework Directive: European requirements and German transposition. *Environmental Science & Policy*, *55*(2), 368–375. https://doi.org/10.1016/j.envsci.2015.07.019

Aligică, P. D., & Tarko, V. (2012). Polycentricity: From Polanyi to Ostrom, and beyond. *Governance*, *25*(2), 237–262. https://doi.org/10.1111/j.1468-0491.2011.01550.x

Andersson, K. P., & Ostrom, E. (2008). Analyzing decentralized resource regimes from a polycentric perspective. *Policy Sciences*, *41*(1), 71–93. https://doi.org/10.1007/s11077-007-9055-6

Angst, M., Mewhirter, J., McLaughlin, D., & Fischer, M. (2022). Who joins a forum—And who does not?—Evaluating drivers of forum participation in polycentric governance systems. *Public Administration Review*, *82*(4), 692–707. https://doi.org/10.1111/puar.13427

Ansell, C., & Gash, A. (2007). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, *18*(4), 543–571. https://doi.org/10.1093/jopart/mum032

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, *35*(4), 216–224. https://doi.org/10.1080/01944366908977225

Beierle, T. C. (2000). *The quality of stakeholder-based decisions: Lessons from the case study record* (discussion paper No. 00-56). https://media.rff.org/documents/RFF-DP-00-56.pdf

Blackstock, K. L., Kelly, G. J., & Horsey, B. L. (2007). Developing and applying a framework to evaluate participatory research for sustainability. *Ecological Economics*, *60*(4), 726–742. https://doi.org/10.1016/j.ecolecon.2006.05.014

Blackstock, K. L., Waylen, K. A., Dunglinson, J., & Marshall, K. M. (2012). Linking process to outcomes—Internal and external criteria for a stakeholder involvement in River Basin Management Planning. *Ecological Economics*, *77*(5), 113–122. https://doi.org/10.1016/j.ecolecon.2012.02.015

Blackstock, K. L., Waylen, K. A., Marshall, K. M., & Dunglinson, J. (2014). Hybridity of representation: Insights from River Basin management planning in Scotland. *Environment and Planning C: Government and Policy*, *32*(3), 549–566. https://doi.org/10.1068/c11261

Blomquist, W. A., & Schröder, N. J. S. (2019). Seeing Polycentrically: Examining governance situations using a polycentricity lens. In A. Thiel, W. A. Blomquist, & D. Garrick (Eds.), *Cambridge studies in economics, choice, and society. Governing complexity: Analyzing and applying polycentricity* (pp. 45–64). Cambridge University Press https://www.cambridge.org/core/books/governing-complexity/25F8891FABEB6B35A2D2008D71967823#

Bogumil, J., & Jann, W. (2009). *Verwaltung und Verwaltungswissenschaft in Deutschland: Einführung in die Verwaltungswissenschaft; [Lehrbuch] (2., völlig überarb. Aufl.). Grundwissen Politik: Vol. 36*. VS Verl. für Sozialwiss. https://doi.org/10.1007/978-3-531-91341-4

Borowski-Maaser, I., Mostert, E., & Junier, S. J. (2010). Innovative instruments and institutions in implementing the water framework directive: Lessons learnt for the second implementation cycle of the WFD. Case study cross comparison & the QuickScan training package. Research Report No. 3 & 4 Delft University of Technology website: https://pure.tudelft.nl/ws/portalfiles/portal/66952692/i_Five_Report4_4_CrossCaseComparison_QuickScan_October2010.pdf

Bull, R., Petts, J., & Evans, J. (2008). Social learning from public engagement: Dreaming the impossible? *Journal of Environmental Planning and Management*, *51*(5), 701–716. https://doi.org/10.1080/09640560802208140

Bund/Länder-Arbeitsgemeinschaft Wasser (LAWA). (2018). Umsetzungsstand der Maßnahmen Nach Wasserrahmenrichtlinie: Zwischenbilanz 2018.

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU). (2010). *Die Wasserrahmenrichtlinie*. Auf dem Weg zu guten Gewässern https://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/4012.pdf

Campbell, J. T., Koontz, T. M., & Bonnell, J. E. (2011). Does collaboration promote grass-roots behavior change? Farmer adoption of best management practices in two watersheds. *Society & Natural Resources*, *24*(11), 1127–1141. https://doi.org/10.1080/08941920.2010.512358

Carlisle, K., & Gruby, R. L. (2017). Polycentric systems of governance: A theoretical model for the commons. *Policy Studies Journal*, *47*(4), 927–952. https://doi.org/10.1111/psj.12212

Diduck, A., & Sinclair, A. J. (2002). Public involvement in environmental assessment: The case of the nonparticipant. *Environmental Management*, *29*(4), 578–588. https://doi.org/10.1007/s00267-001-0028-9

Erkelens, M. v. (2013). *Representational roles and constituency communication: An analysis of the stakeholder-representatives who took part in the participatory visioning project MijnBorne2030* (Master thesis public administration). University of Twente https://essay.utwente.nl/63902/

European Communities (2003). *Public participation in relation to the water framework directive* (common implementation strategy for the water framework directive (2000/60/EC), guidance document No. 8). Office for Official Publications of the European Communities.

European Environment Agency (2018). *European waters—Assessment of status and pressures 2018* (EEA Report No. 7). European Environment Agency.

Fritsch, O., & Newig, J. (2007). *Under which conditions does public participation really advance sustainability goals? Findings of a meta-analysis of stakeholder involvement in environmental decision-making*. Paper prepared for the conference 'Earth System Governance: Theories and Strategies for Sustainability' 2007 Amsterdam Conference on the Human Dimensions of Global Environmental Change. https://www.academia.edu/672949

Heijden, J., & Heuvelhof, E. (2012). The mechanics of virtue: Lessons on public participation from implementing the water framework directive in The Netherlands. *Environmental Policy and Governance*, *22*(3), 177–188. https://doi.org/10.1002/eet.1583

Holley, C. (2010). Public participation, environmental law and new governance: Lessons for designing inclusive and representative participatory processes. *Environmental and Planning Law Journal*, *27*(5), 360–391.

Huitema, D., Mostert, E., Egas, W., Moellenkamp, S., Pahl-Wostl, C., & Yalcin, R. (2009). Adaptive water governance: Assessing the institutional prescriptions of adaptive (co-)management from a governance perspective and defining a research agenda. *Ecology and Society*, *14*(1). https://doi.org/10.5751/ES-02827-140126

Jordan, A., Huitema, D., van Asselt, H., & Forster, J. (Eds.). (2018). *Governing climate change: Polycentricity in action?* Cambridge University Press. https://doi.org/10.1017/9781108284646

Koontz, T. M., & Newig, J. (2014). Cross-level information and influence in mandated participatory planning: Alternative pathways to sustainable water management in Germany's implementation of the EU Water Framework Directive. *Land Use Policy*, *38*, 594–604. https://doi.org/10.1016/j.landusepol.2014.01.005

Liefferink, D., Wiering, M., & Uitenboogaart, Y. (2011). The EU Water Framework Directive: A multi-dimensional analysis of implementation and domestic impact. *Land Use Policy*, *28*(4), 712–722. https://doi.org/10.1016/j.landusepol.2010.12.006

Lubell, M., & Robbins, M. (2022). Adapting to sea-level rise: Centralization or decentralization in polycentric governance systems? *Policy Studies Journal*, *50*(1), 143–175. https://doi.org/10.1111/psj.12430

Margerum, R., & Robinson, C. (2016). *The challenges of collaboration in environmental governance*. Edward Elgar Publishing.

McGinnis, M. D. (Ed.). (1999). Polycentricity and local public economies: Readings from the workshop in political theory and policy analysis. In *Institutional analysis* (4th ed.). University of Michigan Press.

Morrison, T. H., Bodin, Ö., Cumming, G. S., Lubell, M., Seppelt, R., Seppelt, T., & Weible, C. M. (2023). Building blocks of polycentric governance. *Policy Studies Journal*, *275*(6), 109769. https://doi.org/10.1111/psj.12492

Neef, A. (2009). Transforming rural water governance: Towards deliberative and polycentric models? *Water Alternatives*, *2*(1), 53–60. https://www.water-alternatives.org/index.php/allabs/43-a2-1-4/file

Newig, J. (2007). Does public participation in environmental decisions lead to improved environmental quality? Towards an analytical framework. *Communication, Cooperation, Participation (International Journal of Sustainability Communication)*, *1*(1), 51–71.

Newig, J., Challies, E., Jager, N. W., Kochskaemper, E., & Adzersen, A. (2018). The environmental performance of participatory and collaborative governance: A framework of causal mechanisms. *Policy Studies Journal*, *46*(2), 269–297. https://doi.org/10.1111/psj.12209

Newig, J., & Fritsch, O. (2009). Environmental governance: Participatory, multi-level - and effective? *Environmental Policy and Governance*, *19*(3), 197–214. https://doi.org/10.1002/eet.509

Newig, J., Jager, N., & Challies, E. (2012). Führt Bürgerbeteiligung in umweltpolitischen Entscheidungsprozessen zu mehr Effektivität und Legitimität? Erste Ergebnisse einer Metaanalyse von 71 wasserpolitischen Fallstudien. *Zeitschrift für Politikwissenschaft*, *22*(4), 527–564. https://doi.org/10.5771/1430-6387-2012-4-527

Newig, J., Schulz, D., & Jager, N. W. (2016). Disentangling puzzles of spatial scales and participation in environmental governance-the case of governance Re-scaling through the European Water Framework Directive. *Environmental Management*, *58*(6), 998–1014. https://doi.org/10.1007/s00267-016-0753-8

Niles, M. T., & Lubell, M. (2012). Integrative Frontiers in environmental policy theory and research. *Policy Studies Journal*, *40*(3), 41–64. https://doi.org/10.1111/j.1541-0072.2012.00445.x

Ostrom, E., & Parks, R. B. (1999). Neither Gargantua nor the Land of Lilliputs: Conjectures on mixed systems of metropolitan organization. In M. D. McGinnis (Ed.), *Institutional analysis. Polycentricity and local public economies: Readings from the workshop in political theory and policy analysis* (4th ed., pp. 284–305). Univ. of Michigan Press.

Ostrom, V., Tiebout, C. M., & Warren, R. (1961). The organization of government in metropolitan areas: A theoretical inquiry. *The American Political Science Review*, *55*(4), 831–842. https://doi.org/10.2307/1952530

Özerol, G., & Newig, J. (2008). Evaluating the success of public participation in water resources management: Five key constituents. *Water Policy*, *10*(6), 639–655. https://doi.org/10.2166/wp.2008.001

Pahl-Wostl, C., Lebel, L., Knieper, C., & Nikitina, E. (2012). From applying panaceas to mastering complexity: Toward adaptive water governance in river basins. *Environmental Science & Policy*, *23*, 24–34. https://doi.org/10.1016/j.envsci.2012.07.014

Pattberg, P., Chan, S., Sanderink, L., & Widerberg, O. (2018). Linkages: Understanding their role in polycentric governance. In A. Jordan, D. Huitema, H. van Asselt, & J. Forster (Eds.), *Governing climate change: Polycentricity in action?* (pp. 169–187). Cambridge University Press https://www.cambridge.org/core/books/governing-climate-change/033486F6DA7F2CD1F8F3D6011B17909B

Petts, J. (2008). Public engagement to build trust: False hopes? *Journal of Risk Research*, *11*(6), 821–835. https://doi.org/10.1080/13669870701715592

Pressman, J. L., & Wildavsky, A. (1984). *Implementation: How great expectations in Washington are dashed in Oakland* (3rd ed., Oakland Project Series). University of California Press.

Rauschmayer, F., Berghöfer, A., Omann, I., & Zikos, D. (2009). Examining processes or/and outcomes? Evaluation concepts in European governance of natural resources. *Environmental Policy and Governance*, *19*(3), 159–173. https://doi.org/10.1002/eet.506

Rowe, G., & Frewer, L. J. (2000). Public participation methods: A framework for evaluation. *Science, Technology, & Human Values*, *25*(1), 3–29. https://doi.org/10.1177/016224390002500101

Rowe, G., & Frewer, L. J. (2004). Evaluating public-participation exercises: A research agenda. *Science, Technology, & Human Values*, *29*(4), 512–556. https://doi.org/10.1177/0162243903259197

Schlüter, M., Hirsch, D., & Pahl-Wostl, C. (2010). Coping with change: Responses of the Uzbek water management regime to socio-economic transition and global change. *Environmental Science & Policy*, *13*(7), 620–636. https://doi.org/10.1016/j.envsci.2010.09.001

Schröder, N. J. S. (2018). The lens of polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance. *Environmental Policy and Governance*, *28*(4), 236–251. https://doi.org/10.1002/eet.1812

Schröder, N. J. S. (2022). Umsetzungsprozess der EU-Wasserrahmenrichtlinie in Deutschland: Teil 3 - WRRL-Zielerreichung zwischen fachlichem Anspruch und Beteiligung. *Korrespondenz Wasserwirtschaft*, *15*(1), 21–30.

Schröder, N. J. S., Newig, J., & Watson, N. (2020). Bright spots for local WFD implementation through collaboration with nature conservation authorities? *Water Alternatives*, *13*(3), 582–617.

Scott, T. A., & Thomas, C. W. (2017). Unpacking the collaborative toolbox: Why and when do public managers choose collaborative governance strategies? *Policy Studies Journal*, *45*(1), 191–214. https://doi.org/10.1111/psj.12162

Setzer, J., & Nachmany, M. (2018). National governance: The state's role in steering polycentric action. In A. Jordan, D. Huitema, H. van Asselt, & J. Forster (Eds.), *Governing climate change: Polycentricity in action?* (pp. 47–62). Cambridge University Press.

Speer, J. (2012). Participatory governance reform: A good strategy for increasing government responsiveness and improving public services? *World Development*, *40*(12), 2379–2398. https://doi.org/10.1016/j.worlddev.2012.05.034

Steinebach, Y. (2022). Instrument choice, implementation structures, and the effectiveness of environmental policies: A cross-national analysis. *Regulation & Governance*, *16*(1), 225–242. https://doi.org/10.1111/rego.12297

Stringer, L. C., Dougill, A. J., Fraser, E., Hubacek, K., Prell, C., & Reed, M. S. (2006). Unpacking "participation" in the adaptive management of social–ecological systems: A critical review. *Ecology and Society*, *11*(2). https://www.ecologyandsociety.org/vol11/iss2/art39/

Thiel, A., Blomquist, W. A., & Garrick, D. (Eds.). (2019). Governing complexity: Analyzing and applying polycentricity. In *Cambridge studies in economics, choice, and society*. Cambridge University Press.

Thompson, J. R., Elmendorf, W. F., McDonough, M. H., & Burban, L. L. (2005). Participation and conflict: Lessons learned from community forestry. *Journal of Forestry*, *103*(4), 174–178. https://doi.org/10.1093/jof/103.4.174

Trein, P., Biesbroek, R., Bolognesi, T., Cejudo, G. M., Duffy, R., Hustedt, T., & Meyer, I. (2021). Policy coordination and integration: A research agenda. *Public Administration Review*, *81*(5), 973–977. https://doi.org/10.1111/puar.13180

Ulibarri, N. (2015). Collaboration in federal hydropower licensing: Impacts on process, outputs, and outcomes. *Public Performance & Management Review*, *38*(4), 578–606. https://doi.org/10.1080/15309576.2015.1031004

Van Zeben, J., & Bobić, A. (2019). *Polycentricity in the European Union*. Cambridge University Press.

Vente, J. d., Reed, M. S., Stringer, L. C., Valente, S., & Newig, J. (2016). How does the context and design of participatory decision making processes affect their outcomes? Evidence from sustainable land management in global drylands. *Ecology and Society*, *21*(2). https://doi.org/10.5751/ES-08053-210224

VERBI Software. (2021). *MAXQDA 2022 [computer software]*. VERBI Software. Available from maxqda.com.

Wesselink, A., Paavola, J., Fritsch, O., & Renn, O. (2011). Rationales for public participation in environmental policy and governance: Practitioners' perspectives. *Environment and Planning A: Economy and Space*, *43*(11), 2688–2704. https://doi.org/10.1068/a44161

Wright, S. A. L., & Fritsch, O. (2011). Operationalising active involvement in the EU water framework directive: Why, when and how? *Ecological Economics*, *70*(12), 2268–2274. https://doi.org/10.1016/j.ecolecon.2011.07.023

AUTHOR BIOGRAPHIES

Nadine Schröder works as a landscape planner in an engineering company in the state Lower Saxony, Germany. She is a PhD candidate at the Chair for Environmentally sound Urban and Infrastructure Planning at HafenCity University Hamburg and takes part in the IRI THESys Graduate Program at Humboldt-Universität zu Berlin. Her research focusses on the role of polycentricity, especially organizational structures, for policy implementation processes in water governance systems.

Nigel Watson is Professor of Geography and Environmental Management at Lancaster University, UK. His research is focused on institutional arrangements, water governance and integrated environmental management.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Schröder, N. J. S., & Watson, N. (2024). Assessing participatory process-system linkages in polycentric water governance: Insights from WFD implementation in Germany. *Review of Policy Research*, *00*, 1–36. https://doi.org/10.1111/ropr.12588

INTERVIEWS AND OBSERVATIONS

The following tables show the actors interviewed and processes observed for the analysis of each German federal state. They are numbered for referencing in the text. The time frame for interviews is indicated.

Interviews:

Saxony-Anhalt: January 2017, March–June/August 2018.

No.	Organization
I1	Landesverwaltungsamt: water
I2	City Magdeburg, lower water authority
I3	Unterhaltungsverband Ehle-Ihle a
I4	Unterhaltungsverband Ehle-Ihle b
I5	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology a
I6	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology b
I7	Landesbetrieb für Hochwasserschutz und Wasserwirtschaft (LHW): hydrology and ecology c
I8	Wasserstraßen- und Schifffahrtsamt Magdeburg—Burg
I9	BUND Saxony-Anhalt (friends of the earth Germany)
I10	Ministry for Environment, Agriculture and Energy of the state Saxony-Anhalt: waste water treatment, facilities for handling water-polluting substances, water provision, water protection, water framework directive
I11	NABU Saxony-Anhalt (Nature and Biodiversity Conservation Union) + County Börde lower nature conservation authority

Saxony: January/April/May 2017, December 2018, January 2019.

No.	Organization
I12	City Dresden: environment
I13	Landesdirektion Sachsen—Dresden a
I14	Landesdirektion Sachsen—Dresden b
I15	Wasser- und Schifffahrtsverwaltung des Bundes, WSA Dresden
I16	City Dresden, lower water authority
I17	Community Dresden: water and soil maintenance

No.	Organization
I18	Landestalsperrenverwaltung: EU directives, nature conservation
I19	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie (technical authority): surface waters, water framework directive
I20	Landschaftspflegeverband Sächsische Schweiz-Osterzgebirge e.V.: landscape development, flood protection WFD public relations project
I21	County Meißen, lower water authority

Hesse: September, November 2018.

No.	Organization
I22	Hessisches Landesamt für Naturschutz, Umwelt und Geologie (HLNUG): water ecology
I23	Regierungspräsidium Darmstadt placed in Wiesbaden: surface waters
I24	Hesse Ministry for environment, climate protection, agriculture and consumer protection: surface water protection/water ecology
I25	Hesse Ministry for environment, climate protection, agriculture and consumer protection: questions of principle, state-crossing and international cooperation, coordination of water framework directive, public relations a
I26	Hesse Ministry for environment, climate protection, agriculture and consumer protection: questions of principle, state-crossing and international cooperation, coordination of water framework directive, public relations b
I27	City Wiesbaden: protection and management of waters, water maintenance/lower water authority for non-WFD issues
I28	Rheingau-Taunus-County, lower water authority
I29	Main-Taunus-County, lower water authority
I30	Gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung GmbH (organizes water neighborhoods for the exchange of experiences)
I31	NABU Hesse (Nature and Biodiversity Conservation Union)
I32	Abwasserverband Main-Taunus: water maintenance
I33	City Taunusstein: city development, technical environmental protection, nature conservation, water protection

North Rhine Westphalia (NRW): October–December 2018, February 2019.

No.	Organization
I34	Water network NRW (by nature conservation associations)
I35	Bezirksregierung Arnsberg: water management including facility related environmental protection, water advisor
I36	County Soest, water maintenance
I37	Kommunalagentur NRW (community agency): water advisor
I38	Lippeverband: river area development, central department EU directives, nature conservation
I39	City Hamm, lower water authority
I40	agw—Arbeitsgemeinschaft der Wasserwirtschaftsverbände in Nordrhein-Westfalen (umbrella organization of special water law associations)

No.	Organization
I41	Ministry for environment, agriculture, nature and consumer protection of the state North Rhine-Westphalia: river area management, water ecology, flood protection
I42	Bezirksregierung Arnsberg: funding approvals, conceptual work
I43	County Coesfeld lower water authority
I44	Bezirksregierung Arnsberg: building authority, water maintenance

Thuringia: January–March 2019.

No.	Organization
I45	City Erfurt, lower water authority: surface waters
I46	Thüringer Landesamt für Umwelt, Bergbau und Naturschutz: river area management
I47	Thüringer Aufbaubank: agricultural advancement, infrastructure, environment, regional water advisor
I48	City Erfurt: garden and graveyard authority, water maintenance
I49	City Blankenhain, building authority
I50	Landschaftspflegeverband "Thüringer Grabfeld" e.V.: landscape development, water maintenance
I51	Thüringer Landgesellschaft: water construction
I52	NATURA2000-Station
I53	City Gera, lower water authority: water maintenance
I54	Flussbüro Erfurt (engineering office), representative of nature conservation associations in the Thuringian water advisory council
I55	Thuringian Ministry for environment, energy and nature conservation: water protection, flood protection
I56	GUV "Harzvorland": water maintenance
I57	Thüringer Gemeinde und Städtebund: department rural area, nature protection, agriculture, forestry and water law

Lower Saxony: January, June, July 2017, September 2019.

No.	Organization
I58	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Verden: river basin management
I59	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Braunschweig: river basin management & biological monitoring
I60	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Lüneburg
I61	River Basin Commission Weser
I62	Lower Saxon Ministry for Environment, Energy, Construction and Climate Protection: surface and coastal waters, marine protection
I63	City Braunschweig, lower water authority
I64	Kommunale Umwelt-Aktion UAN (Municipal Environmental Campaign)
I65	BUND Lower Saxony (friends of the earth Germany)

No.	Organization
I66	City Braunschweig, lower nature conservation authority
I67	Unterhaltungsverband Oker: water maintenance
I68	Aller-Ohre-Verband: water alliance
I69	Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz (NLWKN) Hannover: nature conservation
I70	Wasserverband mittlere Oker + Stadtentwässerung Braunschweig: water maintenance

Participatory observation:

No.	Time	Process
Saxony-Anhalt		
O1	June 2018	2nd project accompanying working group for the water development concept of the river Aller
O2	October 2018	Water advisory council
O3	November 2019	Water Forum North (Elbe-Havel-Weser)
Saxony		
O4	April 2017	Regional working group for the river Elbe
O5	May 2019	Water forum
Hesse		
O6	September 2018	Water advisory council
O7	November 2018	Water forum
NRW		
O8	September 2018	WFD symposium
O9	December 2018	Information of WFD addressees with maintenance and construction duties on measure overviews to be compiled
Thuringia		
O10	February 2019	Discussion forum for WFD addressees to establish water maintenance associations in whole Thuringia by 2020
O11	March 2019	Water workshop to determine measures for the water body Middle of Unstrut
Lower Saxony		
O12	June 2017	Area Cooperation for the river Oker

1 Supplementary material

The following material, text and table, also contains references which interviews [Ix] and observations [Ox] provided information. The list of these references can be found in the main paper.

Data on non-participation, participation and 'overparticipation' in the analysed participatory processes

Although, we focused only on WFD addressees envisaged for realising WFD measures on hydromorphology and connectivity, analysing and mapping the involvement in processes, posed difficulties of data availability and quality: We found formats with representation, e.g. advisory councils, and those with direct participation, e.g. open formats like fora and lower level processes, resulting in a determined selection of participants or openness for everybody who registers. Some processes work by invitation, others by general or specific advertisement. Furthermore, in cases in which different information sources were available, the actual or documented participation differed from lists with intended participants.

The sectoral, temporal and spatial variations in (non-)participation, which we found, have various reasons.

Already well-known is, that processes find their limits in the number of participants allowing **effective communication** (Newig, Schulz, & Jager, 2016) which especially requires a selection of participants for large-scale processes (e.g. advisory councils covering a whole state) at the process design stage. Beyond that, some processes did **not intend to involve** WFD addresses (not at all, not in all phases or not directly), e.g. regional working groups (the larger state agency (enterprise) was involved [I18] (probably not for being a WFD addressee), but not the municipalities [O4]). Some organisers did not perceive them as stakeholders, others intended to separate administrative actors from the public [I26].

Independent from process intentions, also the **capacities of intended participants** and their willingness to participate (for the various reasons for non-participation see e.g. Diduck & Sinclair (2002)) are restricted. The limited capacities are especially, but not solely [I44], attributed to small actors in the federal states' governance systems, such as municipalities which rarely have at least one person being only responsible for water issues. This affects their participation behaviour in open processes [I14] and low-level processes while they may be represented by an umbrella organisation (if existing) in advisory councils.

Furthermore, involvement in larger processes can be even for participants difficult to trace. In some cases, although **perceived as not participating** (e.g. NRW Symposium [I43, O8]), small WFD addressees such as municipalities and water and soil associations, could be found on the participants lists [I40, O8] - albeit a small number out of an unclear high number of WFD addressees.

In contrast, some processes involved **more WFD addressees than** previously **intended** [I53, O10, O9]. Fora have been found which intended to involve two actors for each forum representing all WFD addressees (28 maintenance associations) in the state. However, over time, it established itself that regularly all 28 actors attended the fora. They also participated in the forum which fitted their time schedule best and not necessarily in that of the region they belong to [O3]. For an area cooperation it was reported that several municipalities participated because they could not agree on one representative (Newig et al., 2016).

Participatory and collaborative processes found in the six German states and related data sources

We included recently accessible links of websites, when available, and no longer accessible links when accessed during data collection (access date in brackets). Website information were deleted especially when formats were given up later. Sometimes it was difficult to find information on when a process was established. Therefore, we indicated dates with an 'at least' when we could identify the earliest date when a process was mentioned.

Saxony (Sachsen): participatory processes	
Advisory council WFD (*Beirat WRRL*): • state • at least since 2009	
	• [I19] • Sächsisches Staatsministerium für Umwelt und Landwirtschaft. Umsetzung der Europäischen Wasserrahmenrichtlinie in Sachsen, Organisation zur Umsetzung der Maßnahmenprogramme des zweiten Bewirtschaftungszeitraumes für die im Freistaat Sachsen liegenden Gebiete der Flussgebietseinheiten Elbe und Oder: Organisationserlass vom 22. Dezember 2009 (Az.: 44-8912.10177) • https://www.umwelt.sachsen.de/umwelt/wasser/976.htm (14.01.2019) • Presentation "Umsetzung der Europäischen Wasserrahmenrichtlinie in Sachsen" by Prof. Dr. Martin Socher (Sächsisches Staatsministerium für Umwelt und Landwirtschaft) at 6th Sächsische Gewässertage 10th December 2009) https://www.wasser.sachsen.de/download/Socher__Prof_Dr._Martin.pdf (19.11.2022)
Water forum (*Gewässerforum*): • state (earlier: regional) • since 2004/ 2005	
	• [I18, I19, I20, I21], [O5] • Process materials of latest events https://www.wasser.sachsen.de/wrrl-gewaesserforen-10727.html (19.11.2022) • Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie. (2012). Maßnahmenumsetzung WRRL in Sachsen. Zwischenbericht gemäß Artikel 15 Absatz 3 der Wasserrahmenrichtlinie zur Umsetzung der Maßnahmenprogramme – Sächsisches Hintergrunddokument.
Water days (Sächsische *Gewässertage*): • state • since 2004	
	• [I18], [O5] • Process materials of latest events https://www.wasser.sachsen.de/wrrl-gewaessertage-10802.html (19.11.2022) • Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie. (2012). Maßnahmenumsetzung WRRL in Sachsen. Zwischenbericht gemäß Artikel 15 Absatz 3 der Wasserrahmenrichtlinie zur Umsetzung der Maßnahmenprogramme – Sächsisches Hintergrunddokument.
Regional working groups (*regionale Arbeitsgruppen*): • basin region • since 2010	
	• [I13, I14, I15, I16, I18, I19, I21], [O4] • Sächsisches Staatsministerium für Umwelt und Landwirtschaft. Umsetzung der Europäischen Wasserrahmenrichtlinie in Sachsen, Organisation zur

	Umsetzung der Maßnahmenprogramme des zweiten Bewirtschaftungszeitraumes für die im Freistaat Sachsen liegenden Gebiete der Flussgebietseinheiten Elbe und Oder: Organisationserlass vom 22. Dezember 2009 (Az.: 44-8912.10177) • Presentation "Umsetzung der Europäischen Wasserrahmenrichtlinie in Sachsen" by Prof. Dr. Martin Socher (Sächsisches Staatsministerium für Umwelt und Landwirtschaft) at 6th Sächsische Gewässertage 10th December 2009) https://www.wasser.sachsen.de/download/Socher__Prof_Dr._Martin.pdf (19.11.2022) • Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie. (2012). Maßnahmenumsetzung WRRL in Sachsen. Zwischenbericht gemäß Artikel 15 Absatz 3 der Wasserrahmenrichtlinie zur Umsetzung der Maßnahmenprogramme – Sächsisches Hintergrunddokument.
Saxony: other cooperative processes	
Water neighborhoods (*Gewässernachbarschaften*)* by DWA: • catchment • since 2002	
	• [I20] • https://www.dwa-st.de/de/gn.html (05.01.2023)
Saxony-Anhalt (Sachsen-Anhalt): participatory processes	
Water Advisory Council (*Gewässerbeirat*): • state • since 2004	
	• [I1, I9, I10, I11], [O2] • https://saubereswasser.sachsen-anhalt.de/oeffentlichkeitsarbeit/ (19.11.2022) • Members list (changing over time): https://saubereswasser.sachsen-anhalt.de/fileadmin/Bibliothek/Politik_und_Verwaltung/MLU/WRRL/OEffentlichkeitsarbeit/220808-Gewaesserbeirat.pdf (19.11.2022) • Meeting minutes (not public anymore) • bylaws: Geschäftsordnung des Gewässerbeirates bei dem Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt (Gewässerbeirat). 29th May 2004 (not publicly available) • Poster „Die Umsetzung der Europäischen Wasserrahmenrichtlinie in Sachsen-Anhalt" (not public anymore)
Water Forum (*Gewässerforum*): • basin region • since 2005	
	• [I1, I5, I6, I9, I10, I11], [O2, O3] • Poster „Die Umsetzung der Europäischen Wasserrahmenrichtlinie in Sachsen-Anhalt" (not public anymore) • https://saubereswasser.sachsen-anhalt.de/oeffentlichkeitsarbeit/ (19.11.2022) • Members lists (changing over time): https://saubereswasser.sachsen-anhalt.de/fileadmin/Bibliothek/Politik_und_Verwaltung/MLU/WRRL/OEffentlichkeitsarbeit/200406-GWF-Nord-Mitglieder.pdf https://saubereswasser.sachsen-anhalt.de/fileadmin/Bibliothek/Politik_und_Verwaltung/MLU/WRRL/OEffentlichkeitsarbeit/200406-GWF-Sued-Mitglieder.pdf (19.11.2022) • Short summaries of meetings (not public anymore) • Meeting minutes, participants list of first meeting (provided by participant)

	• Invitation, agenda of 20th meeting (participatory observation)
	• Press releases: Pressemitteilungen des Landesverwaltungsamtes
	  ○ Pressemitteilung Nr. 38/05 vom 06.05.2005: Elbe-Havel-Weser Gewässerforum gegründet
	  ○ Pressemitteilung Nr. 34/05 vom 22.04.2005: Für sauberes Wasser in Sachsen-Anhalt - Gründung des Saale-Mulde-Gewässerforums
	• WRRL- Seminar Nr. 27- Magdeburg, 19th April 2008 „Hochwasserschutz und Biodiversität im Licht der EG- Wasserrahmenrichtlinie“: Presentation by Helmut Harpke (Wassernetz Sachsen- Anhalt/ NABU LV Sachsen- Anhalt) http://wrrl-info.de/site.php4?navione=angebote&navitwo=seminare&content=seminar27 (02.01.2023)
	• https://wrrl.sachsen-anhalt.de/oeffentlichkeitsarbeit/elemente-der-oeffentlichkeitsarbeit/ (25.01.2018)

Steering Group (*Lenkungsgruppe*): • state • 2004-2015	
	• [I5, I10] • Meeting minutes of water advisory council: Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt. Ergebnisniederschrift über die dritte Sitzung des Gewässerbeirates des Landes Sachsen-Anhalt am 10.03.2005 im Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt. (not publicly available) • Meeting minutes of water advisory council: Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt. Ergebnisniederschrift über die erste Sitzung des Gewässerbeirates des Landes Sachsen-Anhalt am 29.10.2004 im Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt. (not publicly available)
Project accompanying working group for a water development concept (*PAG GEK*): • Water body region • since 2010	
	• [I3, I6, I10, I11], [O1] • Landesbetrieb für Hochwasserschutz und Wasserwirtschaft Sachsen-Anhalt (LHW). 2015. Gewässerentwicklungskonzept Ehle-Ihle. Anlage PAG-Vermerke. https://lhw.sachsen-anhalt.de/untersuchen-bewerten/gewaesserentwicklungskonzepte/gek-ehle-ihle (20.11.2022) • Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt. (2014). Wasser bewegt. 3. Sachsen-Anhalt verbessert seine Gewässer. Erfolge. Erfahrungen. Erwartungen. • https://lhw.sachsen-anhalt.de/gewaesserkundlicher-landesdienst/gewaesserentwicklungskonzepte (20.11.2022) • Meeting minutes of water advisory council: Ministerium für Landwirtschaft und Umwelt des Landes Sachsen-Anhalt. Ergebnisniederschrift über die 11./ 12./ 14. Sitzung 24th June 2009/ 17th February 2010/ 15th May 2011. (not publicly available)
Project accompanying working group for a measure (*PAG Maßnahme*) • measure • locally varying	
	• [I3, I11]
Lower Saxony: participatory processes	

Advisory council (*Beirat*): • state • no information	
	• Mentioned as not playing a role anymore [I62] • https://www.umwelt.niedersachsen.de/themen/wasser/WRRL/oeffentlichkeit/7362.html (03.01.2023)
Enlarged professional groups on surface/ subsurface waters (*Erweiterte Fachgruppe Oberflächengewässer/ Grundwasser*): • state • at least since 2013	
	• [I60, I62, I65, I69] • https://www.nlwkn.niedersachsen.de/startseite/wasserwirtschaft/eg_wasserrahmenrichtlinie/umsetzung_der_eg_wrrl_in_niedersachsen/organisation_in_niedersachsen/organisation-in-niedersachsen-42072.html (02.01.2023) • Niedersächsisches Ministerium für Umwelt, Energie und Klimaschutz. (2015). Niedersächsischer Beitrag zu den Bewirtschaftungsplänen 2015 bis 2021 der Flussgebiete Elbe, Weser, Ems und Rhein nach § 118 des Niedersächsischen Wassergesetzes bzw. nach Art. 13 der EG-Wasserrahmenrichtlinie, Dezember 2015.
Area fora (*Gebietsforen*): • basin region • (at least) since 2009	
	• [I60, I62, I64] • Materials of Gebietsforen 2015: https://www.umwelt.niedersachsen.de/startseite/themen/wasser/eg_wasserrahmenrichtlinie/beteiligung_der_offentlichkeit/informationen-zur-umsetzung-der-eg-wasserrahmenrichtlinie-wrrl-135171.html (02.01.2023) Gebietsforen 2015 • Materials of Flussgebietsforum 2021: https://www.umwelt.niedersachsen.de/startseite/themen/wasser/eg_wasserrahmenrichtlinie/flussgebietsforum-2021-200984.html (02.01.2023) • Niedersächsisches Ministerium für Umwelt, Energie und Klimaschutz. (2015). Niedersächsischer Beitrag zu den Bewirtschaftungsplänen 2015 bis 2021 der Flussgebiete Elbe, Weser, Ems und Rhein nach § 118 des Niedersächsischen Wassergesetzes bzw. nach Art. 13 der EG-Wasserrahmenrichtlinie, Dezember 2015.
Area cooperations (*Gebietskooperationen*): • catchment • since 2004/2005	
	• [I58, I60, I62, I63, I64, I66, I67, I68, I69, I70], [O12] • https://www.nlwkn.niedersachsen.de/startseite/wasserwirtschaft/eg_wasserrahmenrichtlinie/umsetzung_der_eg_wrrl_in_niedersachsen/offentlichkeitsbeteiligung/oeffentlichkeitsbeteiligung-42144.html (02.01.2023) • https://www.umwelt.niedersachsen.de/startseite/themen/wasser/eg_wasserrahmenrichtlinie/gebietskooperationen/gebietskooperationen-in-niedersachsen-8130.html (02.01.2023) • Newig, J., Schulz, D., & Jager, N. W. (2016). Disentangling Puzzles of Spatial Scales and Participation in Environmental Governance-The Case of Governance Re-scaling Through the European Water Framework Directive. Environmental Management, 58(6), 998–1014.

	• http://www.wrrl-kommunal.de/index.php?id=15 (Zugriff 06.06.2017) • Niedersächsisches Ministerium für Umwelt, Energie und Klimaschutz. (2015). Niedersächsischer Beitrag zu den Bewirtschaftungsplänen 2015 bis 2021 der Flussgebiete Elbe, Weser, Ems und Rhein nach § 118 des Niedersächsischen Wassergesetzes bzw. nach Art. 13 der EG-Wasserrahmenrichtlinie, Dezember 2015.
Lower Saxony: other cooperative processes	
Professional groups on surface/ subsurface/ transitional and coastal waters (*Fachgruppen für Oberflächenwasser, Grundwasser, Übergangs- und Küstengewässer*): • state • since 2001 [I60]	
	• [I60, I62, I65, I69] • https://www.nlwkn.niedersachsen.de/startseite/wasserwirtschaft/eg_wasserrahmenrichtlinie/umsetzung_der_eg_wrrl_in_niedersachsen/organisation_in_niedersachsen/organisation-in-niedersachsen-42072.html (02.01.2023)
Hesse (Hessen): participatory processes	
Advisory council (*Beirat*): • state • since 2003	
	• [I24, I25, I26, I31], [O6] • Meeting documentation https://flussgebiete.hessen.de/oeffentlichkeitsarbeit/beirat (02.01.2023)
Water forum (*Wasserforum*): • state • since 1999	
	• [I22, I23, I24, I25, I26, I28, I31, I32], [O7] • Meeting documentation https://flussgebiete.hessen.de/oeffentlichkeitsarbeit/wasserforum (02.01.2023) • Invitation flyer of water forum 2018 • Evaluations of the water fora 2007, 2009, 2010, 2018 (internal, not publicly available)
Participation platforms (*Beteiligungsplattformen*) [on morphology and point sources]: • catchments • 2008	
	• [I24] • Documentation https://flussgebiete.hessen.de/umsetzung-in-hessen/aufstellung-des-massnahmenprogramms/beteiligungsplattformen (02.01.2023) • Presentation by Rainer Fuchs (HLUG) at advisory council meeting 29th April 2008 https://flussgebiete.hessen.de/fileadmin/dokumente/4_oeffentlichkeitsbeteiligung/beirat/ab2007-06/080429_top2_vortrag_fuchs.pdf (02.01.2023) • Presentation by Silvia Fengler (HLUG) at advisory council meeting 17th June 2008 https://flussgebiete.hessen.de/fileadmin/dokumente/4_oeffentlichkeitsbeteiligung/beirat/ab2008-05/080617_vortrag_fengler_bpf.pdf (02.01.2023)
Participation workshops (*Beteiligungswerkstätten*) [on diffusive pollution]: • catchments • 2008	

	• [I23] • Documentation https://flussgebiete.hessen.de/umsetzung-in-hessen/aufstellung-des-massnahmenprogramms/beteiligungswerkstaetten (02.01.2023)
Regional conferences (*Regionalkonferenzen*): • coordination areas, government districts • 2004	
	• Meeting documentation https://flussgebiete.hessen.de/oeffentlichkeitsarbeit/regionalkonferenzen (02.01.2023)
Hesse (Hessen): other cooperative processes	
Water neighborhoods (*Gewässernachbarschaften*)* by GFGmbH: • catchments • locally varying (earliest found: since 1996)	
	• [I23, I28, I30, I32, I33] • https://gfg-fortbildung.de/nachbarschaften (07.01.2021)
Visiting tour to municipalities (*Kommunalbereisung*): • counties • since 2016	
	• [I23, I25, I31] • Hessisches Ministerium für Umwelt, Klimaschutz, Landwirtschaft und Verbraucherschutz. (2021). Umsetzung der Wasserrahmenrichtlinie in Hessen. Bewirtschaftungsplan 2021-2027.
North Rhine-Westphalia: participatory processes	
Steering group (*Lenkungsgruppe*) and working group WFD (*AG WRRL*): • State • steering group since 2002 [I41], WG WFD at least since 2010	
	• [I41] • https://www.flussgebiete.nrw.de/wie-kann-ich-mich-beteiligen-745 (02.01.2023) • Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz der Landes Nordrhein-Westfalen. (2015). Bewirtschaftungsplan 2016-2021 für die nordrhein-westfälischen Anteile von Rhein, Weser, Ems und Maas.
WFD-Symposium (*WRRL-Symposium*): • state • probably since 2006, at least 2010 [RBMP]	
	• [I34, I36, I38, I39, I40, I42, I43, I44], [O8] • https://www.flussgebiete.nrw.de/wie-kann-ich-mich-beteiligen-745 (02.01.2023) • Documentation since 2012 https://www.flussgebiete.nrw.de/node/7217 (02.01.2023) • Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz der Landes Nordrhein-Westfalen. (2015). Bewirtschaftungsplan 2016-2021 für die nordrhein-westfälischen Anteile von Rhein, Weser, Ems und Maas. [RBMP]
Area fora/ conferences (*Gebietsforen/ Gebietskonferenzen*): • catchment/ district • since 2004	

	• [I35, I41, I42, I43, I44], [O8] • https://www.flussgebiete.nrw.de/wie-kann-ich-mich-beteiligen-745 (02.01.2023) • Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz der Landes Nordrhein-Westfalen. (2015). Bewirtschaftungsplan 2016-2021 für die nordrhein-westfälischen Anteile von Rhein, Weser, Ems und Maas.
13 Core working groups (*Kernarbeitskreise*): • catchments • since 2002 (as little siblings of working groups) [I41]	
	• [I35, I41, I42, I43, I44] • https://www.flussgebiete.nrw.de/wie-kann-ich-mich-beteiligen-745 (02.01.2023) • Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz der Landes Nordrhein-Westfalen. (2015). Bewirtschaftungsplan 2016-2021 für die nordrhein-westfälischen Anteile von Rhein, Weser, Ems und Maas.
Round tables (*Runde Tische*)/ Implementation road maps (*Umsetzungsfahrpläne*): • Regional, planning units within government districts • 2008 + 2013-14/ 2011-2012	
	• [I34, I35, I38, I39, I41], [O8, O9] • https://www.flussgebiete.nrw.de/wie-kann-ich-mich-beteiligen-745 (02.01.2023) • presentation by Svenya Krämer (Grundbesitzerverband NRW e.V.) at WFD-Symposium 19th April 2012 https://www.flussgebiete.nrw.de/system/files/atoms/files/2012_04_19_symp_07_kraemer.pdf (03.01.2023) and file:///C:/Users/Gute%20Ideen/Downloads/2012_04_19_symp_07_kraemer-skript%20(1).pdf (03.01.2023) • documentation of round tables on river Lippe 2014 https://www.flussgebiete.nrw.de/node/236 (03.01.2023) • Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz der Landes Nordrhein-Westfalen. (2015). Bewirtschaftungsplan 2016-2021 für die nordrhein-westfälischen Anteile von Rhein, Weser, Ems und Maas.
Information events on measure overviews (*Informationsveranstaltungen Maßnahmenübersichten*): • district • 2018 (replacing round tables)	
	• [I35, I38, I41, I43], [O9] • Ministerium für Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen. Einführungserlass Leitfaden zur Erstellung von Übersichten gemäß § 74 LWG vom 06.09.2018.
Project accompanying working groups (*Projektbegleitende Arbeitsgruppen (PAGs)*): • measure • locally varying	
	• [I44, I41]
Thuringia (Thüringen): participatory processes	
Thuringian water advisory council (*Thüringer Gewässerbeirat (TGB)*):	

- state
- since 2003

  - [I47, I53, I54, I55, I57]
  - https://www.thueringen.de/th8/tmuen/umwelt/wasser/euwrrl/beteiligung/gewaesserbeirat/index.aspx (18.02.2019)
  - Members lists of May 2017 and August 2018 (not online anymore)
  - meeting documentation since 2013 https://aktion-fluss.de/downloads/gewaesserbeirat-protokolle/ (03.01.2023)
  - Meeting minutes: Protokoll der 24. Sitzung des Thüringer Gewässerbeirates (TGB) am 27.05.2014 im TMLFUN https://umwelt.thueringen.de/fileadmin/001_TMUEN/Unsere_Themen/Boden_Wasser_Luft_Laerm/Europaeische_Wasserrahmenrichtlinie/24_tgb_protokoll.pdf (03.01.2023)
  - Meeting minutes: Auswertung Fragebogen Thüringer Gewässerbeirat from 12th May 2014 for 24th meeting of the TGB https://umwelt.thueringen.de/fileadmin/001_TMUEN/Unsere_Themen/Boden_Wasser_Luft_Laerm/Europaeische_Wasserrahmenrichtlinie/24_tgb_protokoll_anlage_4_auswertung_frageb__gen_tgb.pdf (03.01.2023)
  - Thüringer Ministerium für Umwelt, Energie und Naturschutz. (2022). Thüringer Landesprogramm Gewässerschutz 2022 – 2027.
  - Thüringer Ministerium für Umwelt, Energie und Naturschutz. (2015). Arbeitspapier zur Regelung der Information, Beteiligung und Anhörung der Öffentlichkeit in Thüringen.

3 Water fora (*Gewässerforen*):

- basin region
- since 2003 (at least until 2017)

  - [I46, I47, I48, I50, I51, I54, I55, I56]
  - Presentation Thüringer Landesanstalt für Umwelt und Geologie „Unstrut-Leine-Forum 14. Sitzung am 21. September 2017" http://www.thueringen.de/mam/th8/tlug/content/wasser/unstrut_leine_Forum/14/20170921_rahmen.pdf (14.01.2018)
  - Thüringer Landesanstalt für Umwelt und Geologie. (2014). Arbeitspapier Hydromorphologie an Schwerpunktgewässern in Thüringen. https://tlubn.thueringen.de/fileadmin/000_TLUBN/Wasser/Fluesse_und_Baeche/Dokumente/Flussgebietsmanagement/grp/hydromorphologie-schwerpunktgewaesser.pdf (03.01.2023)
  - Meeting minutes: Protokoll der 23. Sitzung des Thüringer Gewässerbeirates (TGB) am 09.10.2013 im TMLFUN https://umwelt.thueringen.de/fileadmin/001_TMUEN/Unsere_Themen/Boden_Wasser_Luft_Laerm/Europaeische_Wasserrahmenrichtlinie/23_tgb_protokoll.pdf (03.01.2023)
  - Thüringer Ministerium für Umwelt, Energie und Naturschutz. (2016). Thüringer Landesprogramm Gewässerschutz 2016 – 2021.
  - Thüringer Ministerium für Umwelt, Energie und Naturschutz. (2015). Arbeitspapier zur Regelung der Information, Beteiligung und Anhörung der Öffentlichkeit in Thüringen. (Water fora not mentioned anymore in the update of 2020)
  - Process documentation of the first meeting of the Thuringian water advisory council at 17th November 2003 (not publicly available)

Water Workshops (*Gewässerwerkstätten*)/ Workshop talks (Werkstattgespräche):

- Water body catchment
- at least since 2012/ 2007-2008

- [I46, I47, I48, I52, I54, I55], [O11]
- Presentation by Hardis Zellner (TLUG Jena) "Vorgehen bei der Maßnahmenableitung Struktur und Durchgängigkeit 2. BWZ" at Unstrut-Leine-Forum 19th July 2012 http://www.thueringen.de/imperia/md/content/tlug/wasserwirtschaft/foren/unstrut_leine/11sitzung_top_6_3.pdf (15.01.2018)
- Thüringer Landesanstalt für Umwelt und Geologie. (2014). Arbeitspapier Hydromorphologie an Schwerpunktgewässern in Thüringen. https://tlubn.thueringen.de/fileadmin/000_TLUBN/Wasser/Fluesse_und_Baeche/Dokumente/Flussgebietsmanagement/grp/hydromorphologie-schwerpunktgewaesser.pdf (03.01.2023)
- Invitation to and process documentation of the 2nd water workshop for the water body Mittlere Unstrut at 6th March 2019 (not publicly available)
- Thüringer Ministerium für Landwirtschaft, Forsten, Umwelt und Naturschutz. (2010). Thüringer Landesbericht zu den Bewirtschaftungsplänen und Maßnahmenprogrammen nach EG-Wasserrahmenrichtlinie. https://aktion-fluss.de/wp-content/uploads/Landesbericht.pdf (04.01.2023) (mentions ‚workshops')
- Meeting minutes: Protokoll der 12. Sitzung des Thüringer Gewässerbeirates (TGB) am 26.06.2007 im Staatlichen Umweltamt Erfurt (mentions ‚workshops'; not publicly available)
- Meeting minutes Protokoll der 13. Sitzung des Thüringer Gewässerbeirates (TGB) am 14.11.2007 im TMLNU Erfurt (mentions ‚workshops';not publicly available)
- Meeting minutes: Protokoll der 23. Sitzung des Thüringer Gewässerbeirates (TGB) am 09.10.2013 im TMLFUN (mentions ‚Gewässerwerkstätten') https://aktion-fluss.de/downloads/gewaesserbeirat-protokolle/ (03.01.2023)

Regional events (*Regionalveranstaltungen*) AKTION FLUSS – Kommunal:

- regional
- 2012/2013

- [I47]
- http://www.thueringen.de/th8/tlug/umweltthemen/aktionfluss/kommunal/veranstaltungen/index.aspx (12.01.2018)
- Meeting minutes: Protokoll der 23. Sitzung des Thüringer Gewässerbeirates (TGB) am 09.10.2013 im TMLFUN https://aktion-fluss.de/downloads/gewaesserbeirat-protokolle/ (03.01.2023)
- Process documentation https://aktion-fluss.de/downloads/workshops/ (05.01.2023)

Strategic Workshops on flood and water protection in Thuringia (*Strategische Workshops zum Hochwasser- und Gewässerschutz in Thüringen*):

- state
- 2015

- https://aktion-fluss.de/gewaesserschutz/planungsgrundlagen-gewaesserschutz/ (03.01.2023)
- Process documentation https://aktion-fluss.de/downloads/workshops/ (05.01.2023)

Information events on establishing water maintenance associations (*Diskussionsforum zur Gründung der Gewässerunterhaltungsverbände*)

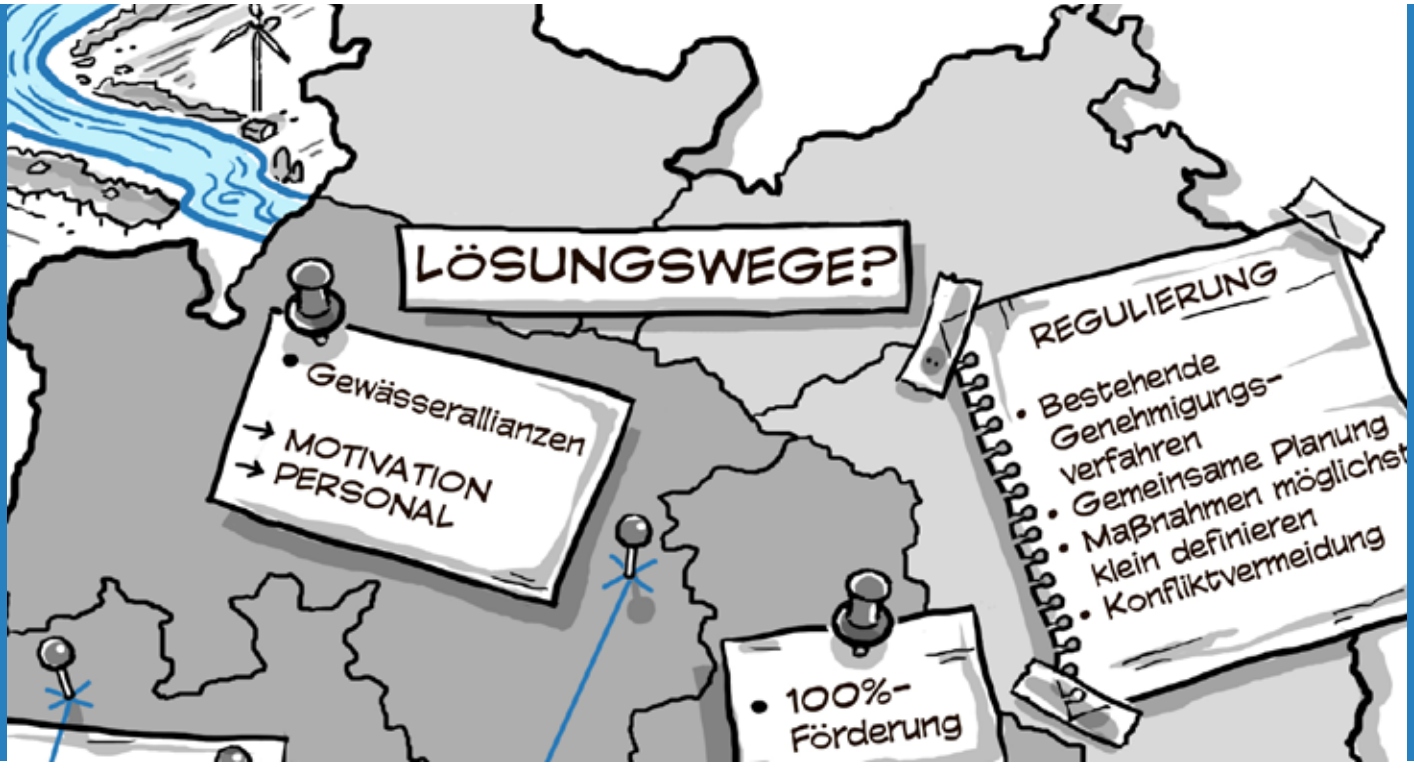
• catchment • 2019	
	• [I50, I53], [O10] • Meeting minutes: Protokoll der 30. Sitzung des Thüringer Gewässerbeirates (TGB) am 24.04.2018 https://aktion-fluss.de/downloads/gewaesserbeirat-protokolle/ (03.01.2023) • Invitation to and process materials of the event in Gera on the catchments Weiße Elster/ Saarbach and Weiße Elster/ Weida at 18th February 2019 (not publicly available)
Thuringia (Thüringen): other cooperative processes	
Water neighborhoods (*Gewässernachbarschaften*)* by DWA: • catchments • since 2002	
	• [I47, I48, I49, I50, I51, I56] • Presentation „DWA-Gewässer-Nachbarschaften. Praxisnahe Schulung und Erfahrungsaustausch“ by Annett Schnaufer at Regionalveranstaltungen AKTION FLUSS – Kommunal 2012 https://aktion-fluss.de/downloads/workshops/ (05.01.2023) • https://www.dwa-st.de/de/gn.html (05.01.2023)
Working group of the lower water authorities (*AG der unteren Wasserbehörden*): • all counties of the state • no information	
	• [I53, I57]

*Water neighborhoods are not intended as participatory processes, but as exchange formats. Nevertheless, that are formats where water actors of the same catchment get in contact to each other and get to know each other's projects fostering participation in future decision-making.

THESys Discussion Paper No. 2020-1

WRRL-Umsetzungshürden: Unpassierbar oder durchgängig für Maßnahmenträger?

Nadine Jenny Shirin Schröder
Nikhil Chaudhary



IRI THESys
Transformations of Human-Environment Systems

IRI THESys – Integrative Research Institute on
Transformations of Human-Environment Systems
Humboldt-Universität zu Berlin
Unter den Linden 6
10099 Berlin
Tel: +49 30 2093-66336
Fax: +49 30 2093-66335
Web: www.iri-thesys.org

Kontakt:
Nadine Jenny Shirin Schröder, THESys Graduate Program & Leuphana Universität Lüneburg (Research Group Governance, Participation and Sustainability),
nadine.schroeder@stud.leuphana.de
Nikhil Chaudhary, European Institute of Innovation & Technology's (EIT) Climate Knowledge & Innovation Community (Climate-KIC),
nikhilchaudhary.aj@gmail.com

THESys Discussion Papers
ISSN 2566-7661 (Print)
ISSN 2566-5561 (Online)
edoc.hu-berlin.de/series/thesysdiscpapers

Chefredakteur:
Jonas Østergaard Nielsen (IRI THESys)
jonas.ostergaard.nielsen@hu-berlin.de

Zitierhinweis:
Schröder, N. J. S.; Chaudhary, N. 2020: WRRL-Umsetzungshürden: Unpassierbar oder durchgängig für Maßnahmenträger? THESys Discussion Paper No. 2020-1. Humboldt-Universität zu Berlin, Berlin, Germany. S. 1-13.
https://doi.org/10.18452/21268

Titelbild © Nikhil Chaudhary

Druck: HU Druckerei, Dorotheenstraße 26, 10117 Berlin

Vorwort

Nachhaltigkeitsthemen brauchen Formate, die über den klassischen Artikel und den wissenschaftlichen Fachvortrag hinausgehen und diese ergänzen: Formate, die auch ein nicht-akademisches Publikum erreichen und ebenso jüngere Zielgruppen ansprechen, genauso wie Formate, die Stakeholder unterstützen, ihre Belange zu kommunizieren. Idealerweise können diese Formate helfen, in der Gesellschaft mehr Verständnis und mehr Motivation für ein besseres Verhältnis zwischen Mensch und Umwelt zu entwickeln.

Wissenschaftscomics sind solch ein mögliches Format. Comics verbinden Bild und Text auf unterhaltsame Weise. Sie erlauben ein Nebeneinander von Fakten und Emotionen, vor allem aber bieten sie eine Bühne für die Helden des Alltags, aus deren Perspektive Klimawandel und Umweltschutz anschaulich gemacht werden können. Nicht zuletzt können Comics zeigen, wie Wissenschaftler*innen arbeiten und dass Forschung Spaß machen kann.

Der vorliegende Wissenschaftscomic ist in Kooperation zwischen einer Nachwuchs-wissenschaftlerin und einem Comiczeichner entstanden. Die Daten stammen aus der Doktorarbeit der Umweltwissenschaftlerin, die Bilder aus dem Stift des Künstlers. Alle Ideen wurden gemeinsam entwickelt. Während der Arbeit im Tandem, die einige Monate dauerte, haben sich die Talente und Möglichkeiten der beiden wunderbar ergänzt und sie haben voneinander gelernt. Das Ergebnis ist ein sechsseitiger Comic, welcher von den lokalen Schwierigkeiten in der Umsetzung der europäischen Wasserrahmenrichtlinie erzählt.

Nadine Schröder und Nikhil Chaudhary verdienen unseren Dank für ihre gemeinsame Arbeit!

Anne Dombrowski, Wissenschaftskommunikation IRI THESys
Berlin, Dezember 2019

WRRL-Umsetzungshürden:
Unpassierbar oder durchgängig für Maßnahmenträger?

Nadine Jenny Shrin Schröder & Nikhil Chaudhary

Abstract

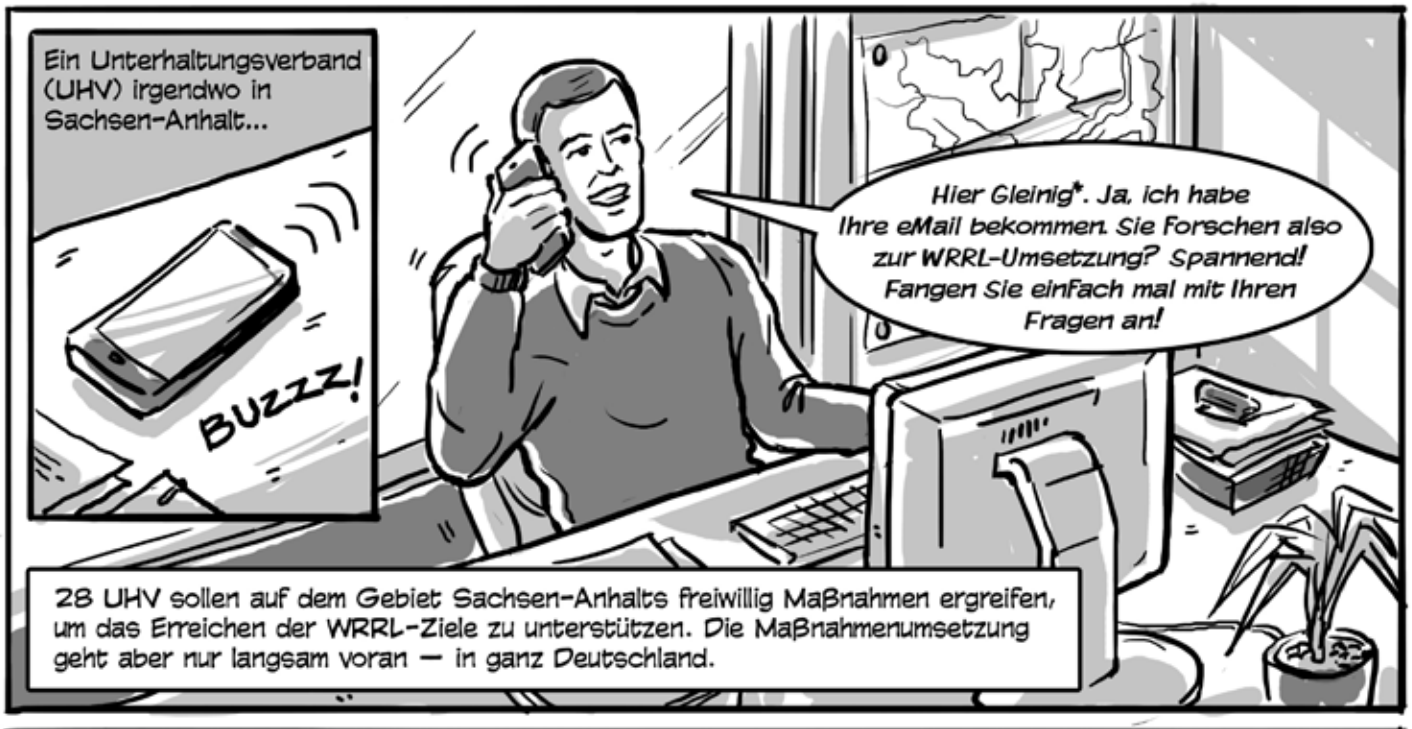
Die EU Wasserrahmenrichtlinie (WRRL) wird eine Richtlinie der neuen Generation genannt, da sie flexibel gehalten wurde, um institutionelle 'Misfits' während der Implementierung zu vermeiden. Nichtsdestotrotz, 20 Jahre nach Inkrafttreten der WRRL sind die Mitgliedsstaaten noch weit vom Erreichen ihrer ambitionierten Ziele, dem guten (ökologischen und chemischen) Zustand in allen europäischen Gewässern, entfernt.

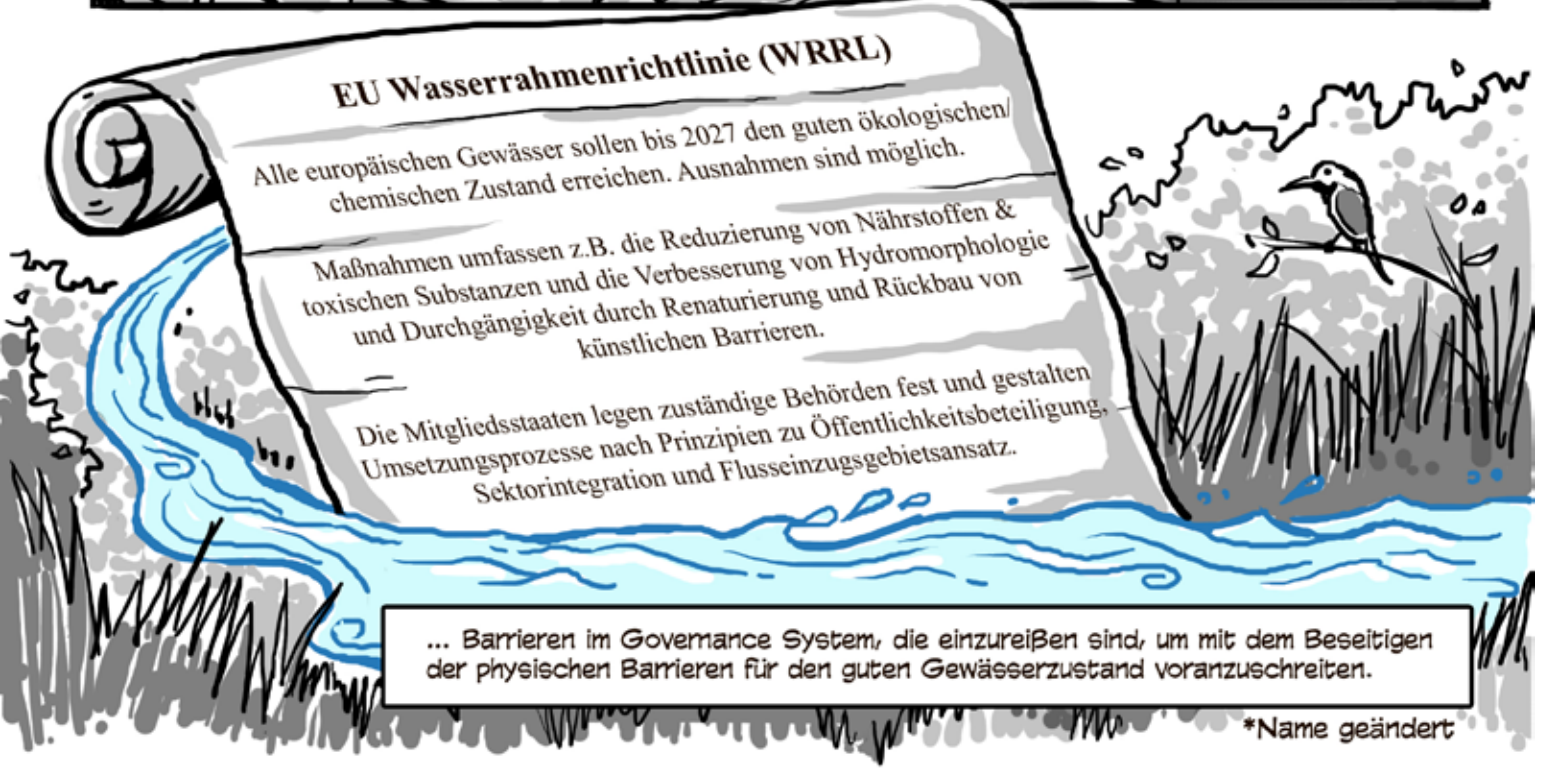
Es kann etliche ökologische Gründe geben, warum ein Zeithorizont von 15 bis 27 Jahren zu kurz bemessen ist, um 500 Jahre anthropogener Einflüsse rückgängig zu machen. Allerdings hat an manchen Orten nicht einmal die Maßnahmenumsetzung begonnen, verzögert sich, oder die Maßnahmen reichen nicht aus, um die WRRL-Ziele zu erreichen. Gründe dafür können in den nationalen und lokalen Governance-Strukturen und Prozessen gefunden werden.

Dieser Comic visualisiert Hürden für die WRRL-Umsetzung auf der lokalen Ebene in Deutschland. WRRL-Maßnahmenträger wurden gefragt, wie sie WRRL-Maßnahmen umsetzen und vor welchen Hürden sie stehen oder welche Konflikte sie wahrnehmen. Die deutschen Bundesländer werden durch verschiedene Konstellationen von Entscheidungsträgern der Wasserwirtschaft mit WRRL-Bezug charakterisiert: darunter Wasserbehörden, Behörden mit steuernden oder unterstützenden Aufgaben im Wassermanagement, Gewässerunterhaltungsverbände und -betriebe, Wasser- und Bodenverbände, Naturschutzbehörden, Naturschutzverbände, Unternehmen und andere staatliche und nicht-staatliche Akteure. Die Länder unterscheiden sich in ihren institutionellen Rahmenbedingungen, bezüglich der in Entscheidungen involvierten Ebenen und den Arten ökologisch-administrativer Grenzen, denen sie begegnen. Lokale Maßnahmenträger teilen bestimmte Arten von Umsetzungshürden, wenn auch die Details variieren. Diese Umsetzungshürden sind Motivation, finanzielle und personelle Ressourcen, Landressourcen und institutionelle Zielkonflikte. Die Ergebnisse hier spiegeln weniger den einzelnen Fall wider, der zur Illustration der Hürden herangezogen wurde, als die Summe aller analysierten lokalen Akteure, die WRRL-Maßnahmen umsetzen. Diese begegnen den dargestellten Hürden in unterschiedlichem Ausmaß. Manche dieser Hürden werden von den Ländern mit unterschiedlichen Strategien adressiert.

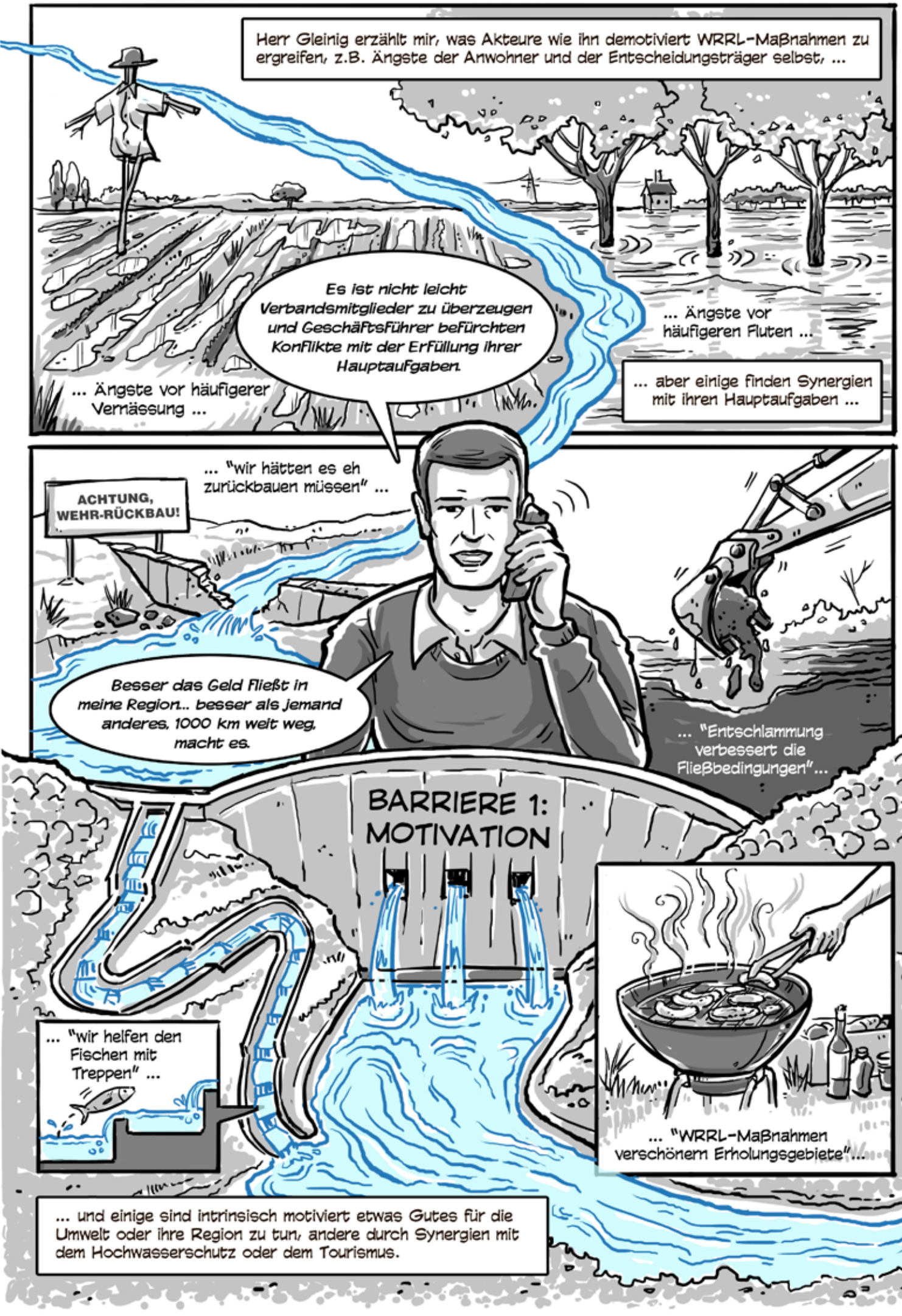
Daten für diese Analyse wurden durch 66 semi-strukturierte Interviews mit Behörden und Maßnahmenträgern aller Ebenen sowie nicht-staatlichen Akteuren in sechs Bundesländern gewonnen — Hessen, Niedersachsen, Sachsen, Sachsen-Anhalt, Thüringen und Nordrhein-Westfalen — und durch die Auswertung von Politikdokumenten und offiziellen Webseiten ergänzt.

Schlagwörter: EU Wasserrahmenrichtlinie, WRRL, Politik-Implementierung, Umsetzungshürden, Umsetzungsstrategien, Deutschland, Sachsen-Anhalt, Comic





*Name geändert


Herr Gleinig erzählt mir, was Akteure wie ihn demotiviert WRRL-Maßnahmen zu ergreifen, z.B. Ängste der Anwohner und der Entscheidungsträger selbst, ...
... Ängste vor häufigerer Vernässung ...
Es ist nicht leicht Verbandsmitglieder zu überzeugen und Geschäftsführer befürchten Konflikte mit der Erfüllung ihrer Hauptaufgaben.
... Ängste vor häufigeren Fluten ...
... aber einige finden Synergien mit ihren Hauptaufgaben ...
ACHTUNG, WEHR-RÜCKBAU!
... "wir hätten es eh zurückbauen müssen" ...
Besser das Geld fließt in meine Region... besser als jemand anderes, 1000 km weit weg, macht es.
... "Entschlammung verbessert die Fließbedingungen"...
BARRIERE 1: MOTIVATION
... "wir helfen den Fischen mit Treppen" ...
... "WRRL-Maßnahmen verschönern Erholungsgebiete"...
... und einige sind intrinsisch motiviert etwas Gutes für die Umwelt oder ihre Region zu tun, andere durch Synergien mit dem Hochwasserschutz oder dem Tourismus.

Ressourcen sind wichtig für Umsetzungsentscheidungen. Sachsen-Anhalt bietet als einziges der 6 Bundesländer eine 100%-Finanzierung, aber selbst hier tauchen finanzielle und personelle Hürden auf. ...

... WRRL-Maßnahmen erhöhen die Arbeitsbelastung...

ZU TUN

GETAN

Ich bin vor Gericht gezogen worden für die Planung von WRRL-Maßnahmen während meiner Arbeitszeit für den Verband.

... "Ein Fisch-Fahrstuhl!??"

BARRIERE 2:

FINANZIELLE

PERSONELLE

RESSOURCEN

FINANZIERUNGS-ANTRAGS-FORMULARE

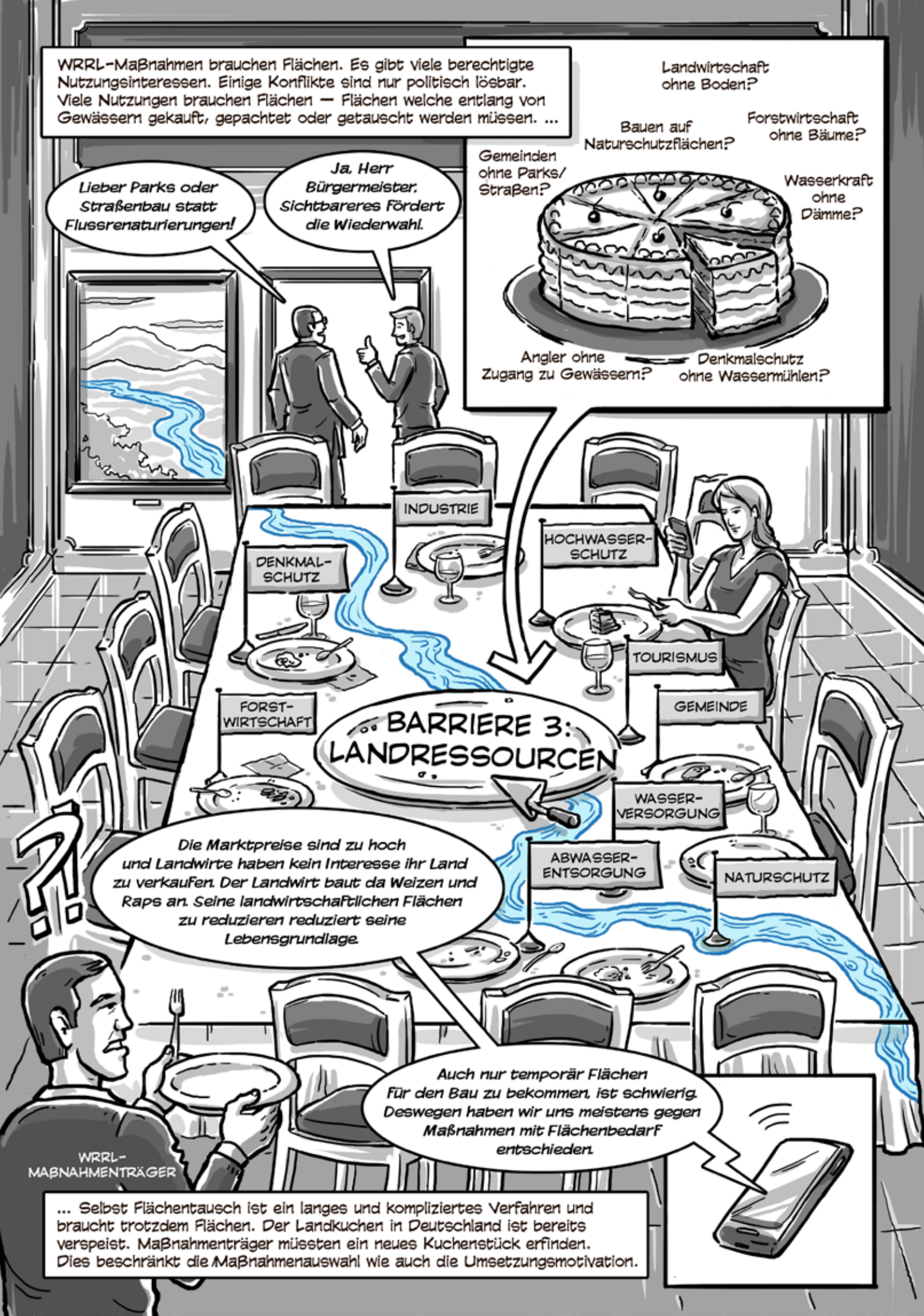
... Genehmigungsverfahren erhöhen die Arbeitsbelastung...

Wenn meine Mitglieder – hauptsächlich Landwirte – nicht betroffen sind und es sie nichts kostet, bin ich frei Maßnahmen umzusetzen – jährlich nach Zustimmung durch die Mitgliederversammlung.

Ich riskiere die Förderung und unverhältnismäßig hohe Strafen, wenn ich Fehler im Vergabeprozess mache. Dann habe ich diesen Job die längste Zeit gemacht.

... "Wer macht die Vorplanung ohne Bezahlung??"...

Nicht allen, aber vielen lokalen Akteuren in Deutschland mangelt es an Wissen oder Personal WRRL-Maßnahmen selbst zu planen. Förderanträge sind komplex, erfordern Eigenanteile oder Planungstiefen vorab, die Akteure nicht erfüllen können.


WRRL-Maßnahmen brauchen Flächen. Es gibt viele berechtigte Nutzungsinteressen. Einige Konflikte sind nur politisch lösbar. Viele Nutzungen brauchen Flächen — Flächen welche entlang von Gewässern gekauft, gepachtet oder getauscht werden müssen. ...
Lieber Parks oder Straßenbau statt Flussrenaturierungen!
Ja, Herr Bürgermeister, Sichtbareres Fördert die Wiederwahl.
Landwirtschaft ohne Boden?
Forstwirtschaft ohne Bäume?
Bauen auf Naturschutzflächen?
Gemeinden ohne Parks/ Straßen?
Wasserkraft ohne Dämme?
Angler ohne Zugang zu Gewässern?
Denkmalschutz ohne Wassermühlen?
INDUSTRIE
DENKMAL-SCHUTZ
HOCHWASSER-SCHUTZ
TOURISMUS
GEMEINDE
FORST-WIRTSCHAFT
BARRIERE 3: LANDRESSOURCEN
WASSER-VERSORGUNG
ABWASSER-ENTSORGUNG
NATURSCHUTZ
?!
Die Marktpreise sind zu hoch und Landwirte haben kein Interesse ihr Land zu verkaufen. Der Landwirt baut da Weizen und Raps an. Seine landwirtschaftlichen Flächen zu reduzieren reduziert seine Lebensgrundlage.
Auch nur temporär Flächen Für den Bau zu bekommen, ist schwierig. Deswegen haben wir uns meistens gegen Maßnahmen mit Flächenbedarf entschieden.
WRRL-MAßNAHMENTRÄGER
... Selbst Flächentausch ist ein langes und kompliziertes Verfahren und braucht trotzdem Flächen. Der Landkuchen in Deutschland ist bereits verspeist. Maßnahmenträger müssten ein neues Kuchenstück erfinden. Dies beschränkt die Maßnahmenauswahl wie auch die Umsetzungsmotivation.

Einige Konflikte werden durch Gesetze verursacht – festgeschriebene Interessen, Ziele oder Prozeduren. Dies erschwert die Neuverteilung des Kuchens zusätzlich, auch wenn die Akteure selbst kompromissbereiter sind. ...

Mein Verband war schon vor meiner Zeit aktiv und grundsätzlich halte ich die WRRL für etwas Gutes. Aber diese Hürden demotivieren meine Kollegen. Vielleicht möchte ich mir WRRL-Maßnahmen bald auch nicht mehr antun.

BARRIERE 4: REGULIERUNG

Naturschutzrecht

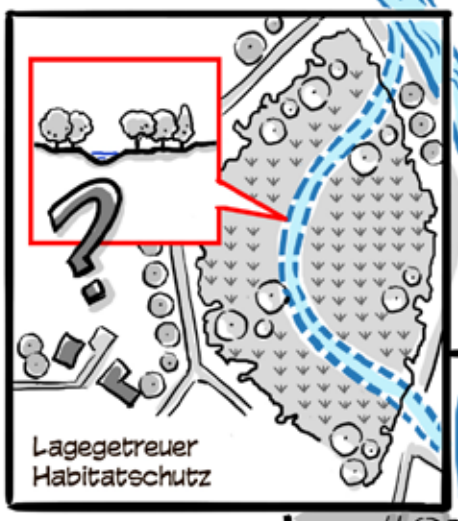
Schützt bestimmte Arten und ihre Habitate

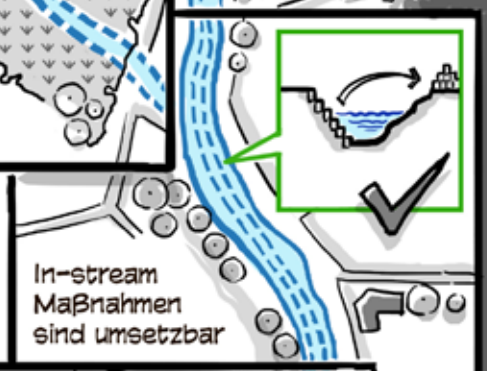
Bautätigkeiten während der Brutzeiten verboten

Eingriffe in die Natur sind auszugleichen

WRRL-Maßnahmen können als Eingriff zählen

WRRL-Maßnahmen können Eingriffe (nicht) ausgleichen

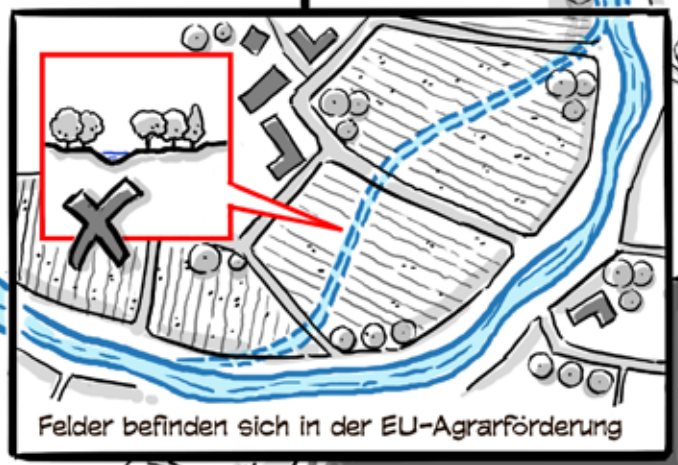




Agrarpolitik

Flächen-basierte Agrarförderung

Die Flächen-basierte Agrarförderung ist so hoch, dass Landwirte ihr Land nicht verkaufen, auch wenn es keinen hohen Wert für den Anbau hat. So behindert die EU-Agrarpolitik die Flächenbereitstellung zusätzlich.

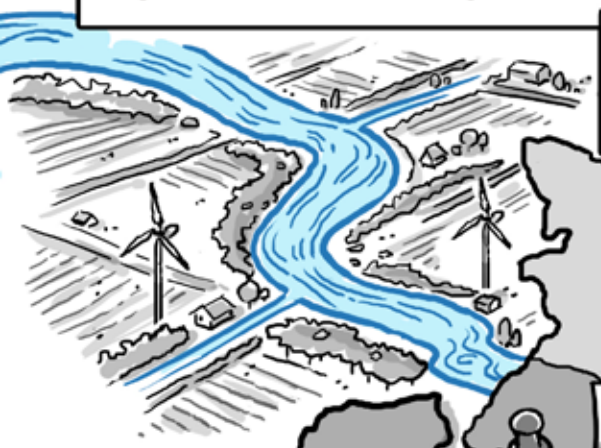


Erneuerbare-Energien--Gesetz

... Die Lösung von Konflikten erfordert hier politische Entscheidungen und politische Stärke lokaler Akteure – welches Ziel bekommt Priorität? Lokale politische Entscheidungen mögen nicht im Sinne der WRRL ausfallen.

Die Zahlen zur Zielerreichung, insbesondere zu noch nicht begonnenen Maßnahmen, zeigen uns den Veränderungsbedarf.

Wie in einem großen Experiment nehmen die Bundesländer immer wieder inkrementelle Änderungen zur Prozessverbesserung vor, lokale Akteure wählen individuelle Strategien, aber reicht all das aus? ...



LÖSUNGSWEGE?

- Gewässerallianzen
  → MOTIVATION
  → PERSONAL

REGULIERUNG
- Bestehende Genehmigungsverfahren
- Gemeinsame Planung
- Maßnahmen möglichst klein definieren
- Konfliktvermeidung

- 100%-Förderung

Gewässerberater:
- Bezirksregierung
- Kommunalagentur

→ MOTIVATION

Gewässerberater:
- Aufbaubank
- Neue Gewässerunterhaltungsverbände

→ MOTIVATION

PERSONAL & MOTIVATION
- Aufgaben an größere Einheit:
  - An Kreisbehörde
  - An einen Zweckverband
- Auftrag vergeben:
  - An Landschaftspflegeverband
- Motivieren:
  - Kreis → Wasser- und Bodenverbände (Übernahme der Eigenbeteiligung aus Kompensationsgeldern + Beratung)

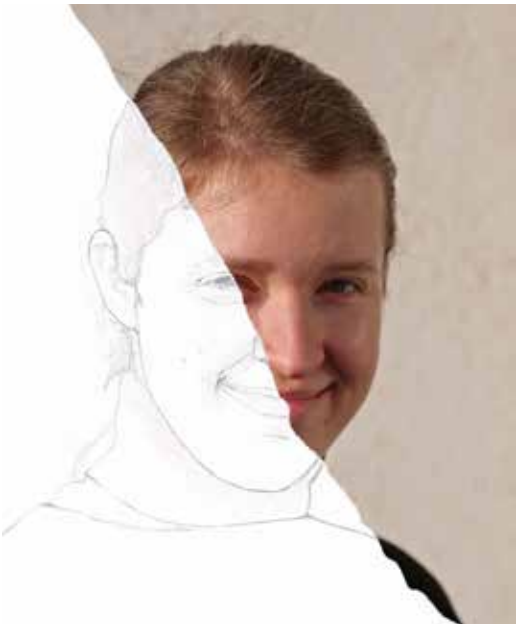
LAND & FINANZIELLE RESSOURCEN
Gemischte Strategien
- Flächenbedarf vermeiden
- Flächennutzung wenn verfügbar
- Flächentausch
- Nutzung von A+E-Instrumenten für (Ko-)Finanzierung & Flächenbeschaffung
- Flächenankauf vor Planungen
- Ko-Finanzierung durch Stiftungen, Gemeinden, Kreise ...

... Wir mögen den ganzen Weg zurück schwimmen und jede Hürde mehr oder weniger gut bewältigen. Letztlich, erscheint die Motivationsbarriere von außen unüberwindbar. Sollten wir überdenken, wen wir erwarten WRRL-Maßnahmen umzusetzen? Und was können WRRL-Akteure voneinander an Strategien lernen?

Danksagung

Wir möchten allen Interviewpartnern für ihre Offenheit und die zahlreichen Stunden ihrer begrenzten Zeit danken, die sie uns zur Beantwortung unserer Fragen geschenkt haben. Wir danken auch Timothy Moss für das Kommentieren des Entwurfes dieses Comics. Wir sind dem IRI THESys dankbar für die Finanzierung und Unterstützung dieses Projektes für eine alternative Wissenschaftskommunikation, insbesondere Anne Dombrowski und Kathrin Klementz.

Die Autor*innen



"Ich habe genossen, wie Nikhil und ich uns Visualisierungsideen bei deren Entwicklung immer wieder gegenseitig zugeworfen haben. Es hat mir gezeigt, dass Wissenschaftskommunikation schon bei der Entwicklung einer Veröffentlichung beginnen kann, indem man das Thema dem Künstler erklärt. Selbst der Entwurf des Comics mag schon als Türöffner für die Kommunikation mit Leuten aus der Praxis fungieren, da er viel einfacher zu erfassen ist."

Die Wissenschaftlerin

Nadine hat parallel Integrated Natural Resource Management M.Sc. an der Humboldt-Universität zu Berlin und Technischer Umweltschutz M.Sc. an der Technischen Universität Berlin studiert. Sie interessiert sich für Wasser- und Bodenthemen aus den unterschiedlichsten Perspektiven und erweitert ihren Blickwinkel gerne durch interdisziplinäre Arbeit.
In ihrer Doktorarbeit untersucht sie, wie polyzentrische Governance Strukturen die lokale Umsetzung der EU-Wasserrahmenrichtlinie in Deutschland beeinflussen: wie Flussgebietsmanagement realisiert wird, wie die Integration verschiedener Sektoren und Öffentlichkeitsbeteiligung bei Umsetzungsprozessen funktioniert und welchen Hürden lokale Akteure begegnen, die diese Richtlinie umsetzen.

Foto von Andreas Renkewitz,
Zeichnung und Collage von Nadine Schröder

"Nadine's Forschung hat mir gezeigt, wie Umweltpolitik und lokale Entscheidungsprozesse im deutschen regionalen Kontext funktionieren. Die gemeinsame Entwicklung hat mir gezeigt, wie gut sich das Medium Comic eignet solch ein komplexes und multi-dimensionales Thema zu präsentieren — durch die Wechselwirkung zwischen Ideen, Text, Komposition, visuellen Motiven und grafischen Redensarten. Das Erzählen der daraus resultierenden Geschichte war ein absolutes Vergnügen!"

Der Künstler

Nikhil Chaudhary ist Architekt und Stadtplaner und hat kürzlich seinen Master in Public Policy an der Hertie School of Governance in Berlin abgeschlossen. Vorher hat er sich am World Resources Institute für Initiativen für nachhaltige Stadtentwicklung in Asien eingesetzt. Seine künstlerische Tätigkeit, zunächst nebenbei betrieben um urbane Themen wirkungsvoll einem nicht-technischen Publikum mit Hilfe von Comics zu kommunizieren, hat sich nachfolgend über Indien und Europa hinaus verbreitet. Seine Geschichten wurden bereits in diversen Print- und Online-Medien in sechs Ländern veröffentlicht.
Nikhil arbeitet derzeit als Berater (Urbaner Wandel) für das European Institute of Innovation & Technology's (EIT) Climate Knowledge & Innovation Community (Climate-KIC).

Foto von Udayabhanu Prakash Vaddi,
Zeichnung und Collage von Nadine Schröder

Humboldt-Universität zu Berlin
IRI THESys
Unter den Linden 6
10099 Berlin

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Umsetzungsprozesse der EU-Wasserrahmenrichtlinie in Deutschland:

Teil 1 – WRRL-Zielerreichung zwischen Plan und Machbarkeit

Nadine Jenny Shirin Schröder (Lüneburg/Berlin)

Zusammenfassung

Die EU Wasserrahmenrichtlinie hat zum Ziel, zeitlich und inhaltlich strukturiert, die Ressource Wasser ganzheitlich und nachhaltig zu schützen. Dazu sind von den Mitgliedstaaten festgelegte Ziele zu erreichen und entsprechende Maßnahmen umzusetzen. Basierend auf einer Untersuchung zur Umsetzung von Maßnahmen der Hydromorphologie und Durchgängigkeit in Sachsen-Anhalt, Sachsen, Niedersachsen, Thüringen, Hessen und Nordrhein-Westfalen wird gezeigt, dass sich die Maßnahmenauswahl Vorort vorrangig an der Machbarkeit statt an übergeordneten Plänen und Konzepten orientiert. Ausgehend von einer theoretischen Perspektive auf Pläne werden ihre praktische Nutzung sowie governancebezogene Umsetzungshürden und lokale Lösungsstrategien in den sechs Bundesländern diskutiert. Daraus folgernd zeigt dieser Beitrag welche Eigenschaften Pläne haben sollten, um unterschiedlich stark motivierte Maßnahmenträger bei der Maßnahmenumsetzung zu unterstützen.

Schlagwörter: Wasserrahmenrichtlinie, Umsetzung, Hydromorphologie, Maßnahmen, Governance, Gewässerentwicklungskonzepte

DOI: 10.3243/kwe2020.09.003

Abstract

Implementation processes for the EU Water Framework Directive in Germany: Part 1 – Reaching WFD goals between planning and feasibility

The EU Water Framework Directive aims to conserve water resources in a holistic and structured manner in a way that is structured in time and content. Member states need to achieve specified targets and implement measures to this end. An analysis of hydromorphological and connectivity measures in the German states of Saxony-Anhalt, Saxony, Lower Saxony, Thuringia, Hesse and North-Rhine Westphalia reveals that the selection of measures at a local level is primarily geared towards feasibility issues rather than higher-level plans or strategies. This article discusses practical use issues and governance-related barriers to implementation and local coping strategies in these six federal states based on a theoretical perspective of plans. In conclusion, this article shows the characteristics that plans should have to support bodies with varying degrees of motivation as they implement measures.

Key Words: water Framework Directive, governance, implementation, hydromorphology, measures, River development concepts

1 Anlass, Datengrundlage und Umsetzungsstrukturen

Durch die Wasserrahmenrichtlinie (WRRL) wissen wir mehr denn je über unsere Gewässer: Das ist eine Errungenschaft für sich. Nichtsdestotrotz, erscheint die Erreichung ihrer ambitionierten Ziele bis 2027 unwahrscheinlich [1]. An manchen Orten hat nicht einmal die Maßnahmenumsetzung begonnen, verzögert sich oder die Maßnahmen reichen nicht aus [2]. Gründe dafür sind unter anderem in den Governance-Strukturen und Prozessen zu finden. Zu diesen zählen die gewählten organisatorischen Strukturen und Instrumente, (nicht) festgesetzte Regularien und Koordinations- und Beteiligungsprozesse.

Dieser Beitrag stellt die theoretische Perspektive auf Pläne und Konzepte und deren Nutzung in sechs Bundesländern den alltäglichen governancebezogenen Umsetzungshürden und den entsprechenden lokalen Lösungsansätzen gegenüber und zeigt damit wie die WRRL-Maßnahmenumsetzung in Qualität und Quantität eher Machbarkeitsaspekten statt übergeordneten Plänen folgt.

Der Beitrag basiert auf der, noch nicht vollständig abgeschlossenen, Doktorarbeit „Polycentricity and the Implementation of the EU Water Framework Directive in Germany“ [3], welche auf der Masterarbeit zu einem ähnlichen Inhalt aber bezogen auf Berlin und Hamburg [4] aufbaut. Die Daten stammen hauptsächlich aus:

- 70 semi-strukturierten Interviews mit 78 Personen (2017–2019) in sechs Bundesländern (siehe Tabelle 1) und
- einer Umfrage mittels Fragebogen (Herbst 2019; vorrangige Ansprache der Flächenländer): 92 Rückmeldungen aus 14 Bundesländern, davon 44 (potenzielle) Maßnahmenträger (siehe Abbildung 1)

Die Doktorarbeit fokussiert auf Maßnahmen im Bereich Hydromorphologie und Durchgängigkeit. In anderen Bundesländern und für andere Maßnahmentypen kann die Situation durch andere Akteursstrukturen und Prozesse von den hier dargelegten Erkenntnissen abweichen.

Tabelle 1 zeigt die Konstellationen an (potenziellen) Maßnahmenträgern, mehrheitlich Träger der Gewässerunterhaltung, in den sechs Bundesländern. Die Umsetzungsstrukturen sind hinsichtlich der Verwaltungsstrukturen [5, 6] und damit

Akteurstypen	Sachsen-Anhalt	Sachsen	Niedersachsen	Thüringen	Hessen	Nordrhein-Westfalen
Ministerien	S	S*	S	S	S	S
Mittelbehörden	S			S		
Unterstützende Fachbehörde		•			•	
Bezirksregierungen/ Regierungspräsidien/ Landesdirektion		S			S/ X*	S/ X
Landesbetriebe	X	X	X	X		
Kreise (untere Wasserbehörde)	•	•	(X)	•	•	(X)
Kreise (untere Naturschutzbehörde)	•		(X)			
Kreisfreie Städte		X	X	X	X	X
Gemeinden		X*	X*	X	X	X*
Unterhaltungsverbände	X		X	+		
Wasser- und Bodenverbände			X*			X*
Sondergesetzliche Wasserverbände						X
Zweckverbände			(X)	X	X	
Naturschutzverbände	•		•	X	•	•
Landschaftspflegeverbände		(X)		(X)		

S: Akteure mit Steuerungsaufgaben; X: anvisierte Maßnahmenträger; (X): einzelne Akteure dieses Typs setzten WRRL-Maßnahmen um, obwohl sie nicht adressiert werden; * Kein Akteur exemplarisch interviewt; + flächendeckende Gründung von Unterhaltungsverbänden 2020

• zusätzliche Interviews

Naturschutzverbände: BUND und NABU Sachsen-Anhalt; BUND Niedersachsen; NATURA2000-Station „Auen, Moore, Feuchtgebiete“ und Flussbüro Erfurt; NABU Hessen; Wassernetz NRW

Weitere Interviewpartner: Wasserstraßen- und Schifffahrtsamt Magdeburg (Sachsen-Anhalt), Wasserstraßen- und Schifffahrtsamt Dresden (Sachsen), gemeinnützige Fortbildungsgesellschaft für Wasserwirtschaft und Landschaftsentwicklung GmbH (Hessen), Kommunal Agentur NRW und Arbeitsgemeinschaft der Wasserwirtschaftsverbände (NRW), Gewässerberater der Thüringer Aufbaubank und Gemeinde- und Städtebund (Thüringen), Kommunale Umwelt Aktion U.A.N., NLWKN Naturschutz und Stadtentwässerung Braunschweig (Niedersachsen) und FGG Weser

Tabelle 1: Akteure der WRRL-Umsetzung und Abdeckung dieser Akteurstypen durch Interviews

auch der Akteure und deren originären Aufgabenzuschnitt in den einzelnen Bundesländern unterschiedlich. In der Mischung aus Akteurstypen gleicht keines der sechs Bundesländer einem der anderen, aber es gibt Gemeinsamkeiten, wie z. B. Gemeinden/ kreisfreie Städte als anvisierte Maßnahmenträger in fünf Bundesländern. Darüber hinaus finden sich Akteurstypen, von denen einzelne Organisationen WRRL-Maßnahmen umsetzen, zum Beispiel Kreisbehörden, Zweckverbände und Landschaftspflegeverbände. Die Umsetzungsstrukturen variieren, gleichwohl ähneln sich die grundsätzlichen Problemstellungen bei der Umsetzung.

2 Konzepte als Ideen-Geber und Auswahlbeschränkung

Aus theoretischer Sicht oder aus Sicht des Prozesssteuerers können Pläne und Konzepte anzeigen, wo es Handlungsbedarf gibt, welche Ursachen dieser hat und welche Maßnahmen umgesetzt werden sollen, und damit eine zielgerichtete Umsetzung von Maßnahmen ermöglichen. Für die konkrete Maßnahmenauswahl und Umsetzung könnte der Maßnahmenträger die zuständige Behörde ansprechen, um Details zu erarbeiten und Unklarheiten auszuräumen. Außerdem können, und werden, Pläne und Konzepte in einigen Bundesländern genutzt, um darüber Finanzierungsentscheidungen zu treffen, welche steuernd auf die Maßnahmenauswahl wirken können: so werden z. B. Maßnahmen nicht oder nur nachrangig gefördert, wenn sie nicht in den Plänen aufgeführt sind. Nur bestimmte Maßnahmentypen, nur Maßnahmen an bestimmten Gewässern oder nur bestimmte Maßnahmenträger werden gefördert.

Aus praktischer Sicht ist festzuhalten, dass aufgrund des Wissensstandes noch Ungewissheit darüber besteht, was genau alles nötig sein wird, um den guten Gewässerzustand zu erreichen. Ohne übergeordnete Planwerke geht es auch nicht – insbesondere, weil sie bei multiplen Belastungsursachen [7] einen Orientierungsrahmen bieten vor allem für Akteure, die weniger eigene Anreize haben oder nur geringes eigenes Know-How zur Umsetzung mitbringen. Dies macht eine zyklische Überprüfung der Ergebnisse und Anpassung der Pläne, wie sie im großen Rahmen in der WRRL angelegt ist, auch regional und lokal unabdingbar.

Vom Bewirtschaftungsplan (BWP) oder Maßnahmenprogramm (MP) bis hin zum Gewässerunterhaltungsplan zeigen sich in der Praxis der sechs Bundesländer verschiedenste Span-

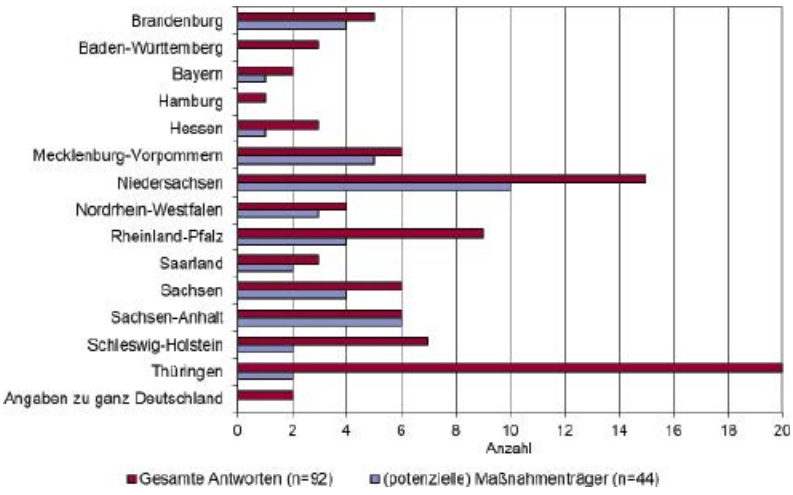

Abb. 1: Rückmeldungen auf die Umfrage 2019 aufgeschlüsselt nach Bundesländern

nungsbögen für Umfang, Ausgestaltung und Nutzung von Plänen und Konzepten:

- Mit oder ohne Berücksichtigung von Restriktionen
- Anspruch auf Vollplanung oder exemplarische Sammlung von Maßnahmen
- Grobe oder genaue räumliche Konkretisierung
- Minimale oder maximale fachliche Ambitionen
- Stichwortzettel oder Genehmigungsplanungsreife
- Übersichtlichkeit, Daten(über)angebot und Operationalisierbarkeit
- Erstellung mit oder ohne Ortskenntnisse
- Fokus auf Defizitermittlung und Kausalanalyse oder Maßnahmenausgestaltung
- Erstellung durch Maßnahmenträger (bzw. in deren Auftrag) oder durch andere Akteure
- Erstellung mit oder ohne Beteiligungsprozesse
- Für fachlich versierte Akteure oder für Laien
- Für motivierte oder noch zu überzeugende Akteure
- Orientierung an Einzugsgebieten oder administrativen Grenzen
- Hohes oder niedriges Budget und Zeitrahmen für die Planerstellung
- Detailliertere Planungen basierend auf übergeordneten Plänen, Grundlage für übergeordnete Pläne/ Berichte oder losgelöst von übergeordneten Plänen wie BWP/ MP
- Anlass: WRRL oder vorrangig aus anderen Gründen wie Hochwasserschutz oder Naturschutz
- Vorgeschriebene Nutzung als Planungsgrundlage, Grundlage für den Vollzug oder freiwillige Nutzung
- Zeitpunkt der Planerstellung im Verhältnis zu Aktivitäten der Akteure

Viele dieser Aspekte hängen voneinander ab, so erschwert zum Beispiel ein geringes Budget und ein kurzer Zeitrahmen umfangreiche Beteiligungsprozesse. Letztere verlieren an Relevanz für das Konzept, wenn Restriktionen noch nicht berücksichtigt werden sollen. Je nach Ausgestaltung erfüllen die gefundenen Planwerke verschiedenste Funktionen für Prozesssteuerer oder Maßnahmenträger unterschiedlichen Typs:

- Priorisierung und Ausschluss von Maßnahmen
- Aufzeigen des fachlich notwendigen Umfanges von Maßnahmen
- Pflichtigkeit aufzeigen und Aufgabenverteilung
- Grundlage für ordnungsrechtlichen Vollzug durch Nachweis der örtlichen Erforderlichkeit
- Ideen-Geber zur Nutzung von Anlässen
- Spezifischer Fahrplan für die Umsetzung
- Grundlage für Anträge, Kostenschätzung, Genehmigungsbedarfsschätzung
- Grundlage für Verfahrensbeschleunigung durch Vorratsplanfeststellung
- Nachweis fachlicher Fundierung von Maßnahmen
- Prognose zur Relevanz einzelner Maßnahmen
- Andere Nutzungsinteressen integrierende Planung
- Kommunikationsmittel

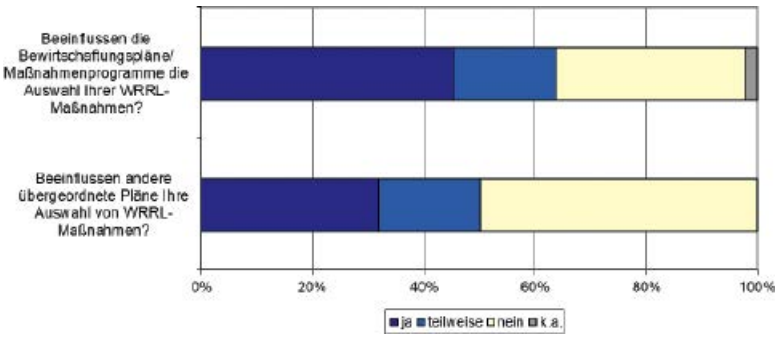

Abb. 2: Einfluss übergeordneter Planungen auf die lokale Maßnahmen-Auswahl (n=44)

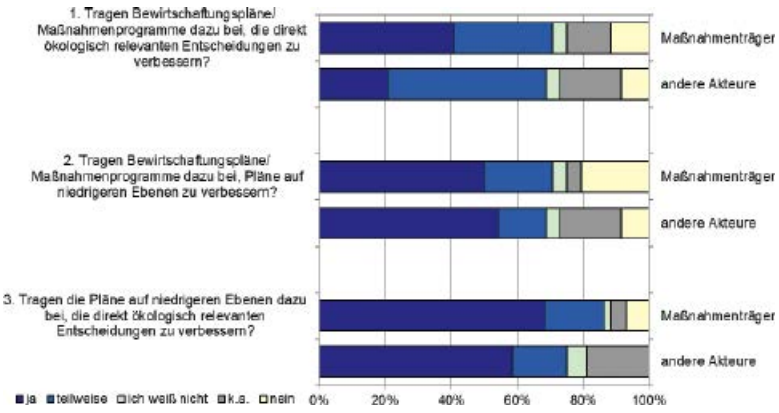

Abb. 3: Einfluss übergeordneter Pläne auf direkt ökologisch relevante Entscheidungen - ob und welche Maßnahmen umgesetzt werden (n=44 Maßnahmenträger/ n=48 andere Akteure)

Jegliche Art von Plan oder Konzept erfordert Aufwand und kostet nicht unerhebliche Mengen Geld – zu viel um regelmäßig in Schubladen zu landen (Einzelfälle werden nie auszuschließen sein). Aufwand und Umfang eines Planes sollten deswegen aus Sicht des Prozesssteuerers seiner Nutzung angepasst sein. Entsprechend der Erwartungen der Prozesssteuerer finden sich in den sechs Bundesländern unterschiedliche Pläne und Konzepte, deren Erstellung unterschiedlich gefördert und forciert wird, individuell nutzen Akteure auch andere Ansätze (siehe: Tabelle 2, die Auflistung ist möglicherweise nicht vollständig). Aber entspricht die tatsächliche Nutzung von Plänen und Konzepten den theoretischen Erwartungen?

In den Interviews hat sich gezeigt, dass bei der Auswahl umzusetzender Maßnahmen BWPs und MPs sowie andere übergeordnete Konzepte oft keine Rolle spielen [14]. Thüringer Maßnahmenträger berichteten noch am Häufigsten, diese zu nutzen. In der Umfrage gaben 63 % der Maßnahmenträger einen mindestens teilweisen Einfluss der Pläne auf ihre Maßnahmenauswahl an (siehe Abbildung 2). Bei der Frage, ob die genannten Pläne grundsätzlich ökologisch relevante Entscheidungen beeinflussen, fallen die Zahlen für einen mindestens teilweisen Einfluss höher aus (siehe Abbildung 3). Insbesondere der geringe Detailgrad, die Nicht-Berücksichtigung von Restriktionen (z. B. Grundstücksverfügbarkeit) und die mangelnde Ortsspezifität der Pläne begründen deren begrenzten Einfluss (siehe Abbildung 4). Als ‚Andere Gründe' wurden die Verbindlichkeit nur für Behörden, zu hohe Komplexität, Rigidität und Bürokratie, die Nicht-Planbarkeit von Chancen zur Umsetzung, ein zu geringer Bekanntheitsgrad und die reine Ausrichtung

Land	Pläne zur Umsetzung der WRRL	Förderung der Konzept-Erstellung	Bemerkung
Sachsen-Anhalt	GEKs seit 2009	ja	Alle GEKs erstellt durch den Landesbetrieb für Hochwasserschutz und Wasserwirtschaft
Sachsen	Beispielhafte Vorhabens- und Sanierungspläne seit 2019 (Erlass 2017; durch Landesamt für Umwelt, Landwirtschaft und Geologie zusammen mit der Landestalsperrenverwaltung)	nein	Maßnahmenermittlung durch Gewässerbegehungen (Erlass 2017); Individuell: Landschaftsplan, Flächennutzungsplan, funktionales GEK (Hochwasser, Gewässerökologie, Erlebbarkeit) bereits vor WRRL
Niedersachsen	GEK	ja	Keine Erwähnung durch Maßnahmenträger innerhalb dieser Untersuchung; Individuell: Landschaftsrahmenplan, Gewässerunterhaltungsrahmenplan
Thüringen	Gewässerrahmenplan (durch Thüringer Landesamt für Umwelt, Bergbau und Naturschutz), GEK/ GUP seit 2008	ja	GEPs schon vor WRRL; Individuell: GUP
Hessen	Maßnahmensteckbriefe (durch Hessisches Landesamt für Naturschutz, Umwelt und Geologie), GEPs und Machbarkeitsstudien	ja	Beauftragung durch Regierungspräsidien, Förderung über Gewässerberatungsleistungen seit 2012; Individuell: Ausgleichskonzept, Gewässerschau
Nordrhein-Westfalen	Umsetzungsfahrpläne 2012 (durch Bezirksregierungen)	ja	KNEF-Förderung schon vor WRRL; Individuell: GUP

KNEF: Konzepte zur naturnahen Entwicklung von Fließgewässern, GUP: Gewässerunterhaltungsplan, GEK: Gewässerentwicklungskonzept, GEP: Gewässerentwicklungsplan

Tabelle 2: In den Bundesländern vorhandene Pläne und Konzepte unterhalb der BWPs und MPs mit Relevanz für die WRRL-Umsetzung

auf Dokumentation und Berichterstattung statt auf Umsetzungsabsichten genannt.

3 Alltägliche Hürden der lokalen Maßnahmenumsetzung

Im Folgenden werden alltägliche Hürden dargestellt, die beeinflussen, ob und inwieweit sich Maßnahmenträger nach übergeordneten Plänen bei der Maßnahmenumsetzung richten. Die hier genannten Hürden gibt es in allen sechs Bundesländern, im Detail gibt es aber Unterschiede. Diese Unterschiede gilt es zu beachten, wenn Hürden effektiv abgebaut werden sollen. Pauschale Lösungen gibt es nicht. Aus den Interviews ergaben sich Personalmangel und Know-How, finanzielle Ressourcen, Flächenverfügbarkeit, Inkohärenzen zwischen verschiedenen Politikbereichen, organisatorische Abhängigkeiten und Motivation zur Umsetzung von Maßnahmen als übergreifende Umsetzungshürden (visualisiert als Wissenschaftscomic: [8], vergleiche dazu auch [1, 9, 10]), welche im Folgenden näher erläutert werden. Abbildung 5 zeigt die Relevanz dieser Hürden aus der Umfrage – Flächenverfügbarkeit, Bürokratie und Personalmangel werden von Maßnahmenträgern hier als größte Hürden wahrgenommen.

Da aktuell das Freiwilligkeitsprinzip angewendet wird [11], entscheidet die **Motivation** der Akteure darüber, ob überhaupt und welche Maßnahmen angestrebt werden noch bevor andere Hürden zum Tragen kommen. Die übrigen Hürden wären auch zu erwarten, wenn eine Umsetzungspflicht bestünde. Sie treten häufig bei der Implementierung neuer Gesetze auf, da sich das System und dessen Akteure erst an die neuen Anforderungen anpassen müssen und die Anforderungen selbst erst mit der Zeit an Klarheit gewinnen. Da die Umfrage überwiegend von Maßnahmenträgern beantwortet wurde, die bereits Maßnahmen umsetzen und damit motiviert sind, verwundert es nicht, dass der Motivation (‚Ich fühle mich nicht zuständig…', ‚mangelnde Unterstützung der eigenen Organisation') eine geringere Bedeutung als Hürde zugeschrieben wurde, als sie sich aus den Interviews ableiten lässt, die auch die Situation anderer potenzieller Maßnahmenträger thematisiert hatten.

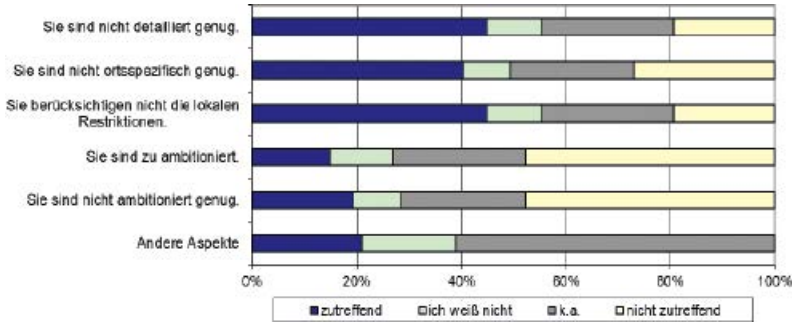

Abb. 4: Gründe für keinen oder nur einen teilweisen Einfluss von BWPs/ MPs auf direkt ökologisch relevante Entscheidungen - ob und welche Maßnahmen umgesetzt werden (n=67)

Die bestehenden **Finanzierungs**programme der Länder für WRRL-Maßnahmen stellen für die anvisierten Maßnahmenträger eher selten einen Anreiz dar, freiwillig WRRL-Maßnahmen umzusetzen. Im Endeffekt müssten die Maßnahmenträger aufgrund der aktuellen Gesetzeslage immer draufzahlen: durch Eigenanteile, Personalleistung, Zinsen, oder die persönliche Arbeitsbelastung. Hürden sind aktuell weniger die insgesamt zur Verfügung stehenden Finanzmittel als eher das Aufbringen von Eigenanteilen, bestehende aufwändige Antragsverfahren oder eine mühsame und zeitintensive Abwicklung (siehe Tabelle 3). Insbesondere die

Finanzmittelumfang
● Schwierigkeiten Eigenanteile zu beschaffen ● zulässige Quellen von Eigenanteilen (z. B. nur öffentliche Mittel) ● Vorfinanzierung
Antragsverfahren
● Vorplanungstiefe (mangelndes Know-How oder Kapazitäten, personell oder finanziell) ● keine nachträgliche Abrechnung der Vorplanungsleistung eines Planungsbüros ● zeitlicher Ablauf (unpassend für Umsetzungsmöglichkeiten wegen Bauzeitbeschränkungen oder der begrenzten Verfügbarkeit von Bauunternehmen) ● hoher bürokratischer Aufwand
Abwicklung
● kein Abdecken von Zinsen oder Überziehungszinsen (Risiko des Maßnahmenträgers) ● zusätzliche Arbeitsbelastung, Zeitverzug und zusätzliches Risiko durch Nachtragsanträge (durch die Höhe des Gesamtvorhabens oder inflexible Zeitrahmenvorgaben für die Umsetzung) ● Sanktionierungsdrohungen und Gerichtsverfahren z. B. wegen Fehlern im Vergabeverfahren oder kurzfristige Einsparungen im Laufe der Umsetzung (Strafzahlungen, reduzierte Auszahlung) ● Vorgaben zur offenen Ausschreibung (keine lokalen Büros – lokales Wissen und informelle Lösungen für das Problem mit der Vorplanungstiefe) ● mangelnde Kollegialität im Umgang, mangelnde Möglichkeiten zu direkter Nachfrage beim Fördermittelgeber und Betreuung

Tabelle 3: Umsetzungshürden im Zusammenhang mit Finanzierungs- und Förderprogrammen

Vorfinanzierung beschränkt die Maßnahmengröße auf die Höhe der vorhandenen flüssigen Mittel eines Maßnahmenträgers, seine Risikobereitschaft und/ oder die Verfügbarkeit von Krediten bis zur Auszahlung der genehmigten Fördermittel. Dies hindert insbesondere kleine Maßnahmenträger an der Umsetzung teurer Maßnahmen.

Diese Förderkulisse trifft auf Maßnahmenträger, deren **Personal** bezüglich Arbeitskraft, Ausbildungshintergrund, Erfahrungsschatz und Motivation sehr unterschiedlich ausgestattet ist. Dabei stehen an einem Ende der Skala große Landesbetriebe, Wasserverbände oder Bezirksregierungen mit spezialisiertem Personal für Wassermanagement und kleine Kommunen mit einem ehrenamtlichen Bürgermeister oder Landwirte ohne Kenntnisse ökologischen Wassermanagements am anderen Ende. Selbst bei den größeren Akteuren ist nicht immer von in Zahl und Spezialisierung ausreichendem Personal auszugehen. Fortzusetzen ist die Kette bei Wasserbehörden, die Genehmigungen zu prüfen haben, aber auch bei der Verfügbarkeit von Planungsbüros und Bauunternehmen.

Maßnahmenträger bewegen sich nicht im luftleeren Raum, sondern in einem komplexen System aus Akteuren mit anderen Interessen. Bestehende Nutzungen begrenzen grundsätzlich die **Flächenverfügbarkeit.** Die Marktpreise sind meist höher als gemäß den Vorgaben aus öffentlichen Mitteln bezahlt werden darf, und der Zeitbedarf für die Flächenbereitstellung, z. B. bei Flurbereinigungsverfahren oder Flächentausch, ist hoch. Baugenehmigungen werden selbst dann nicht immer erteilt, wenn Flächen nur temporär in Anspruch genommen werden sollen. Selbst Flächen in öffentlicher Hand können mangels politischer Unterstützung nicht immer genutzt werden. Pläne, die Nutzungen berücksichtigen, können schnell veralten, schon innerhalb von fünf oder zehn Jahren, zum Beispiel wegen des Baubooms oder sich wandelnder Interessenlagen der Stakeholder – auch nach Beteiligungsprozessen.

Inkohärenzen in der Gesetzgebung wurden vor allem im Bereich Naturschutzrecht, Landwirtschaftspolitik und Erneuerbare-Energien-Gesetz genannt. Die beiden letzt genannten wirken sich bei Maßnahmen zur Hydromorphologie und Durchgängigkeit vor allem über die Flächennutzungskonkurrenz aus. Dabei wurde berichtet, dass die Agrarförderung auch bei kooperativen Landwirten die Flächenbereitstellung erschweren kann: Innerhalb einer Förderperiode müssten Fördergelder rückwirkend zurückgezahlt werden, wenn das Land durch die Bereitstellung für WRRL-Maßnahmen aus der Förderung falle (Inkohärenz von Instrumenten). Bei Konflikten mit dem Naturschutzrecht [1] kollidieren unterschiedliche Leitbilder, Artenschutz und konservierender Naturschutz vs. dynamischer Gewässerschutz: Der Erhalt eines Stillgewässerbiotops kann der Anbindung ehemaliger Altarme entgegenstehen (Zielkonflikte). Das Naturschutzrecht kann außerdem die zulässigen Bauzeiten stark einschränken, z. B. (in Kombination mit Finanzierungsvorgaben) auf nur zwei Monate im Jahr. Mancherorts verursachen Renaturierungen Kompensationsverpflichtungen, weil die Ökopunkte-Regelungen den Abtrag von Boden und das Fällen von Bäumen negativer bewerten als die neugewonnene Dynamik eines Gewässers (siehe auch [4]). Durch nicht auszuräumende Zielkonflikte werden politische Entscheidungen über Prioritäten auf die lokale Ebene verlagert und fallen dann nicht notwendigerweise zugunsten des Gewässerschutzes aus.

Abhängigkeitsverhältnisse nehmen unterschiedlichste Formen an. Mitglieder (z. B. Landwirte) eines Unterhaltungsverbandes müssen den geplanten WRRL-Maßnahmen zustimmen. Die politische Unterstützung eines Bürgermeisters richtet sich nach (Wieder)Wahlthemen – ein Kindergarten oder Park mag Vorrang haben. Finanziers mögen Einfluss auf die Art der

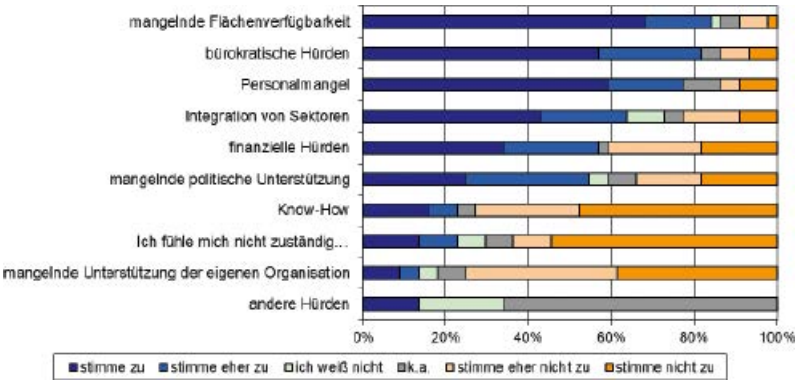

Abb. 5: Umsetzungshürden bei der lokalen Planung und Umsetzung von WRRL-Maßnahmen (n=44)

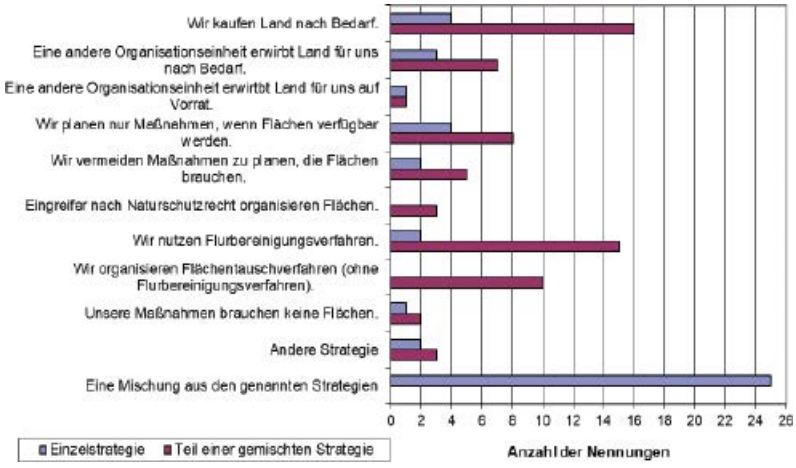

Abb. 6: Umgang der Maßnahmenträger mit der Flächenproblematik (n=44)

Maßnahmenauswahl und -umsetzung nehmen genauso wie Kooperationserfordernisse, Genehmigungsverfahren mit sehr vielen Akteuren, oder lange interne Abstimmungserfordernisse bei großen hierarchischen Akteuren.

4 Alltagslösungen: Lokaler Umgang mit Hürden

Angesichts der zahlreichen Umsetzungshürden ist es eher erstaunlich, dass überhaupt Maßnahmen umgesetzt werden [12]. Mancherorts gibt es individuelle Lösungen für die genannten Umsetzungshürden oder Wege diese zu umschiffen, die im Folgenden dargestellt werden.

Vereinzelt haben kleinere Organisationseinheiten bereits im Rahmen der Gewässerunterhaltungsaufgaben Wege gefunden, eine **Personal**-Stelle mit wasserwirtschaftlichem Bezug für die Aufgabenerfüllung einzurichten:

- Zusammenschluss zu größeren Einheiten: Gemeinden in Zweckverbänden
- Übertragung von Aufgaben an größere Einheiten: komplett an Kreisbehörde, einzelne Aufgaben von Wasser- und Bodenverbänden und Unterhaltungsverbänden an einen Dachverband
- Beauftragung von Beratung oder Maßnahmenplanung (nicht von Planungsbüros, sondern länger bestehende Beziehungen, bei denen auch die Ideen-Entwicklung ganz oder teilweise übertragen wird): Gemeinden an einen Landschaftspflegeverband; Mittelbehörde an eine Landgesellschaft

Gemeinsam ist diesen Lösungen, dass sie punktuell sind, dass sie mit unterschiedlichsten Ausgangspunkten mehrheitlich historisch gewachsen sind und parallel zu den landesweit bestehenden Strukturen aus anvisierten Maßnahmenträgern bestehen.

Lokale Pläne werden als Kommunikationsmittel zum Umgang mit **Abhängigkeitsverhältnissen** genutzt: 1) Ein Beispiel aus Thüringen: Ein langfristiger Gewässerentwicklungsplan kann eine Routine bei der Einstellung von Haushaltsmitteln erzeugen. Der Plan wird einmal in den politischen Gremien verhandelt und die Gelder müssen nicht wiederholt neu gerechtfertigt werden. 2) Ein Beispiel aus Niedersachsen: Da ein Bebauungsplan nach Wasserrecht noch keine Genehmigung oder Planfeststellung liefert, birgt das für Investoren Verfahrensrisiken. Der Flusslauf kann frühzeitig mit Mustern und Varianten beplant werden, für die bereits eine Genehmigung/ Planfeststellung eingeholt wird (hier durch die untere Naturschutzbehörde), allerdings ohne enteignungsrechtliche Wirkung – ‚Vorratsplanfeststellung'. Dem Investor kann dann kommuniziert werden, dass er diese Maßnahme ebenso schnell realisieren kann wie andere.

Weder in den Interviews noch in der Umfrage haben sich übergreifende Strategien für den Umgang mit **finanziellen Hürden** und der **Flächenproblematik** abgezeichnet – alleinig die Nutzung einer Mischung aller Möglichkeiten (siehe Abbildung 6 und Abbildung 7). Durch die Landeszuständigkeit entfällt an Gewässern 1. Ordnung die Problematik der Eigenanteile, ebenso wie bei der 100 %-Finanzierung der WRRL-Umsetzung durch Unterhaltungsverbände in Sachsen-Anhalt. Wenn die Vorplanungstiefe nicht selbst gestemmt oder durch Dritte offiziell vorbearbeitet werden kann, könnten Planungsbüros diese inoffiziell übernehmen und später hoffen in der offenen Ausschreibung den Zuschlag zu bekommen. Die Notwendigkeit zu letzterem trägt nicht gerade zur Motivation der Maßnahmenträger bei.

In den Interviews zeichnete sich bezüglich der Flächenproblematik eine starke Machbarkeitsorientierung ab – keine Maßnahmen mit Flächenbedarf oder nur dann, wenn Flächen (leicht) verfügbar werden (auch über freiwillige Bereitstellung, Gestattungen und privatrechtliche Vereinbarungen).

Trotz der beschriebenen Konflikte mit dem Naturschutz, finden sich bundeslandübergreifend (ausgenommen Sachsen-Anhalt) Fälle, in denen die Zusammenarbeit zwischen Maßnahmenträgern und unteren Naturschutzbehörden über das genehmigungsrechtlich vorgeschriebene Maß hinaus geht [13] – überwiegend dort, wo durch räumliche Nähe (Arbeit im gleichen Haus) oder Netzwerke durch frühere oder andere Tä-

tigkeiten enge Kontakte zwischen den Maßnahmenträgern und den unteren Naturschutzbehörden bestehen. Diese Zusammenarbeit wurde oft auch als notwendige Strategie beschrieben, um überhaupt WRRL-Maßnahmen umsetzen zu können.

Die Rolle dieser Zusammenarbeit – lokal für einzelne Maßnahmen oder regelmäßig – ist vielfältig. Das Instrumentarium des Naturschutzes wurde vor allem zur Bewältigung finanzieller Hürden:

- Maßnahmenfinanzierung durch die Umsetzung von Kompensationsmaßnahmen an Gewässern
- Nutzung von Kompensationsgeldern oder Öko-Punkten zur (Re-)Finanzierung von WRRL-Maßnahmen (voll oder für Eigenanteile)
- Nutzung für Maßnahmen oder Wasserkörper, die nicht von WRRL-Finanzierungsprogrammen abgedeckt werden
- Vermeidung Zeit-intensiver Antragsverfahren und Einflüsse höherer Behörden über WRRL-Finanzierungsprogramme

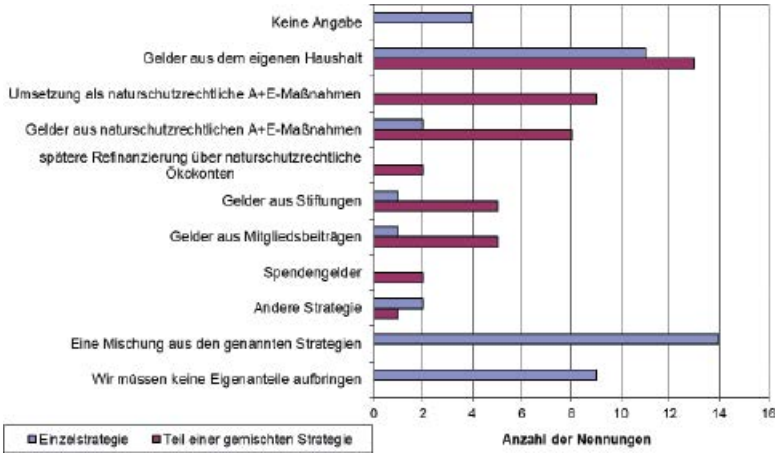

Abb. 7: Umgang der Maßnahmenträger mit der Eigenanteilfinanzierung (n=44)

und teilweise für die Flächenproblematik genutzt

- Flächenbeschaffung durch private Investoren, die die Marktpreise zahlen können, um Kompensationsverpflichtungen zu erfüllen
- Druck zur Erzeugung politischen Willens durch Kompensationsverpflichtungen.

Die Gründe des Naturschutzes für die Zusammenarbeit sind vielfältig: Die Unzufriedenheit mit bisherigen Kompensationsmaßnahmen, wie Streuobstwiesen oder andere kleine Maßnahmen, die mangels eines Kümmerers nicht gepflegt wurden; die Notwendigkeit neue Ideen für Kompensationsmaßnahmen zu generieren; und ein integrierter Ansatz, in dem Gewässerschutz und Naturschutz nicht zwei verschiedenen Sektoren zuzuordnen sind.

Der allgemeinen Nutzung der Zusammenarbeit als Strategie zur Bewältigung der Umsetzungshürden sind allerdings auch Grenzen gesetzt, praktische Grenzen:

- nur in Wachstumsregionen, in denen Kompensationsverpflichtungen anfallen
- Zeitliche Passfähigkeit in der Planung: ad-hoc notwendige Kompensationsmaßnahmen vs. langfristige Antragstellung für WRRL-Maßnahmen
- Zufall: rechtzeitiges Wissen der WRRL-Maßnahmenträger um Kompensationsplanung
- 'Menscheln' zwischen den Akteuren

und Grenzen des rechtlichen Rahmens und dessen lokaler Auslegung:

- Generelle Anerkennung von WRRL-Maßnahmen als Kompensation und nachteilige Ökopunkt-Berechnung (mangelnde Anreize für Gewässerschutzmaßnahmen)
- Möglichkeit zum Transfer von Kompensationspflichten und der dazugehörigen Unterhaltung (Öko-Pool-Projekte)
- Zugriff auf Kompensationsgelder
- Keine Öko-Punkt-Konten für öffentliche Projekte
- Zeitbegrenzung für Punkte auf Öko-Konten.

Insbesondere die Grenzen im rechtlichen Rahmen variieren von Bundesland zu Bundesland. Sachsen-Anhalt hat beispielsweise 2011 eine Verordnung erlassen, die die Übertragung von Kompensationspflichten ermöglicht (Öko-Pool-Projekte durch die Landgesellschaft, festgelegt durch die oberste Naturschutzbehörde). Unklar ist hier, inwieweit das für den Gewässerschutz schon eine Rolle spielte. Derlei Instrumentarien erweitern aber die Palette der Möglichkeiten.

Manche Maßnahmenträger sind unsicher, inwieweit sie sich im Rahmen des rechtlich zulässigen bewegen, wenn sie die beschriebenen finanziellen Optionen nutzen. Auch findet eine starke Umsetzung von WRRL-Maßnahmen über Kompensationsverpflichtungen im Naturschutz nicht überall Anklang, sollten doch Gewässerschutz und Kompensationen parallel erfolgen, damit in Summe mehr für die Umwelt passiert. Letztlich wäre ersteres klarer herauszuarbeiten und letzteres eine politische Entscheidung. In einem System, in dem sowohl Gewässerschutz als auch Naturschutz mit Hürden und mangelnder Umsetzung zu kämpfen haben, kann die lokale Zusammenarbeit Maßnahmen ermöglichen.

5 Schlussfolgerungen: Eine Machbarkeitsorientierte Umsetzung braucht andere Pläne

Alles in allem zeigen die Umsetzungshürden und die lokalen Lösungsstrategien, dass die WRRL-Umsetzung in Deutschland von sehr vielen kleinteiligen Faktoren abhängt. Die Frage der Flächenverfügbarkeit und der Beschaffung der Eigenanteile stellt sich für jede Maßnahme neu. Dies führt dazu, dass sich die Maßnahmenauswahl nach der Verfügbarkeit von Flächen richtet, sich die Maßnahmenumsetzung sehr lange hinzieht, oder gar nicht erst in Angriff genommen wird. Bei der Maßnahmenauswahl, in der Abwägung und Priorisierung von Interessen und vorhandenen Ressourcen, verändern Maßnahmenträger nicht nur den Umfang realisierter Maßnahmen, sondern gegebenenfalls auch deren Zielsetzung, zum Beispiel zugunsten des Artenschutzes, dessen Ziele, wie bei anderen parallel existierenden Gesetzen, gleichermaßen zu erfüllen sind. Insgesamt müssen, um eine Maßnahme zur Umsetzung zu bringen, viele günstige Umstände zusammenkommen, die zu einem nicht geringen Teil vom Zufall abhängen. Alles in allem entspricht dies einer an Machbarkeit, Anlässen und Interessen

statt an übergeordneten Planungen und Defiziten orientierten Umsetzung.

Für hydromorphologische Maßnahmen könnte zumindest eine übergeordnete Flächenbeschaffung, die langfristig darauf ausgelegt ist den Gewässern mehr Raum zu geben, einer übergeordneten Planung deutlich mehr Einfluss auf die Maßnahmenauswahl geben.

Insgesamt, sollten Aufwand und Nutzen jedes Plans und des aktuellen Berichtswesens kritisch überprüft und angepasst werden. Dabei ist zu beachten, dass Akteure durch ihre unterschiedlichen Grade an Motivation zur WRRL-Maßnahmenumsetzung und Unabhängigkeit unterschiedliche Ansprüche an Pläne und Konzepte haben:

- Die stark motivierten Akteure mögen besser wirken, wenn sie Konzepte gefördert bekommen, deren Erstellung und Inhalte (Detailgrad und Defizitermittlung nach Bedarf und Zeitrahmen), sie maßgeblich selbst beeinflussen. Eine regelmäßige Fortschreibung der Konzepte sollte möglich sein, um dem Wandel Rechnung zu tragen.
- Für die zu überzeugenden Akteure mögen Planwerke besser geeignet sein, die konkret und übersichtlich aufzeigen, was zu tun ist, und trotzdem flexibel genug sind, die Anpassung an die örtlichen Gegebenheiten nicht zu mühsam und zeitaufwendig erscheinen zu lassen (möglichst wenig Bürokratie). Insbesondere für diesen Typus braucht es Ansprechpartner und Kümmerer, die helfen Umsetzungshürden zu bewältigen.
- Zusätzlich ist ein Plan im Sinne einer Ideen-Sammlung sinnvoll, dessen Maßnahmen-Ideen geeignet sind anlassbezogen und gegebenenfalls ohne langen Vorlauf genutzt zu werden – von Akteuren, die mit der WRRL maximal am Rande zu tun haben. Wenn solche Anlässe vorrangig bei Naturschutzbehörden durch Ausgleichs- und Ersatzmaßnahmen entstehen, sollte das Konzept auch unter/ mit/ für die jeweilige Naturschutzbehörde erstellt werden, so dass der Entscheider es als persönlichen Plan begreift, Eingreifern Maßnahmen vorzuschlagen/ vorzuschreiben (alternativ können enge Netzwerke zwischen solchen Akteuren und WRRL-Umsetzern wirken, so dass letztere bei Bedarf kurzfristig aktuelle Ideen liefern).

In jedem Falle sollten die Konzepte eng mit den Maßnahmenträgern oder Kümmerern verknüpft sein, damit die Ideen es zur Umsetzung schaffen. Eine gezielte Konzepterstellung und Konzept-Förderprogramme sollten darauf hinwirken bzw. diesen Mix erlauben, was neben den fachlichen Aspekten einer tieferen Beschäftigung mit den potenziellen Maßnahmenträgern, ihres Umsetzungsalltages und ihrer Motivation bedarf.

Dank

Vielen Dank an alle Interviewpartner*innen und Umfrageteilnehmer*innen, dass Sie mir Ihre wertvolle Zeit geschenkt haben, an *Simon Henneberg* für Feedback und Diskussion zu einer früheren Version des Artikels, an die Hans-Böckler-Stiftung für die Finanzierung meiner Doktorarbeit mit einem Stipendium, ebenso wie an die AöW für die Ermöglichung der zeitweisen Mitarbeit, ohne die meine Forschungskosten nicht abzudecken gewesen wären.

Literatur

[1] Salomon, M., Dahms, H., Bernard, B., Steup, L., Niekisch, M. 2020. *Renaturierung von Oberflächengewässern – wie kann die Umsetzung der Wasserrahmenrichtlinie verbessert werden?* Korrespondenz Wasserwirtschaft (13), Nr. 6: 308–316.

[2] LAWA (Bund/Länder-Arbeitsgemeinschaft Wasser). 2018. *Umsetzungsstand der Maßnahmen nach Wasserrahmenrichtlinie: Zwischenbilanz 2018. https://www.wasserblick.net/servlet/is/182310/*

[3] Schröder, N.J.S. *Polycentricity and the Implementation of the EU Water Framework Directive in Germany*. Die Doktorarbeit ist entsprechend dem kumulativen Promotionsverfahren bereits in Teilen, in Englisch, veröffentlicht, jedoch noch nicht vollständig. Aktuelle und zukünftige Veröffentlichungen, finden Sie auf dem Profil: *https://sustainability-governance.net/people/nadine-schroeder/*

[4] Schröder, N.J.S. 2014. *Die Umsetzung der Wasserrahmenrichtlinie in Berlin und Hamburg*. Masterarbeit. Humboldt-Universität zu Berlin, Berlin, Deutschland. *https://edoc.hu-berlin.de/handle/18452/14879*

[5] Monsees, J. 2008. *Governancestrukturen für Fließgewässer. Eine vergleichende Institutionenanalyse gewässerunterhaltender Verbände und Behörden*. Nomos Verlagsgesellschaft, Baden-Baden.

[6] Bauer, M.W., Bogumil, J., Knill, C., Ebinger, F., Krapf, S., Reißig, K. 2007. *Modernisierung der Umweltverwaltung. Reformstrategien und Effekte in den Bundesländern*. Edition sigma, Berlin.

[7] Feld, C. K., Lorenz, A. W., Michel, J., Peise, M., Schulz, C. 2020. *Diagnose multipler Belastungen und Maßnahmenableitung am Beispiel der oberen Wipper (Thüringen)*. Korrespondenz Wasserwirtschaft (13), Nr. 5.

[8] Schröder, N. J. S., Chaudhary, N. 2020. *WRRL-Umsetzungshürden: Unpassierbar oder durchgängig für Maßnahmenträger?* THESys Discussion Paper No. 2020-1. Humboldt-Universität zu Berlin, Berlin, Deutschland: 1–13. *https://edoc.hu-berlin.de/handle/18452/22110*

[9] Reese, M., Bedtke, N., Gawel, E., Klauer, B., Köck, W., Möckel, S. 2018. *Wasserrahmenrichtlinie – Wege aus der Umsetzungskrise. Rechtliche, organisatorische und fiskalische Wege zu einer richtlinienkonformen Gewässerentwicklung am Beispiel Niedersachsens*. Nomos Verlagsgesellschaft, Baden-Baden.

[10] Weyand, M. 2019. *Wasserwirtschaft zwischen politischem Anspruch, wissenschaftlichen Auffassungen und technischer Umsetzung. 19. Workshop Flussgebietsmanagement als Gemeinschaftsveranstaltung*. Korrespondenz Wasserwirtschaft (12), Nr. 9: 494–501.

[11] Lamberty, G., Kemper, M., Wagner, F., Zumbroich, T., Naumann, S. 2020. *Mehr Aufmerksamkeit für gewässerökologische Maßnahmen. Umweltbundesamt startet Online-Informationsplattform zur Renaturierung von Fließgewässern*. Korrespondenz Wasserwirtschaft (13), Nr. 4: 209–213.

[12] Pressman, J. L., Wildavsky, A. 1973. *Implementation: How Great Expectations in Washington are dashed in Oakland*. University of California Press, London, England.

[13] Schröder, N. J. S., Newig, J., Watson, N. (Im Review-Verfahren bei Water Alternatives). *Bright spots for local WFD implementation through collaboration with nature conservation authorities?*

[14] Schröder, N.J.S. 2019. *IWRM through WFD Implementation? Drivers for Integration in Polycentric Water Governance Systems*. Water 11(5): 27. *https://www.mdpi.com/2073-4441/11/5/1063*

Autorin

Nadine Jenny Shirin Schröder, M. Sc., B. Sc., B. A.
Leuphana Universität Lüneburg
Research Group Governance, Participation and Sustainability
Humboldt-Universität zu Berlin
IRITHESys
(Integrative Research Institute on
Transformations of Human-Environment Systems)
Graduiertenprogramm

E-Mail: nadine.schroeder@stud.leuphana.de KW

Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland:

Teil 2 – WRRL-Zielerreichung zwischen Freiwilligkeit und Pflicht

Nadine Jenny Shirin Schröder (Lüneburg/Berlin)

Zusammenfassung

Dieser Beitrag zur EU Wasserrahmenrichtlinie behandelt, basierend auf einer Untersuchung zur Umsetzung von Maßnahmen der Hydromorphologie und Durchgängigkeit in Sachsen-Anhalt, Sachsen, Niedersachsen, Thüringen, Hessen und Nordrhein-Westfalen, die Motivation von Akteuren zur Umsetzung von WRRL-Maßnahmen im Spannungsfeld zwischen Freiwilligkeit und Pflicht: Die Maßnahmen-Umsetzung wird von ganz unterschiedlichen Akteurstypen erwartet, die mit variierenden Hürden zu kämpfen haben und über verschiedene Anreizsysteme verfügen. „Kümmerer" können Synergien aufzeigen und damit Anreize schaffen, aber die Entscheidungen verbleiben bei den Maßnahmenträgern. Weder Freiwilligkeit noch Pflicht verändern die grundsätzliche Wirkung unterschiedlicher Motivationsgrade, der Unabhängigkeit der Maßnahmenträger sowie der praktischen Umsetzungshürden. Es braucht mehr und effektivere Instrumente, die Umsetzungshürden abbauen und entweder mehr Akteuren individuell Synergien aufzeigen oder andere Maßnahmenträger schaffen oder gewinnen. Die Bundesländer können anhand des bunten Blumenstraußes an Instrumenten voneinander lernen, den es bereits gibt. Bei dem Fachbeitrag handelt es sich um den zweiten Teil der Reihe „Umsetzungsprozesse der EU-Wasserrahmenrichtlinie in Deutschland". Teil 1: „WRRL-Zielerreichung zwischen Plan und Machbarkeit" ist im September in der KW Korrespondenz Wasserwirtschaft erschienen.

Schlagwörter: Wasserrahmenrichtlinie, Umsetzung, Hydromorphologie, Maßnahmen, Governance, Freiwilligkeitsprinzip und Kümmerer

DOI: 10.3243/kwe2020.12.002

Abstract

Implementation processes for the EU Water Framework Directive in Germany: Part 2 – Reaching WFD targets between voluntary and mandatory approaches

This article on the EU Water Framework Directive (WFD) discusses how voluntary and mandatory approaches affect the motivation of stakeholders to implement WFD measures. This discussion is based on an analysis of the implementation of hydromorphological and connectivity measures in the German federal states of Saxony-Anhalt, Saxony, Lower Saxony, Thuringia, Hesse and North Rhine-Westphalia. Measures are expected to be implemented by a wide variety of types of stakeholders that battle various barriers to implementation and have different incentive structures. 'Stewards' can pinpoint synergies and create incentives in the process. However, decisions are left in the hands of policy addressees. Whether the approach is voluntary or mandatory does not change the fundamental effect of varying degrees of motivation, the independence of policy addressees and practical barriers to implementation. The number and effectiveness of instruments to reduce barriers to implementation need to increase, with either more stakeholders demonstrated synergies on a case-by-case basis or other policy addresses created or attracted. The federal states can learn from one another based on the 'colourful bouquet' of instruments. This part of the article continues on from part 1 ('Reaching WFD goals between planning and feasibility') published in the September issue of KW.

Key Words: Water Framework Directive, implementation, hydromorphology, measures, governance, voluntariness prinziple, carer

1 Anlass und Datengrundlage

Die Wasserrahmenrichtlinie (WRRL) hat den Mitgliedsstaaten der EU ambitionierte Ziele gesetzt – den guten ökologischen und chemischen Zustand in allen europäischen Gewässern bis spätestens 2027 zu erreichen. Damit dies gelingen kann, braucht es eine zügige Umsetzung der notwendigen Maßnahmen, da die Wirkung der Maßnahmen häufig erst verzögert eintritt [1]. Nichtsdestotrotz, zeigt der LAWA-Zwischenbericht 18 Jahre nach In-Kraft-Treten der WRRL eine große Zahl identifizierter aber noch nicht begonnener Maßnahmen zu Hydromorphologie und Durchgängigkeit in Deutschland [2]. Ursächlich dafür ist weniger eine ‚Warteschlange' bei den abzuarbeitenden Maßnahmen, die erwarten ließe, dass bislang fehlende Maßnahmen zu entsprechender Zeit an der Reihe sein werden, sondern vielmehr, dass viele der anvisierten Maßnahmenträger Maßnahmen nicht ergreifen oder andere, gegebenenfalls nicht ausreichende, Maßnahmen an ihrer Stelle umsetzen.

Teil 1 dieses Artikels hat in diesem Zusammenhang beleuchtet, welchen alltäglichen Umsetzungshürden Maßnahmenträger gegenüberstehen, wie dies einer Umsetzung gemäß übergeordneten Plänen und Konzepten, die in den Bundesländern von verschiedensten Akteuren, in unterschiedlichem Umfang und mit variierendem Anspruch erstellt werden, entgegensteht und welche Lösungen Maßnahmenträger zum Umgang mit diesen Hürden gefunden haben. Teil 2 betrachtet nun die Motivation der Maßnahmenträger – den Willen Maßnahmen überhaupt umzusetzen und Hürden zu bewältigen – im Spannungsfeld zwischen Freiwilligkeitsprinzip und Pflichtsetzung.

Das Freiwilligkeitsprinzip wird häufig als Ursache für die mangelnde Maßnahmenumsetzung genannt [3, 4] und eine Pflicht zur Umsetzung gefordert. Dieser Beitrag zeigt, dass wegen unterschiedlicher Motivationsgrade und der Unabhängigkeit der Akteure eine Pflichtsetzung an sich das Problem der schleppenden Maßnahmenumsetzung nicht grundsätzlich beheben würde. Er zeigt ebenfalls, dass es weitere Instrumente braucht – unabhängig davon, ob das Freiwilligkeitsprinzip angewendet oder eine Pflicht durchgesetzt wird – insbesondere wegen der zahlreichen Umsetzungshürden, die nicht ursächlich in der Motivation der Maßnahmenträger liegen, und dass diese Instrumente Akteure mit unterschiedlichen Motivationsgraden ansprechen.

Wie bereits in Teil 1 dieses Beitrages detaillierter dargelegt [5], basieren die nachfolgenden Beobachtungen auf einer noch nicht vollständig abgeschlossenen Doktorarbeit zu „Polycentricity and the Implementation of the EU Water Framework Directive in Germany“ [6]. Diese untersucht den Einfluss der Governance-Strukturen und Prozesse, dazu zählen im Wesentlichen die gewählten organisatorischen Strukturen und Instrumente, (nicht) festgesetzte Regularien und Koordinations- und Beteiligungsprozesse, auf die Umsetzung von Maßnahmen für Hydromorphologie und Durchgängigkeit. Die Daten stammen hauptsächlich aus:

- 70 semi-strukturierten Interviews mit 78 Personen verschiedenster Ebenen aus Wasserwirtschaft, Naturschutz, Verbänden und weiteren Akteuren in Sachsen, Sachsen-Anhalt, Niedersachsen, Thüringen, Hessen, Nordrhein-Westfalen (2017-2019) und
- einer Umfrage mittels Fragebogen (Herbst 2019; vorrangige Ansprache der Flächenländer): 92 Rückmeldungen aus 14 Bundesländern, davon 44 (potenzielle) Maßnahmenträger

2 Ein großes In-situ-Experiment: Politik-Implementierung

Jede Politik ist ein großes In-situ-Experiment, da Interessen und Handeln aller Akteure nicht vollständig vorhersehbar und steuerbar sind [7]. Dabei sind drei Eigenschaften des Systems zentral: 1) Der Motivationsgrad der Akteure, 2) deren Maß an Unabhängigkeit (die Akteure sind keine reinen Ausführungsgehilfen [8]) und 3) die Dynamik des sich stetig wandelnden Systems. Der Steuerungsebene obliegt die Durchführung dieses Experimentes und gegebenenfalls eine Anpassung, wenn sich die gewünschten Ergebnisse nicht einstellen. Die Steuerungsebene ist also angehalten, für die richtlinienkonforme Umsetzung der WRRL zu sorgen, sowohl hinsichtlich der Prozessvorgaben (Planerstellung, Beteiligungsprozesse, Flusseinzugsgebietsansatz, Monitoring etc.) als auch des Einsteuerns von Maßnahmen in der richtigen Menge und Qualität.

Da die WRRL von der EU-Ebene ausgeht, ist die Steuerung durch Bund und Länder gleichzeitig auch Prozessparameter im WRRL-Experiment. Umfang, Inhalt und Prioritäten der Aktivitäten der Steuerungsebene können sich dabei genauso wie auf den unteren Umsetzungsebenen an der vorrangigen Pflichterfüllung dessen orientieren, was am stärksten kontrolliert wird, zum Beispiel die Erstellung von Bewirtschaftungsplänen und Maßnahmenprogrammen oder die Berichtspflichten für Gewässer ab einer definierten Größe – ‚Berichtsgewässer‘, wenn auch die WRRL für alle Gewässer gilt. Akteure der Steuerungsebene können verschiedenste Steuerungsinstrumente gemäß ihren Präferenzen – innerhalb ihrer gegebenen Handlungsspielräume – auswählen. Grenzen in der Auswahl sind ihnen soweit gesetzt wie diese Instrumente politisch durchgesetzt werden müssen (Positionen verschiedener Akteure zum WRRL-Review-Prozess sind zusammengestellt in [9]), um zum Einsatz zu kommen: Je weitreichender der Eingriff in das bestehende System ist, desto größer ist der Widerstand oder zumindest desto länger ist der zu erwartende Durchsetzungsprozess. Beispielsweise mag das Einsetzen von Kümmerern als Steuerungsinstrument hauptsächlich eine Haushaltsfrage sein (wer finanziert Kümmerer und wo werden sie angesiedelt?), während die Schaffung von Enteignungsmöglichkeiten zur Landbeschaffung einen Gesetzgebungsprozess erfordert und damit die Schaffung dieses Instrumentes nur noch bedingt in den Händen der Steuerungsebene, hier der Umweltministerien, liegt. Damit wird die Nutzung weicher Instrumente wahrscheinlicher.

3 Freiwilligkeit in der aktuellen WRRL-Umsetzung?

Mit der Anwendung des Freiwilligkeitsprinzips hat man sich in Deutschland bei Maßnahmen zur Hydromorphologie und Durchgängigkeit für die leichter durchsetzbaren, weicheren Instrumente – Anreizsysteme für eine freiwillige Umsetzung – statt der Durchsetzung einer Pflicht entschieden. Dabei visiert man Akteure der bisherigen Gewässerunterhaltung als Maßnahmenträger an. Tabelle 1 zeigt die Konstellationen an (potenziellen) Maßnahmenträgern in den sechs Bundesländern. Die mit den Akteurstypen verbundenen Verwaltungsstrukturen [10] und deren originärer Aufgabenzuschnitt sind sehr unterschiedlich. Neben den anvisierten Maßnahmenträgern der Gewässerunterhaltung finden sich Akteurstypen, von denen einzelne Organisationen WRRL-Maßnahmen umsetzen, zum Beispiel Kreisbehörden, Zweckverbände und Landschaftspflegeverbände. Nicht nur die Akteurstypen sind divers, sondern auch deren Anzahl. Während in Sachsen-Anhalt ein Landesbetrieb und 28 Unterhaltungsverbände Maßnahmen umsetzen sollen, erschwert in NRW die hohe Zahl der Gemeinden und der Wasser- und Bodenverbände sowie das gemeinsame Übertragen von Aufgaben an andere Akteure hier die Nennung der Gesamtzahl potenzieller Maßnahmenträger.

Abgesehen von Präferenzen und (Ausbildungs-)Hintergründen von Individuen sprechen unterschiedliche Akteurstypen auf variierende Anreizsysteme an. Verschiedenste Argumente oder praktische Aspekte sind notwendig, um Akzeptanz oder Motivation zum Beispiel bei einem Landwirt in einem Wasser- und Bodenverband, einem Bürgermeister ohne wasserwirtschaftlichen Hintergrund oder einem Landesbetrieb zu erreichen. Hinzu kommt, dass es schwieriger wird, diese Vielfalt in der Ausgestaltung der Instrumente zu berücksichtigen, je höher die Zahl der Akteurstypen und die absolute Anzahl der zur Zielerreichung notwendigen Maßnahmenträger ist. Es gibt nicht den einen Anreiz, der alle Maßnahmenträger zur freiwilligen Umsetzung von WRRL-Maßnahmen bewegt, deswegen ist die Motivation jedes einzelnen wichtig, um in der Summe der Einzelentscheidungen eine flächenhafte Umsetzung zu erreichen und damit eine Zielerreichung zu ermöglichen.

Die Frage nach der Notwendigkeit der Maßnahmen und der Motivation sie umzusetzen wird darüber hinaus immer wieder neu aufgeworfen, da sich Fragen der Flächenverfügbarkeit und

Akteurstypen	Sachsen-Anhalt	Sachsen	Niedersachsen	Thüringen	Hessen	Nordrhein-Westfalen
Bezirksregierungen/ Regierungspräsidien/ Landesdirektion					X	X
Landesbetriebe	X	X	X	X		
Kreise (untere Wasserbehörde)			(X)			(X)
Kreise (untere Naturschutzbehörde)			(X)			
Kreisfreie Städte		X	X	X	X	X
Gemeinden		X	X	X	X	X
Unterhaltungsverbände	X		X	+		
Wasser- und Bodenverbände			X			X
Sondergesetzliche Wasserverbände						X
Zweckverbände			(X)	X	X	
NATURA2000-Station				X		
Landschaftspflegeverbände		(X)		(X)		

X: anvisierte Maßnahmenträger; (X): einzelne Akteure dieses Typs setzten WRRL-Maßnahmen um, obwohl sie nicht adressiert werden;
+ flächendeckende Gründung von Unterhaltungsverbänden 2020

Tabelle 1: (potenzielle) Maßnahmenträger für Maßnahmen der Hydromorphologie und Durchgängigkeit

der Beschaffung von Eigenanteilen für jede Maßnahme neu stellen. Das unterbindet die Entstehung von Routinen. Arbeitsroutinen vermindern das Maß notwendiger Motivation, welches zur Umsetzung aufzubringen ist. Die WRRL ist eine flächendeckende Langzeitaufgabe und erfordert deswegen Arbeitsroutinen, auch wenn jede Maßnahme individuell und deswegen ein Projekt für sich ist. Die Umsetzung unterliegt außerdem den sich wandelnden Möglichkeiten und Interessenlagen aller Akteure – lokal wie regional und national, da sie in einem sich stetig wandelnden, dynamischen System stattfindet. Maßnahmen, die vor fünf Jahren unmöglich erschienen, finden heute Anreize bei den Akteuren (oder auch umgekehrt). Sehr häufig müssen Maßnahmen, genauso wie die Durchsetzung neuer Instrumente, auf Gelegenheitsfenster treffen, bei denen Motivation und alle nötigen Voraussetzungen zusammentreffen.

Aktuell wird die WRRL von den anvisierten Maßnahmenträgern oftmals nicht als originäre Aufgabe wahrgenommen, sondern als etwas Zusätzliches von außen Aufgebürdetes beziehungsweise außerhalb der eigenen Zuständigkeit Liegendes. Hinzukommen Bedenken hinsichtlich Konflikten mit originären Aufgaben. Durch die nur eingeschränkte Erfüllung ebenjener werden Konflikte mit Mitgliedern oder anderen Akteuren erwartet und diese treten nachweislich auch auf.

Die bestehenden Finanzierungsprogramme der Länder für WRRL-Maßnahmen stellen für sich genommen für die anvisierten Maßnahmenträger aktuell eher selten einen Anreiz dar, freiwillig WRRL-Maßnahmen umzusetzen. Sie gewinnen aber an Attraktivität, wenn sie als Wertschöpfungshebel genutzt werden können, weil die Kombination verschiedener Finanzierungstöpfe den Akteuren die Realisierung größerer Projekte erlaubt. Die Motivation für eine Maßnahme liegt dabei nicht ursächlich im Vorhandensein des Förderprogrammes, sondern in dem Interesse bestimmte Projekte umzusetzen.

Maßnahmenträger können, wie die Interviews gezeigt haben, motiviert sein, durch persönliche Überzeugungen [11, 12], z. B. für den Umweltschutz, bestimmte Arten oder die Entwicklung der Region, oder durch die Wahrnehmung als eigene Aufgabe, die Erwartung von Synergien mit originären Aufgaben, ökonomischen Vorteilen oder Vorteile anderer Art wie die Umsetzung von Hochwasserschutzmaßnahmen, die anderweitig nicht finanziert werden würden. Darüber hinaus kann es positive Effekte haben, wenn andere Akteure im jeweiligen Gebiet aktiv werden – durch sozialen Zusammenhalt und Prestige-Wirkung.

Die Motivation der Akteure entscheidet bereits darüber, ob Maßnahmen ergriffen werden und wie stark das Durchhaltevermögen ausgeprägt ist, wenn im Laufe der Planungen Hürden (visualisiert im Wissenschaftscomic: [12]) auftreten. Aber auch motivierte Akteure orientieren sich an der Machbarkeit der Maßnahmen [5], wenn es um die Auswahl der Maßnahmen und die Art der Umsetzung geht. Die aktuellen Umsetzungshürden führen deswegen zu Maßnahmen, die in Anzahl und Qualität (z. B. in-stream Maßnahmen statt einer umfassenden Renaturierung) nicht notwendigerweise für die Zielerreichung ausreichen (siehe Abbildung 1). Einer der interviewten Maßnahmenumsetzer hat außerdem überschlagen, dass sie im Verband unter den jetzigen Gegebenheiten 150 Jahre für die Umsetzung der Maßnahmen bräuchten, die sie aktuell als notwendig zur Zielerreichung erachten (siehe auch [13]).

Im Wesentlichen kann, basierend auf den geführten Interviews, zwischen drei Motivationsgraden unterschieden werden (die Übergänge sind fließend): a) motivierte Akteure, deren individuelle Ziele stark mit denen der WRRL übereinstimmen oder präferierte Synergien erzeugen; b) Akteure, die die Ziele der WRRL akzeptieren, aber keine Anreize haben deren Ziele zu verfolgen; c) Akteure, die der WRRL entgegenstehende In-

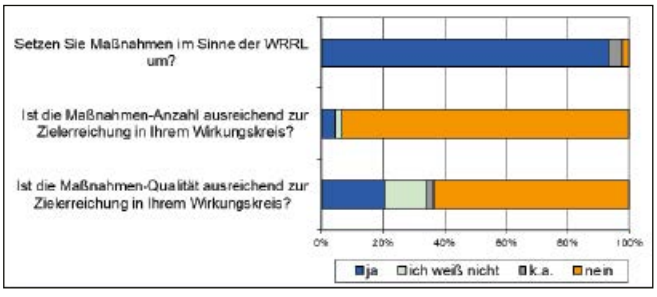

Abb. 1: Maßnahmenumsetzung durch befragte (potenzielle) Maßnahmenträger (n=44)

teressen haben und deswegen den WRRL-Zielen eher ablehnend gegenüberstehen.

Die stark motivierten Akteure beweisen einen langen Atem [14], auch wenn sie mit vielen Umsetzungshürden [5] konfrontiert sind. Findige Akteure suchen nach ergänzenden oder alternativen Finanzierungsquellen, wenn ihnen die Finanzierungsprogramme nicht gangbar erscheinen. Sie werden kreativ bei der Flächenbeschaffung und nutzen ihre Netzwerke für die Überzeugungsarbeit. Bei Personalmangel leisten sie auch Überstunden bzw. arbeiten in ihrer Freizeit (inklusive Nachtschichten zur Einhaltung bürokratisch gesetzter Fristen) – letzteres tritt zum Beispiel in Strukturen auf, die vom Ehrenamt mit Aufwandsentschädigungen leben. Sie suchen außerdem auch aktiv nach Know-How durch Netzwerke und die Teilnahme an Schulungen und Beteiligungsprozessen. Weniger stark motivierte Akteure lassen sich bereits von wenigen, niederschwelligen Hürden ausbremsen.

Akzeptierende Akteure setzen Maßnahmen um, wenn sie sich dazu aufgefordert fühlen, zum Beispiel durch Auflagen unterer oder oberer Behörden im Zusammenhang mit Plangenehmigungen oder Planfeststellungen für andere Projekte oder durch Kümmerer, und wenn die notwendigen Ressourcen zur Umsetzung vorhanden oder leicht zu beschaffen sind. Von selbst haben sie nur wenig Anreize nach Leitfäden, Schulungen und Beteiligungsprozessen Ausschau zu halten und diese zu nutzen.

Ablehnende Akteure haben aktuell keine Veranlassung WRRL-Maßnahmen umzusetzen. Wenn sie aber eine starke (negative) Betroffenheit durch die WRRL-Umsetzung in Zukunft erwarten, haben sie Anreize Beteiligungsprozesse zu nutzen, um ihre Interessen zu äußern.

Insgesamt lassen die Verwaltungsstrukturen der anvisierten Maßnahmenträger nicht erwarten, dass das Gros der Maßnahmenträger in die Kategorie der (hoch) motivierten Akteure fällt, sondern vielmehr in die Kategorie der akzeptierenden Akteure und zum Teil in die der ablehnenden Akteure. Die Umsetzungshürden sind aktuell so hoch, dass selbst sehr engagierte Maßnahmenträger schon mal ans Kapitulieren denken. Das enorme Engagement, dass einige motivierte Maßnahmenträger aktuell zeigen, kann also weder flächendeckend noch dauerhaft erwartet werden.

Dabei passt die aktuell hohe Motivation einiger Akteure hinsichtlich Gewässern, Maßnahmentypen oder Maßnahmenträgertypen nicht notwendigerweise zur Prioritätensetzung steuernder Akteure, die ihre Prioritätensetzung mit Hilfe von Finanzierungsprogrammen, Plänen und Konzepten forcieren. Beispielsweise hat die Thüringer Aufbaubank geschätzt, dass nur 50 % der Förderanträge zu Maßnahmen an Schwerpunktgewässern gestellt werden. In Sachsen-Anhalt dürfen nur Unterhaltungsverbände Finanzierungsanträge stellen. Die Frage ist, ob man sich aktuell leisten kann, motivierte Akteure durch eine enge Ausrichtung von Förderprogrammen auszubremsen, deren positive Ergebnisse motivierend auf bislang nicht aktive Maßnahmenträger wirken könnten, zumal die WRRL ohnehin für alle Gewässer gilt.

4 „Kümmerer“ für Motivation, Ideen und Know-How

Wenn die Mehrheit der anvisierten Maßnahmenträger nicht oder nicht stark genug motiviert ist, freiwillig Maßnahmen umzusetzen, Förderprogramme keine ausreichenden Anreize setzen und keine Umsetzungspflicht durchgesetzt wird, braucht es andere Instrumente, um Akteure zum Umsetzen von Maßnahmen zu bewegen. Es brauche „Kümmerer“, heißt es immer wieder auf verschiedenen Ebenen. Dies scheint grundsätzlich richtig. Aus einer Steuerungsperspektive stellt sich allerdings die Frage, ob „Kümmerer“ als Instrument wirksam eingesetzt werden können und in welcher Form sie effektiv wirken können. Im Folgenden wird kurz erläutert, welche Modelle von „Kümmerern“ sich in den untersuchten Bundesländern finden (Details in Tabelle 2), welche Grenzen sie haben und was sie leisten können.

In **Thüringen** sprechen seit 2011 Gewässerberater der Thüringer Aufbaubank Kommunen direkt an und beraten sie bei der WRRL-Umsetzung, von der Maßnahmenidentifikation, auch am Gewässer vor Ort mit dem Bürgermeister, über die Erschließung von Finanzierungsquellen und die Beantragung von Fördermitteln bis hin zur Umsetzung. Sie prüfen seit 2013 außerdem beim Wiederaufbau nach dem Hochwasser auf WRRL-Konformität.

In **NRW** gibt es seit 2017 Gewässerberater bei den fünf Bezirksregierungen und der Kommunal Agentur NRW. Anlass war ein schleppender Fördermittelabruf. Die Beratung soll sowohl motivieren als auch Hinderungsgründe aufdecken. In diesem Zusammenhang ist die Kommunal Agentur auf das Ministerium zugegangen – gegründet wurde sie bereits 1996 als Abwasserberatung für kleinere Kommunen.

In **Niedersachsen** werden seit 2015 im Pilotprojekt Gewässerallianzen WRRL-Koordinatorenstellen bei Unterhaltungsverbänden zu 80 % vom Land finanziert. Damit sollen Verbände einen Anreiz haben, jemanden einzustellen, der professionell WRRL-Maßnahmen vorantreibt. Im Rahmen des Projektes Wasserrahmenrichtlinien-Infobörse (2005-2019 gefördert durch das niedersächsische Umweltministerium), kurz wib,

Land	Format und Zeitraum	Organisatorische Anbindung und Personal	Zielgruppe	Ziele/ Zweck/ Aufgaben
Thüringen	**Seit 2011 Gewässerberater:** für verschiedene Regionen orientiert an Oberflächenwasserkörpern	Thüringer Aufbaubank: 3-5	Unterhaltungspflichtige für Gewässer 2. Ordnung (Kommunen)	● direkte Ansprache der Kommunen ● Beratung: von der Idee bis zur Umsetzung ● Auftritt bei Informationsveranstaltungen durch das Ministerium oder Gewässerschauen der unteren Wasserbehörden ● seit 2013 Hochwasserschutzberatung: Prüfung auf WRRL-Konformität beim Wiederaufbau ● seit 2015 Beratungsangebot auch für private Träger offen (die direkte Ansprache müsste aber durch die unteren Wasserbehörden erfolgen) ● jährliche Controlling-Gespräche zum Stand der Maßnahmenumsetzung zwischen Wasserbehörden und TLUBN über die Gewässerberater, inklusive der Erörterung von Hinderungsgründen zur Umsetzung
	Seit 2007 lokale Strategie: Motivation durch Landschaftspflegeverband (LPV)	LPV „Thüringer Grabfeld“ e. V.: ~ 1	Unterhaltungspflichtige Gemeinden mit Mitgliedschaft im LPV	LPV: ● seit 1997 Übernahme einfacher Unterhaltungsaufgaben ● seit 2007 Möglichkeit Betreuungsvertrag (jährlich kündbar): Bestandsaufnahme an den Gewässern 2. Ordnung und Erstellung eines Gewässerunterhaltungsplanes, aus dem sich einzelne Maßnahmen herauslösen und investiv umsetzen lassen ● Vorschläge zu fachlich notwendigem ● Erläuterung der Vorteile für die Gemeinde ● Vorbereitung von Fördermittelanträgen und Unterstützung bei der Fördermittelakquise ● Übernahme kleinerer Maßnahmen wie ein Büro (Planungs- oder Bauherrenleistungen) Gemeinden: ● behalten die Planungshoheit ● Umsetzung der Maßnahme über den Betrieb/ Bauhof der Gemeinde oder über eine Ausschreibung ● eigene Ideen oder konkrete Anliegen oder Vorgabe der zur Verfügung stehenden Finanzmittel
Nordrhein-Westfalen	**Seit 2017 Gewässerberater:** in jeder Bezirksregierung (BR) und landesweit	5 BR: z. B. BR Arnsberg 4 (2 mit Fokus auf die Flächenproblematik) und Kommunal Agentur NRW: 5-10	Maßnahmenträger: Kommunen, Wasser- und Bodenverbände, Wasserverbände	● Grundidee: 1. Ansprache bislang nicht aktiver Bürgermeister und weiterer lokaler Akteure durch die Kommunal Agentur, Überzeugungsarbeit, Lösungsfindung; 2. Bei Umsetzungsbereitschaft übernimmt die Bezirksregierung die fachliche Beratung Kommunal Agentur ● Motivation durch Beratung ● Aufdecken von Hinderungsgründen ● Newsletter zwei Mal im Jahr Gewässerberater der Bezirksregierung Arnsberg: ● Ansprache seit Mitte 2018 teils mit einer gewissen fachlichen Vorbereitung (z. B. Plan oder Prüfung der Flächenverfügbarkeit in der Hand der Kommunen ● Unterstützung bei der Ideenfindung und -entwicklung, Flächenbereitstellung und beim Finden weiterer Finanzierungsquellen u. a. aus anderen Sachgebieten der Bezirksregierung
	lokale Strategie: Motivation durch Mitarbeiter der unteren Wasser- und Naturschutzbehörden	Kreis Coesfeld	21 Wasser- und Bodenverbände (WuB) im Kreis Coesfeld	● Motivieren zur WRRL-Umsetzung ● Kontakt halten: bestehende Rechtsaufsicht und regelmäßige Teilnahme der unteren Wasserbehörde an Vorstands- und Ausschusssitzungen der WuBs ● Ansprechpartner bei Fragen Lockmittel bis 2016 (bis zur Änderung des Landeswassergesetzes hin zur vollständigen Kostenumlage auf Flächeneigentümer): ● Übernahme des Eigenanteiles bei Förderprogrammen aus A+E-Geldern ● Risiko-Übernahme durch die Vorfinanzierung der Planungskosten: keine Rückzahlung an den Kreis im Falle eines negativen Fördermittelbescheides
Niedersachsen	**Seit 2015 Pilotprojekt Gewässerallianzen:** Finanzierung von WRRL-Koordinatorenstellen zu je 80 % durch das Land	Unterhaltungsverbände (UHV): je eine Koordinatorenstelle bei 12 UHV (anfangs 8)	UHV und Akteure in deren Wirkungskreis	● Anreiz für die UHV schaffen, jemanden einzustellen, der professionell WRRL-Maßnahmen vorantreibt ● Bevorzugte finanzielle Förderung von Maßnahmen aus Gewässerallianzen Koordinatoren sollen: ● mit Belastungsdaten des NLWKN Ideen für Maßnahmen sammeln ● Kontakte zu Akteuren vor Ort aufbauen/ halten ● Öffentlichkeitsarbeit leisten ● Maßnahmen zur Umsetzung bringen
	2014–2019 im Projekt Wasserrahmenrichtlinien-Infobörse (wib) 2005–2019: Ansprechpartner	Kommunale Aktion-Umwelt U.A.N.	Gemeinden	● wib als Ansprechpartner, Informationspool und Kommunikationsplattform für die Gemeinden zum Thema WRRL ● ergänzende Beratung und Ideen für Maßnahmen nach Bedarf

Tabelle 2: Eckdaten der verschiedenen Formate mit „Kümmerer“-Funktion

konnten sich Gemeinden ab 2014 ergänzende Beratung und Ideen für Maßnahmen bei der Kommunalen Aktion-Umwelt U.A.N. holen.

Lokal begrenzter sind auch andere Akteure in gewachsenen Strukturen gezielt beratend aktiv. So berät zum Beispiel in NRW der Kreis Coesfeld in einer Zusammenarbeit aus unterer Wasser- und Naturschutzbehörde Wasser- und Bodenverbände und versucht diese zur WRRL-Umsetzung zu motivieren, insbesondere durch die Übernahme des im Förderprogramm geforderten Eigenanteils (bis 2016). In Thüringen engagiert sich der Landschaftspflegeverband „Thüringer Grabfeld" e. V. für die WRRL-Umsetzung durch das Motivieren seiner Mitgliedsgemeinden. Seit 2007 bietet er einen Betreuungsvertrag an, der die Erstellung eines Gewässerunterhaltungsplanes umfasst. Daraus lassen sich einzelne Maßnahmen herauslösen und investiv umsetzen. In diesem Zusammenhang erläutert der Verband

Konfliktfeld	Befähigung von bereits motivierten Akteuren	Aktivierung akzeptierender Akteure	Pflicht-Erzeugung/ Systemneugestaltung
Flächenverfügbarkeit	● Verbesserte Finanzierung des Flächenkaufs ● Kartensystem, welches (leichter) verfügbare Flächen anzeigt ● Verstärkte Information über die Relevanz WRRL-orientierter Gewässerunterhaltung und deren Vorteile (Motivation bei Unterhaltern)	● Strategische Beschaffung von Flächen, quasi auf Vorrat, auf übergeordneter Ebene ● Vorkaufsrecht für Flächen ● Anleitung zu, Durchsetzung und Kontrolle von WRRL-orientierter Gewässerunterhaltung ● Öffentlichkeitsarbeit zu WRRL-orientierter Gewässerunterhaltung zur Herstellung von Akzeptanz bei Anliegern, Bürgern und denen, denen Unterhalter rechenschaftspflichtig sind	● Regelungen zur Enteignung ähnlich jenen beim Hochwasserschutz
Finanzierung	● Finanzierungsanträge und Abwicklung vereinfachen/ verbessern ● Information über Möglichkeiten von Finanzierungsalternativen oder -ergänzungen (Eigenanteile)	● 100 % Finanzierung auf Antrag/ per Vertrag inklusive Personalkosten(pauschale) ● Lösung der Vorfinanzierungsproblematik	● Umsetzung über finanzierte Träger mit festem Personal (z. B. Landesbetriebe) – dies würde auch die **Abhängigkeitsverhältnisse** ändern ● Pflicht statt Freiwilligkeitsprinzip ● Maßnahmenträgertypen überdenken ● Bei vorhandenen Flächen kann auch eine fachlich orientierte, auf der Defizitermittlung basierende Planung höherer Ebenen greifen
Personal: Motivation	● Offenhaltung verschiedener Maßnahmenträgerformen ● Abbau von Bürokratie	● Kümmerer (auch auf lokalerer Ebene als bisher) ● Schaffung (oder Vermittlung) tatsächlicher Anreize für Maßnahmenträger ● Druckmittel oberhalb der Freiwilligkeitsschwelle	
Personal: Know-How	● Fachliche Handlungsleitfäden (unterstützen Aktive bei der Suche nach Know-How, Akteursgruppen spezifisch, auch einfach anzuwendendes) ● Breites Schulungsangebot ● Förderung von Austausch-Plattformen wie Gewässernachbarschaften, auch überregional ● Prozess-Leitfäden inklusive Best-Practice-Beispiele (Verknüpfung von Fördermittelquellen, Zwänge anderer Akteure und Handlungsoptionen, Optionen der Verfahrensbeschleunigung, Kniffe lokal politische Unterstützung zu erzeugen, Lösungsstrategien Zielkonflikte, Beteiligungsmodelle, Kontakte für Nachfragen) (zur Arbeitsteilung bei Leitfäden und Schulungen bundeslandübergreifende Zusammenarbeit) ● Finanzierung von Planwerken auf der Maßnahmenträger-Ebene ● Finanzierung von Planwerken als Ideen-Pools auf der Ebene, wo die meisten anlassbezogenen Ideen gebraucht werden – alternativ gezielte Vernetzung der Akteure	● Fachliche Kontrolle ● Ansprechpartner für Fragen ● Finanzielle Unterstützung des Einstellens von WRRL-Verantwortlichen mit Know-How ● Finanzierung und Erstellung von Planwerken, die als Fahrplan geeignet sind (möglichst bereits in Zusammenarbeit von Kümmerern und Maßnahmenträgern unter Berücksichtigung der lokalen Bedürfnisse)	
Zielkonflikte	● Akteure verschiedener Sektoren vernetzen (für Vertrauen und Zusammenarbeit zur lokalen Lösungsfindung; aktive Einladungen gezielt unter Synergieaspekten z. B. untere Wasser- und Naturschutzbehörde und Maßnahmenträger eines Kreises)	● Effektive Anreize für sektorübergreifende Kooperation z. B. durch höhere Finanzierung ● Strategieentwicklung mit anderen Interessengruppen auf oberen Ebenen (unter welchen Bedingungen wird kooperatives Handeln wahrscheinlicher? Welche Interessen könnten andere an der WRRL haben und lässt sich dies nutzen? Welche Sachzwänge haben andere?) ● Klärung des Umganges mit lokal nicht zu lösenden Zielkonflikten (Priorisierung oder z. B. Erfassung zur Begründung verringerter Ziele)	● Ausräumung von Zielkonflikten und instrumentellen Konflikten auf gesetzlicher Ebene

Tabelle 3: Instrumente zur Überwindung von WRRL-Umsetzungshürden kategorisiert nach der Motivation der Maßnahmenträger

die Vorteile für die Gemeinde und unterstützt beim Umsetzungsprozess. Da die Beratungsverträge allein keine Stelle finanzieren, hat der Verband zum Erhalt des Personals ein Eigeninteresse ergänzende Planungs- und Bauherrenleistungen über die grundsätzliche Beratung hinaus, zum Beispiel für konkrete Maßnahmen, anzubieten.

Ergänzend sei hier zu erwähnen, dass andere Instrumente unter ähnlichem Namen firmieren, aber andere Effekte haben, beispielsweise die Gewässerberatung in **Hessen**. Maßnahmenträger können eine Beratung buchen, also Leistungen von Ingenieurbüros in Anspruch nehmen, die finanziert werden, zum Beispiel die Konzepterstellung, Machbarkeitsstudien und spezifische fachliche Fragestellungen, aber auch Bauherrenaufgaben. Damit können Ideen generiert und Know-How ergänzt werden, aber es fehlt die Funktion eines „Kümmerers", der motiviert oder Projekte vorantreibt.

„Kümmerer" haben natürliche Kapazitätsgrenzen: Je höher die Anzahl der zu motivierenden Akteure und je komplexer das System, desto schwieriger ist es flächenhafte Effekte zu erreichen. „Kümmerer" können pro Zeiteinheit nur eine begrenzte Anzahl potenzieller Maßnahmenträger vorbereitet ansprechen. Sie können sich nicht mit allen lokalen Gegebenheiten ausreichend auskennen, um überzeugende Synergien aufzuzeigen. Die Kommunal Agentur NRW hat, selbst geschätzt, in zwei Jahren rund 40 Bürgermeister ansprechen können. NRW hat 396 Kommunen. Bezirksregierungen und Aufbaubank können durch die Größe ihres Zuständigkeitsbereiches notwendigerweise nur begrenzt lokales Wissen einbringen. Niedersachsens Gewässerallianzkoordinatoren sind lokal verankert, haben dadurch aber weniger Überblicks- und Verwaltungswissen und -kontakte. Sie erfüllen nicht die Funktion des Ansprechpartners bei individuellen Anliegen, sondern könnten diesen teilweise bei der Maßnahmen-Umsetzung selbst gebrauchen.

Darüber hinaus können „Kümmerer", wie in der Landwirtschaftsberatung auch, nur Argumente vorbringen, die Akteure bleiben nichtsdestotrotz unabhängig in ihren Entscheidungen. Diese Unabhängigkeit ist meist größer als berücksichtigt und Akteure entscheiden häufiger unter voller Ausschöpfung ihrer Handlungsspielräume und hinterfragen Lösungsansätze/ Vorschriften/ Pläne, die von anderen Akteuren als ihnen selbst kommen. Die Kommunal Agentur NRW schätzt den Erfolg ihrer Beratung auf 50 %. Im Modell der Gewässerallianzen wird dieses Problem teilweise umgangen, da der „Kümmerer" Teil des Maßnahmenträgers wird. Mit diesem Modell können aber von vornherein nur Maßnahmenträger erreicht werden, die ein gewisses Interesse an den WRRL-Zielen zeigen oder ihnen mindestens nicht ablehnend gegenüberstehen.

Der, keineswegs zu unterschätzende, Mehrwert der Kümmerer liegt darin, die Anreize zu verdeutlichen, die Förderprogramme allein nicht erzeugen, und die Akteure am Ball zu halten. Eine erfolgreiche Umsetzung braucht für die Überzeugungsarbeit lokal Kontakte und Erfahrungswissen, beides muss wachsen. Das braucht Zeit. Wie bereits erläutert, sprechen Akteure auf ganz unterschiedliche Anreize an. „Kümmerer" können fall- und akteursspezifisch diese Anreize aufzeigen. Das kann die Prioritätensetzung der Maßnahmenträger in Richtung des Gewässerschutzes verschieben. Teilweise gleichen sie mangelnde Kapazitäten der Maßnahmenträger, vor allem beim Know-How und Personal, aus. Die grundsätzlichen Umsetzungshürden bleiben jedoch bestehen, es ändert sich wenig an der Umsetzung nach Machbarkeit. Je mehr Umsetzungshürden abgebaut werden, desto weniger Überzeugungsarbeit ist in der Gruppe der akzeptierenden Akteure notwendig.

Gemeinsam ist den Kümmerern, dass sie gute Einblicke in diese kleinen Stolpersteine und großen Staudämme der lokalen WRRL-Maßnahmenumsetzung haben. Dieses Wissen sollte genutzt werden, um Hürden abzubauen.

5 Umgehungsgerinne oder Bulldozer im Einsatz für die WRRL-Zielerreichung?

Erreichen wir die flächenhafte Maßnahmenumsetzung also mit dem Umgehungsgerinne Freiwilligkeit oder brauchen wir den Bulldozer Pflicht? Beides wird für sich genommen nicht alle Akteure zur Maßnahmenumsetzung bewegen. Stellen wir uns vor, rechtlich wäre gerade eine durchsetzbare Pflicht zur Maßnahmenumsetzung festgeschrieben worden:

- Grundsätzlich würden wir immer noch unterschiedliche Motivationsgrade vorfinden. Die Mengenverhältnisse mögen sich über die Zeit ändern, wenn bei den Maßnahmenträgern eigens für die Aufgabenerfüllung Stellen geschaffen werden – wenn die Aufgabe als originäre Aufgabe angenommen wird. (Die Frage wäre, ob signifikant schneller Stellen geschaffen und Maßnahmen umgesetzt werden als Maßnahmen aktuell freiwillig umgesetzt werden.)
- Ablehnende Akteure müssten trotzdem durch Zwang, in Form effektiver Kontrollen und Sanktionierungen, zur Umsetzung bewegt werden. Eine rechtlich festgeschriebene Verpflichtung ist aufgrund der Unabhängigkeit der Akteure in ihren Entscheidungen kein Automatismus für Umsetzungsaktivitäten. Der Anteil an Akteuren, die dadurch auch ohne Ausübung von Zwang Maßnahmen umsetzen, mag aber im Vergleich zu einem System mit Freiwilligkeit steigen.
- Auch die grundsätzlichen Umsetzungshürden unabhängig von der Motivation der Akteure sind mit einer festgeschriebenen Umsetzungspflicht nicht aus der Welt. Kräfteverhältnisse und abhängigkeitsbezogene Hürden können sich teilweise ändern, da die Pflicht argumentativ verwendet werden kann. Signifikante Änderungen sind dadurch aber nur zu erwarten, wenn Hürden auf den oberen Ebenen abgebaut werden, wenn also die Umsetzungspflicht zum Beispiel auch zu einer Pflicht bei der Flächenbereitstellung führt.
- Andererseits wird der Umsetzungsrahmen umso starrer je mehr Kontroll- und Sanktionierungsinstrumente eingeführt werden, um die Umsetzung auch tatsächlich durchzusetzen. Damit werden einige individuelle Lösungswege zum Umgang mit Hürden und die Nutzung bestimmter Synergien [5] ausgeschlossen. Es ist damit wahrscheinlich, dass im aktuellen System motivierte Akteure ihre Anreize zur Umsetzung verlieren und diese Gruppe entsprechend kleiner wird.

Sowohl in einem System mit Freiwilligkeit als auch in einem System mit Pflicht wird es mindestens an den Rändern des Motivationsspektrums Akteure geben, die keine Maßnahmen umsetzen. Um das Gros der Maßnahmenträger zu erreichen, braucht es zahlreiche andere Instrumente zur Motivation, Akzeptanzgewinnung und zum Abbau von Umsetzungshürden im Sinne sich ergänzender Bausteine.

Nicht alle Hürden treten gleichermaßen in allen Bundesländern auf und werden auch nicht gleichermaßen von allen Maßnahmenträgern und anderen Akteuren in gleicher Weise und

als problematische Hürden wahrgenommen. Die Wahrnehmung als Problem kann aber schon ausreichen, damit es als tatsächliche Umsetzungshürde wirkt. Insbesondere, weil die Wahrnehmung, zum Beispiel negativer Erfahrungen anderer Akteure, die Motivation und strategische Entscheidungen schon beeinflusst noch bevor die Probleme tatsächlich auftreten. Angegangen werden müssen sowohl die relativen, stark wahrnehmungsbezogenen, als auch die absoluten (Sachzwänge) Umsetzungshürden.

Tabelle 3 enthält, kategorisiert nach ihrer Wirkung auf Akteure mit unterschiedlichem Motivationsgrad, Instrumente, die die verschiedenen Umsetzungshürden adressieren. Dabei handelt es sich um Instrumente, die in einigen Bundesländern schon zum Einsatz kommen oder als mögliche Lösungen für Hürden in den Interviews benannt wurden. Die Übergänge zwischen diesen Kategorien sind fließend und hin zur Pflicht ist natürlich mit zunehmendem politischem Gegenwind zu rechnen. Die unterschiedlichen Motivationsgrade gelten auch für andere Akteure des Systems als Maßnahmenträger. Dementsprechend adressieren manche Instrumente nicht die Maßnahmenträger selbst, sondern Akteure, wie Flächeneigentümer, mit denen die Umsetzungshürden verknüpft sind.

Abgesehen von einer Pflicht für die aktuell anvisierten Maßnahmenträger könnte das System auch durch die Schaffung neuer Maßnahmenträger für diese Aufgabe umgestaltet werden. Für neue Maßnahmenträger kann die WRRL-Umsetzung als originäre Aufgabe definiert werden. Beispielsweise begann 2019 in Thüringen per Gesetz der Prozess einer flächendeckenden Gründung von Gewässerunterhaltungsverbänden zur Neustrukturierung von Gewässerunterhaltungsaufgaben, Hochwasserschutz und teilweise der WRRL. Es gibt bei Umstrukturierungen allerdings grundsätzlich zwei Limitierungen. Zum einen gibt es keine Strukturen, die überall passen und die man lediglich einzuführen braucht. Zum anderen sind sie immer ein Eingriff, der auch funktionierende Strukturen und Netzwerke zerstören oder längerfristig lähmen kann. Der Zugewinn durch die Umstrukturierung sollte daher gut gegen die möglichen Verluste abgewogen werden.

Wir wissen durch die WRRL mehr denn je über unsere Gewässer. Um dieses Wissen zur Verbesserung des Zustandes unserer Gewässer nutzen zu können, brauchen wir effektive Governance-Strukturen und Prozesse. Grundsätzlich sollten auch diese zur Optimierung zyklisch betrachtet werden – nicht nur die ökologische Planung. Sie sollten entsprechend eines Experimentes häufiger kritisch hinterfragt und gegebenenfalls angepasst werden. Die Hoffnung bleibt, dass sich auch bei politischem Gegenwind und ungünstigem politischen Machtgefüge in Zukunft Gelegenheitsfenster öffnen, eine effektive Mischung der verschiedenen Strategien umzusetzen. Die Vielfalt unseres föderalen Systems sollte in jedem Fall aktiv zum Voneinander-Lernen genutzt werden, über Bundesländer, Ebenen und administrative Grenzen hinweg.

Dank

Vielen Dank an alle Interviewpartner*innen und Umfrageteilnehmer*innen, dass Sie mir Ihre wertvolle Zeit geschenkt haben, an *Simon Henneberg* für Feedback und Diskussion zu einer früheren Version des Artikels, an die Hans-Böckler-Stiftung für die Finanzierung meiner Doktorarbeit mit einem Stipendium, ebenso wie an die AöW für die Ermöglichung der zeitweisen Mitarbeit, ohne die meine Forschungskosten nicht abzudecken gewesen wären.

Literatur

[1] LAWA (Bund/Länder-Arbeitsgemeinschaft Wasser), 2018. *Weitere Vorschläge an die UMK zur Erreichung der Ziele der WRRL, beschlossen auf der LAWA-Sondersitzung am 17.10.2018 in Berlin*. *https://www.umweltministerkonferenz.de/documents/top_25_lawa-wasserrahmenrichtlinie_anlage_1545313820.pdf*

[2] LAWA (Bund/Länder-Arbeitsgemeinschaft Wasser), 2018. *Umsetzungsstand der Maßnahmen nach Wasserrahmenrichtlinie: Zwischenbilanz 2018*. *https://www.wasserblick.net/servlet/is/182310/*

[3] Reese, M., Bedtke, N., Gawel, E., Klauer, B., Köck, W., Möckel, S., 2018. *Wasserrahmenrichtlinie – Wege aus der Umsetzungskrise. Rechtliche, organisatorische und fiskalische Wege zu einer richtlinienkonformen Gewässerentwicklung am Beispiel Niedersachsens*. Nomos Verlagsgesellschaft, Baden-Baden.

[4] Lamberty, G., Kemper, M., Wagner, F., Zumbroich, T., Naumann, S., 2020. *Mehr Aufmerksamkeit für gewässerökologische Maßnahmen. Umweltbundesamt startet Online-Informationsplattform zur Renaturierung von Fließgewässern*. Korrespondenz Wasserwirtschaft (13), Nr. 4: 209–213.

[5] Schröder, N.J.S., 2020. *Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 1 – WRRL-Zielerreichung zwischen Plan und Machbarkeit*. Korrespondenz Wasserwirtschaft (13), Nr. 9: 490–497.

[6] Die Doktorarbeit ist entsprechend dem kumulativen Promotionsverfahren bereits in Teilen, in Englisch, veröffentlicht. Aktuelle und zukünftige Veröffentlichungen, finden Sie auf meinem Profil, welches ich laufend aktuell halte: *https://sustainability-governance.net/people/nadine-schroeder/*

[7] Mitchell, B., 2018. *Resource and environmental management*. New York, NY: Oxford University Press: 268–298.

[8] Schröder, N.J.S., 2018. *The lens of polycentricity: Identifying polycentric governance systems illustrated through examples from the field of water governance*. Environmental Policy and Governance 28(4): 236–251. *https://onlinelibrary.wiley.com/doi/abs/10.1002/eet.1812*

[9] Schröder, N.J.S., 2019. *Überprüfung der Wasserrahmenrichtlinie (Richtlinie 2000/60/EG vom 23. Oktober 2000)*. Reader im Auftrag des Bundesfachgruppenvorstands Wasserwirtschaft ver.di. *https://ver-und-entsorgung.verdi.de/themen/wasser-ist-menschenrecht/++co++54c33b4a-43fc-11e9-9e6b-52540066e5a9*

[10] Monsees, J., 2008. *Governancestrukturen für Fließgewässer. Eine vergleichende Institutionenanalyse gewässerunterhaltender Verbände und Behörden*. Nomos Verlagsgesellschaft, Baden-Baden.

[11] Schröder, N.J.S., 2019. *IWRM through WFD Implementation? Drivers for Integration in Polycentric Water Governance Systems*. Water 11(5): 27. *https://www.mdpi.com/2073-4441/11/5/1063*

[12] Schröder, N. J. S., Chaudhary, N., 2020. *WRRL-Umsetzungshürden: Unpassierbar oder durchgängig für Maßnahmenträger? THESys Discussion Paper No. 2020-1*. Humboldt-Universität zu Berlin, Berlin, Deutschland: 1–13. *https://edoc.hu-berlin.de/handle/18452/22110*

[13] Weyand, M., 2019. *Wasserwirtschaft zwischen politischem Anspruch, wissenschaftlichen Auffassungen und technischer Umsetzung*. 19. Workshop Flussgebietsmanagement als Gemeinschaftsveranstaltung. Korrespondenz Wasserwirtschaft (12), Nr. 9: 494-–501.

[14] Schröder, N. J. S., Newig, J., Watson, N., 2020. *Bright spots for local WFD implementation through collaboration with nature conservation authorities?* Water Alternatives (13), Nr. 3: 582-617. http://www.water-alternatives.org/index.php/alldoc/articles/vol13/v13issue3/601-a13-3-19/file

Autorin

Nadine Jenny Shirin Schröder, M. Sc., M. Sc., B. Sc., B. A.
Leuphana Universität Lüneburg
Research Group Governance, Participation and Sustainability
Humboldt-Universität zu Berlin
IRI THESys (Integrative Research Institute on Transformations of Human-Environment Systems) Graduiertenprogramm

E-Mail: nadine.schroeder@stud.leuphana.de

Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland:

Teil 3 – WRRL-Zielerreichung zwischen fachlichem Anspruch und Beteiligung

Nadine Jenny Shirin Schröder (Berlin/Hamburg/Meppen)

Zusammenfassung

Dieser Beitrag beruht auf einer Untersuchung der Beteiligungsprozesse zur Umsetzung der Wasserrahmenrichtlinie (WRRL) in Sachsen-Anhalt, Sachsen, Niedersachsen, Thüringen, Hessen und Nordrhein-Westfalen. Beteiligung soll den Umsetzungserfolg der WRRL fördern, entsprechend schreibt die WRRL Beteiligung an den Umsetzungsprozessen vor. Diese Vorgaben werden von einer großen Mehrheit von Umfrageteilnehmern in Deutschland als eher oder sehr nützlich bzw. wichtig betrachtet. Der Erfolg der Umsetzung dieser Vorgaben hingegen wird sehr unterschiedlich bewertet. Basierend auf der Analyse der Erwartungen von EU, Prozessorganisatoren und Teilnehmern an die Leistung von Beteiligungsprozessen skizziert dieser Beitrag die aktuelle Rolle von Beteiligungsprozessen für die WRRL-Umsetzung im Akteurssystem der Bundesländer und zeigt Verbesserungspotenziale auf. Während sich die EU eine verbesserte Entscheidungsfindung und effektivere Umsetzung von Entscheidungen durch Beteiligungsprozesse verspricht, geben Organisatoren Informationsvermittlung und Informationsaustausch als vorrangige Prozessziele an. Insgesamt ist die Entscheidung für eine bestimmte Prozessgestaltung nicht nur die Wahl zwischen fachlicher Qualität und Akzeptanz, sondern durch die gegebenen Governance-Strukturen auch eine Wahl zwischen unterschiedlichen fachlichen Ansichten, was am Gewässer nötig und möglich ist.

Schlagwörter: Wasserrahmenrichtlinie, Beteiligungsprozesse, Umsetzung, Governance, Öffentlichkeit, Kommunikation

DOI: 10.3243/kwe2022.01.001

Abstract

The process of implementing the EU Water Framework Directive in Germany: Part 3 – Achieving the WFD targets while balancing professional standards and participation

This article is based on an evaluation of the participatory processes used for implementing the EU Water Framework Directive (WFD) in Saxony-Anhalt, Saxony, Lower Saxony, Thuringia, Hesse and North Rhine-Westphalia. Participation seeks to promote the successful implementation of the WFD. Therefore, the WFD requires participation in the process of implementation. A large majority of survey participants in Germany rate these rules as rather or very useful or important. However, respondents have very mixed views about the successful implementation of the rules. Based on an analysis of expectations held by the EU, process organisers and participants about the efficiency of participation processes, this article outlines the current role that participation processes play in implementing the WFD within the parameters of the federal states' system of stakeholders. It also shows potential improvements. While the EU believes that participatory processes will lead to better decision-making and more effective implementation of decisions, the organisers list providing and exchanging information as the primary goals of the process. All told, the decision to design the process in a specific way is not only the choice between professional quality and acceptance but also a choice between different professional views about what is feasible and necessary for water bodies through the provided governance structures.

Keywords: Water Framework Directive, participation processes, implementation, governance, public, communication

1 Beteiligung – erfolgreich oder verbesserungsbedürftig?

Auch am Ende des zweiten Bewirtschaftungszeitraumes der Wasserrahmenrichtlinie (WRRL) sind die Mitgliedsstaaten noch weit vom Erreichen ihrer ambitionierten Ziele, dem guten (ökologischen und chemischen) Zustand in allen europäischen Gewässern, entfernt, welcher bis spätestens zum Jahr 2027 erreicht werden sollte. Um den Umsetzungserfolg zu fördern, macht die WRRL verschiedene Prozessvorgaben. Unter den Governance-bezogenen Vorgaben finden sich die Beteiligung der Öffentlichkeit und die Integration anderer Sektoren in die Umsetzungsprozesse. Der CIS-Leitfaden zur Beteiligung der Öffentlichkeit definiert diese *„als das Einräumen der Möglichkeit für die Bevölkerung, auf die Ergebnisse von Planungen und Arbeitsprozessen Einfluss zu nehmen."* [1]

Die WRRL stellt die Abhängigkeit des Erfolges der Richtlinie von der Beteiligung der Öffentlichkeit, einer engen Zusammenarbeit auf verschiedenen Ebenen und kohärenten Maßnahmen in ihrer Präambel 14 heraus und schreibt mit Artikel 14 vor, dass Information und Anhörung zu gewährleisten sind und die aktive Beteiligung zu fördern ist. Ebene und Form der aktiven Beteiligung werden dabei nicht vorgeschrieben, auch wird

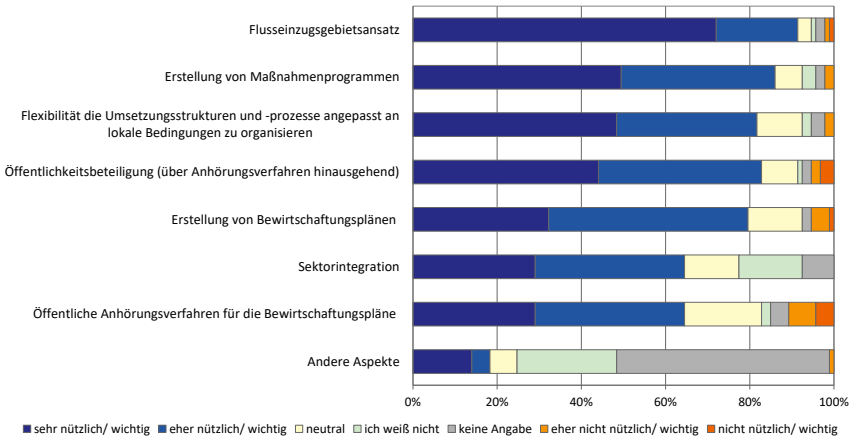

Abb. 1: Welche Prozessvorgaben der WRRL betrachten Sie grundsätzlich als nützlich bzw. wichtig für die WRRL-Umsetzung? (n = 93)

im CIS-Leitfaden und in der Praxis nicht klar getrennt zwischen der Beteiligung der breiten oder interessierten Öffentlichkeit und anderen Sektoren. Entsprechend betrachtet dieser Beitrag die Gesamtheit der Prozesse, die unter aktiver Beteiligung für die WRRL-Umsetzung in den ausgewählten Bundesländern (siehe Datengrundlage) firmieren, lässt aber die stärker regulierten Anhörungsverfahren außen vor.

Öffentlichkeitsbeteiligung und Sektorintegration wurden von einer großen Mehrheit der Befragten in einer deutschlandweiten Umfrage aus dem Jahr 2019 (siehe Datengrundlage und Teil 1) zu den eher oder sogar sehr nützlichen bzw. wichtigen Prozessvorgaben der WRRL gezählt (siehe Abbildung 1). Wenn allerdings Kritik an den existierenden Beteiligungsprozessen geäußert wird, verursacht das nicht selten Abwehrreaktionen im Sinne ‚wir machen doch schon so viel'. Dem kann nur schwer widersprochen werden – seit Einführung der WRRL ist in Deutschland viel in Sachen Beteiligungsprozesse passiert, und diese Aktivitäten bedeuten einen erheblichen Aufwand für die Prozess-Organisatoren. Dieselbe Umfrage zeigt aber auch, dass Öffentlichkeitsbeteiligung und besonders die Integration anderer Sektoren zu den Aspekten der WRRL zählen, deren Erfolg sehr unterschiedlich bewertet und weniger als (eher) erfolgreiche Prozessvorgabe angesehen wird (siehe Abbildung 2). Aber welche Rolle spielen WRRL-Beteiligungsprozesse aktuell in Deutschland und welche können sie für den Umsetzungserfolg spielen?

Dieser Beitrag gibt einen Überblick über die verschiedenen Erwartungen von EU, Prozess-Organisatoren und (Nicht-)Teilnehmern an die Leistung von Beteiligungsprozessen. Darauf aufbauend wird die aktuelle Rolle der Beteiligungsprozesse (mit Ausnahme von Anhörungen) im Umsetzungssystem der Länder vor dem Hintergrund von Teil 1 (WRRL-Umsetzung zwischen Plan und Machbarkeit) [2] und Teil 2 (WRRL-Umsetzung zwischen Freiwilligkeit und Pflicht) [3] analysiert. Zuletzt werden aus der System-Perspektive heraus Potenziale des effektiveren Einsatzes von Beteiligungsprozessen aufgezeigt. Die Datengrundlage ist daran anschließend nachzulesen.

2 Was sollten Beteiligungsprozesse leisten?

Es scheint naheliegend Beteiligungsprozesse daran zu messen, was von ihnen erwartet wird. Diese Erwartungen können aber je nachdem, ob man die EU als Normgeber, Prozess-Organisatoren oder Prozess-Teilnehmer und Prozess-Beobachter fragt, unterschiedlich ausfallen.

Während die Richtlinie selbst in ihrer Präambel lediglich darauf verweist, dass ihr Erfolg von Beteiligungsprozessen abhängt, führt der CIS-Leitfaden zur Beteiligung der Öffentlichkeit [1] im gesamten Dokument immer wieder Aspekte an, wie der Erfolg durch Beteiligungsprozesse gefördert wird. Den argumentativen Strängen im Forschungsdiskurs [4] entsprechend lassen sich diese Aspekte zwei Effekt-Mechanismen zuordnen: Zum einen soll die Entscheidungsfindung beziehungsweise sollen die Entscheidungen selbst verbessert werden und zum anderen soll Beteiligung zur effektiveren und effizienteren Umsetzung dieser Entscheidungen beitragen:

(a) **Verbesserung der Entscheidungsfindung** bzw. der Entscheidungen (Qualität von Plänen, Maßnahmen und der Bewirtschaftung von Flusseinzugsgebieten etc.), indem nachhaltigere und ausgewogenere Lösungen gefunden werden durch das Gewährleisten …

- des frühzeitigen Erkennens und weitest möglichen Lösens von Konflikten
- eines soliden Fundamentes aus gemeinsamem Wissen, Erfahrungen und wissenschaftlichen Erkenntnissen

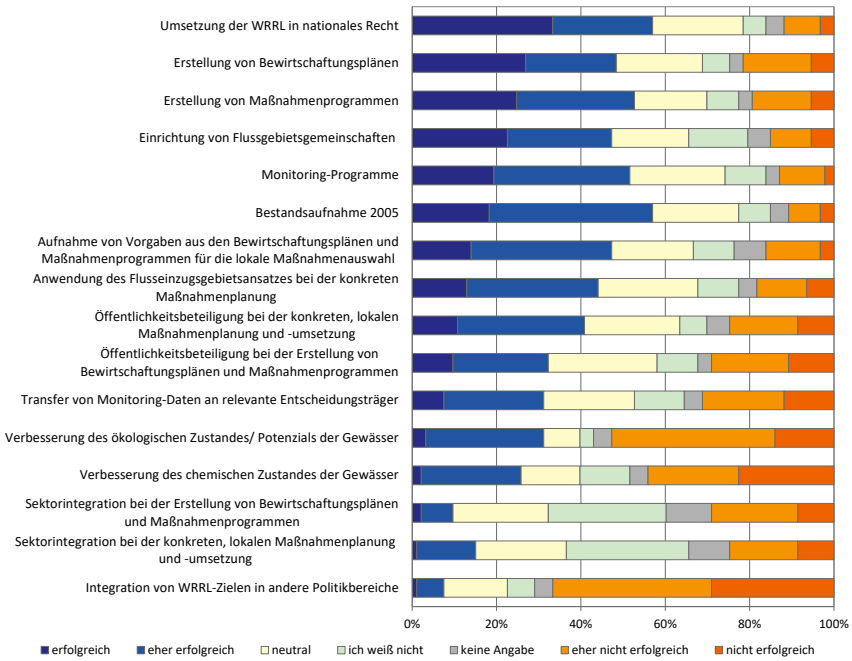

Abb. 2: Wie erfolgreich würden Sie bestimmte Teile der WRRL-Umsetzung in ihrem Bundesland bewerten? (n = 93)

- des Einfließens der Ansichten und Erfahrungen der jeweils Betroffenen
- der Berücksichtigung innovativer und kreativer Optionen
- der Ermittlung durchführbarer und wirksamer Optionen und alternativer Möglichkeiten

(b) Beitrag zur effektiveren/ effizienteren **Umsetzung von Entscheidungen** (Bewirtschaftungsplan, Maßnahmenprogramm, Maßnahmen etc.) und langfristig zu deren Realisierung durch

- Transparenz herstellen und Erklärung der Entstehung von Entscheidungen
- Probleme erörtern und zu ihrer Lösung beitragen
- weniger Streit, Missverständnisse und Verzögerungen
- Erhöhung und Aufrechterhaltung des öffentlichen Bewusstseins für Umweltfragen und -situation
- Förderung von Identifikation
- Erhöhung der Durchführbarkeit neuer Vorkehrungen und der Akzeptabilität für die Öffentlichkeit
- Erhöhung der Akzeptanz für beabsichtigte Planungen
- Erhöhung des Engagements/ der Einsatzbereitschaft für beabsichtigte Planungen
- Förderung von Kooperation
- Nutzung von Vorteilen durch Kooperation
- Langfristige Stärkung der Beziehungen zwischen Behörden und Interessengruppen
- soziales Lernen und Erfahrungen der verschiedenen Öffentlichkeiten [1]

Die Beschreibungen der Beteiligungsprozesse geben neben dem Informieren, dem Austauschen von Informationen und dem Beraten unterschiedlichste Prozess-Ziele an, wie das Lösen von Konflikten, das Koordinieren, das Multiplizieren, das Gewinnen von Akzeptanz, das Motivieren, das Entwickeln von Ideen und das Berichten. Information und Informationsaustausch werden bei den meisten Prozessen genannt, die anderen Ziele nur bei jeweils einem Teil der Prozesse. Im direkten Gespräch mit den Organisatoren spielt das Motivieren eine größere Rolle, genannt wird auch, dass die Prozesse der Erfüllung der auferlegten Pflichten dienen. Legitimation als zweiter Hauptbeweggrund für die Umsetzung von Beteiligungsprozessen neben Effektivität [5] spielt hier aber eine untergeordnete Rolle.

Die Motivation zur Teilnahme an Beteiligungsprozessen wurde nur schlaglichtartig und nicht systematisch und quantitativ erhoben – durch Beobachtung und Gespräche während

Informationsquelle	
Praxis-Wissen	● Erfahrungen: Was läuft anderswo? Wie liegen dort die Probleme? Wie werden Konflikte/ Probleme gelöst? Was ist das richtige Vorgehen? ● Umsetzung von der Theorie in die Praxis ● Optionen/ Ideen/ Beispiele/ Best-Practices
Strategie-Wissen (Bewegen im Feld mit oder zwischen anderen Akteuren)	● Was ist geplant? ● Was wird diskutiert? ● Bestätigung von Informationen aus anderen Kanälen ● Sichtweisen/ Interessen/ Aufgaben anderer Akteure ● Mögliche Argumente ● Optionen bezüglich Best-Practices, Problemlagen, Zeitplan und Zuständigkeiten z. B. durch das Vorgehen anderer Bundesländer ● Governance-Strukturen und Prozesse anderer Sektoren z. B. der Landwirtschaft
Monitoring	● Grundlagen für die Umsetzung ● Umsetzungsstand
Forschung	● Neue Erkenntnisse ● Zusammenhänge
Rechtliche Grundlagen	● Neues ● Auslegung
Einflussnahme-Möglichkeit	
Wissen einbringen	● Erfahrungswissen ● Fachwissen ● Spezialwissen ● Sichtweisen ● Ideen
Agenda-Setting	● Aufmerksamkeit erzeugen/ Anliegen vorbringen: Prozess-Themenbezogen oder Prozess-Themenfremd (als verfügbarer Kommunikationskanal)
Interaktion mit anderen Teilnehmern	● (Kritische) Diskussion ● Konkrete Zusammenarbeit ● Andere motivieren ● Andere unterstützen ● Vermitteln innerhalb des Prozesses oder hinzu Nicht-Teilnehmern
Kommunikationskanal	
Kontakte	● Aufbau ● Pflege
Kommunikation	● Besprechungen auf kleinem Dienstweg ● Aufrechterhalten der Kommunikation ● Ansprechpartner finden
Präsenz zeigen	

Tabelle 1: Erwartungen an Beteiligungsprozesse aus Teilnehmer-Sicht

Organisatoren	Sachsen-Anhalt	Sachsen	Niedersachsen	Thüringen	Hessen	NRW
Ministerium	*Beirat*	Beirat	(Beirat), Gebietsforen	Beirat	*Beirat, Forum*	*Symposium*
Mittelbehörde/ Landesdirektionen/ Regierungspräsidien/ Bezirksregierungen	*2 Foren*	*4 Regionale AGs*	-	3 Gebietsforen, *Werkstätten*		5 Gebietsforen/ -konferenzen, Kernarbeitskreise
Fachbehörde		*Forum*				
Landesbetrieb	*Projektbegleitende AGs für GEKs*		*Gebiets-kooperationen*			
Unterhaltungsverbände	Projektbegleitende AGs für Maßnahmen					

Durch die Autorin teilnehmend beobachtet; – Akteursebene nicht vorhanden; GEK: Gewässerentwicklungskonzept

Tabelle 2: Wiederholt stattfindende Beteiligungsformate (wahrscheinlich unvollständig durch Namensänderungen im zeitlichen Verlauf)

der Beteiligungsprozesse und Interviews unabhängig von den Prozessen. Die Motivation variiert je nach Format des Prozesses und je nachdem, ob es sich um geschlossene oder offene Runden handelt – also ob die Teilnehmer von ihrer Organisation entsendet werden, ob sie von den Organisatoren als Repräsentanten einer Gruppe eingeladen werden, oder ob sie sich selbst anmelden. Bei letzterem Fall hatten Befragte mindestens ein konkretes Anliegen, welches sie zur Teilnahme motiviert hat: Eine spezifische Frage zu Gewässerrandstreifen, die Aussicht beruflich mit dem Thema zu tun zu haben und der Wille sich schon mal zu informieren oder auch die Möglichkeit einen Ansprechpartner zu finden, um eine spezifische Frage loszuwerden, oder Kontakte zu Behördenvertretern (z. B. Ministerien), die sonst unerreichbar erscheinen.

Was Teilnehmer erwarten, was sie motiviert teilzunehmen und was sie aus den Prozessen mitnehmen, scheint sehr individuell. Nichtsdestotrotz lassen sich aus Teilnehmersicht drei Kategorien herauskristallisieren (siehe Tabelle 1): Beteiligungsprozesse können oder sollen als Informationsquelle (meiste Nennungen), Kommunikationskanal oder Einflussnahme-Möglichkeit fungieren. Eine besondere Gewichtung kommt dem Praxis-Wissen zu, den Erfahrungen, die anderswo gemacht wurden, um sie für die eigene Arbeit zu nutzen und das eigene Vorgehen einzuordnen (z. B. bei Unsicherheit über die richtigen Maßnahmen), sowie dem Strategie-Wissen, um im Zusammenspiel mit anderen Akteuren besser agieren zu können. Als wichtiger Kommunikationskanal zwischen verschiedenen Akteuren und Ebenen sollen Prozesse zum einen dem „Netzwerken" für die Kommunikation außerhalb des Prozesses dienen, zum anderen als direkter Kanal, wenn das Kommunizieren oder Ansprechen auf anderen Wegen schwieriger ist. Präsente Akteure können angesprochen werden, auch wenn diese ohne spezifische Ziele teilnehmen. Einfluss genommen werden soll auf die WRRL-Umsetzung an sich, auf grundsätzliche Fragen, auf Einzelmaßnahmen oder auch die Gestaltung der Beteiligung selbst sowie auf das Handeln anderer Akteure.

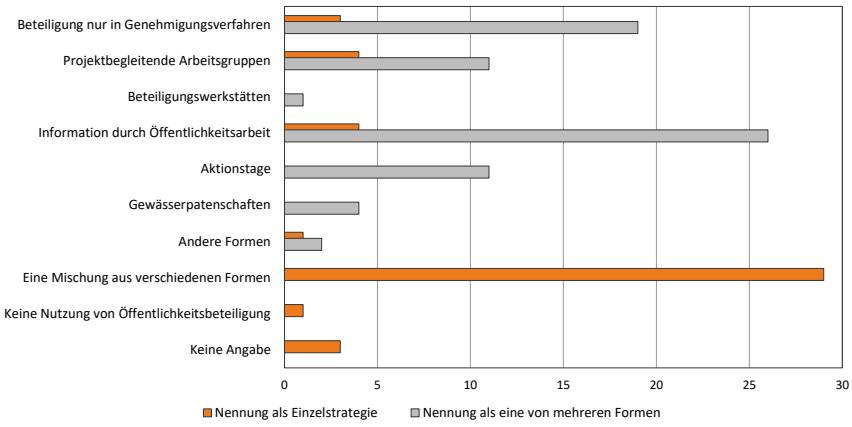

Abb. 3: Nutzung von Öffentlichkeitsbeteiligungsformaten durch WRRL-Maßnahmenträger (n=45). Diese Formate konnten im Rahmen der Untersuchung nicht exemplarisch teilnehmend beobachtet werden.

3 Welche Rolle spielen Beteiligungsprozesse aktuell?

Die Unterschiedlichkeit der Erwartungen an die Leistung von Beteiligungsprozessen in dieser überblicksartigen Zusammenstellung deutet bereits die Schwierigkeiten an, wenn Beteiligungsprozesse alle Erwartungen erfüllen woll(t)en – was also kennzeichnet die aktuellen Beteiligungsprozesse zur WRRL-Umsetzung?

In Deutschland wird eine Vielfalt von Koordinations-, Beteiligungs- und Informationsprozessen auf allen Ebenen genutzt. Tabelle 2 zeigt Formate, die auf den WRRL-Webseiten der sechs untersuchten Bundesländer im Untersuchungszeitraum als Beteiligungsformate geführt wurden, und die Ebene, die diese Formate organisiert. Hinzukommen nicht regelmäßig stattfindende Formate (hier nicht aufgeführt). Abbildung 3 zeigt die Beteiligungsformate, die Maßnahmenträger aus 14 Bundesländern in der Umfrage als solche angegeben haben. Unterscheiden lassen sich große, teilweise bundeslandweite Veranstaltungen (100-400 Teilnehmende; Symposium, die meisten Foren und Konferenzen), mittelgroße Veranstaltungen mit bis zu 30 Teilnehmenden und maßnahmenspezifische Prozesse mit bis zu 15 oder 30 Teilnehmenden. Die mittelgroßen Formate sind dabei mit Beiräten, Foren, regionalen AGs, Werkstätten, Kernarbeitskreisen und Projektbegleitenden AGs am diversesten ausgeprägt. Die Varianz in den oben genannten Prozesszielen ist dabei nicht an bestimmte Formate geknüpft.

Die Informationsvermittlung dominierte die beobachteten (siehe Tabelle 2) Prozesse, dabei überwog nicht selten das Fach-, das Erfahrungswissen und noch deutlicher das Strategiewissen. Insbesondere prägten die Prozesse häufig die vorbereiteten Präsentationen (top-down) statt die Diskussionsanteile

bzw. Teilnehmerbeiträge (bottom-up). Eine aktive Förderung der kreativen Entwicklung von Ideen und Optionen oder von Kooperationen innerhalb der Prozesse konnte nicht beobachtet werden. Damit bleibt die Nutzung der Beteiligungsprozesse als Kommunikationskanal über den reinen Wissensaustausch hinaus auf die Eigeninitiative der Teilnehmer beschränkt. Manche Formate haben die Netzwerkbildung und den Austausch durch eine längere Veranstaltungsdauer (z. B. zweitägig) und eine ‚zusammenhaltende' Pausen- und Mahlzeitengestaltung (z. B. längere Pausen, aber Essensangebote vor Ort, so dass sich die Teilnehmer nicht zerstreuen) unterstützt.

Die Teile 1 und 2 dieser Artikel-Serie haben dargelegt, dass zwischen Steuerungsebene(n) und Maßnahmenträgern unterschieden werden kann. Da die Steuerungsebene Maßnahmenträger aktuell genauso wenig zu Beteiligungsprozessen zwingen kann, die über die klassischen Genehmigungsverfahren hinaus gehen, wie zum Ergreifen von Maßnahmen, erscheint es unausweichlich, dass Akteure der Steuerungsebene die Organisation von Prozessen übernehmen, wie dies bei den meisten Beteiligungsprozessen aus Tabelle 2 der Fall ist. Die Varianz an Teilnehmern ist groß. Der einfache Bürger spielt dabei aber eher eine untergeordnete Rolle. Es überwiegt die interessierte Öffentlichkeit aus Akteuren der Wasserwirtschaft und anderen Sektoren.

Auffällig ist, dass nur sehr begrenzt Entscheidungen innerhalb der Prozesse getroffen wurden (z. B. zur Tagesordnung, zu Protokollen, zu den für den Prozess zur Verfügung stehenden Finanzmitteln). Den verschiedenen Beteiligungsprozessen wurden keine Entscheidungskompetenzen übertragen, obwohl einige Prozesse zwischen stimmberechtigten und nicht stimmberechtigten Teilnehmern unterscheiden. Damit verbleiben die Entscheidungskompetenzen bei den Organisatoren, Teilnehmern und Nicht-Teilnehmern. Je nach Art von Entscheidung – Steuerungsinstrumente oder Maßnahmenumsetzung – ließe sich die Frage aufwerfen, wer an wessen Entscheidungen beteiligt ist. Wer ist Entscheider und wer ist Betroffener?

Diese Unschärfe lässt die Unterscheidung zwischen verbesserter Entscheidungsfindung und effektiverer Umsetzung dieser Entscheidungen in den Hintergrund treten. Dadurch bekommen die Erhöhung von Akzeptanz und Einsatzbereitschaft und die Förderung von Kooperation als Erwartungen an die Leistung von Beteiligungsprozessen einen noch höheren Stellenwert, wenn Beteiligungsprozesse die Umsetzung voranbringen sollen. Da die Maßnahmenträger, wie in Teil 2 gezeigt, aufgrund des Freiwilligkeitsprinzips sehr unabhängig über das Ergreifen von Maßnahmen entscheiden, muss nicht nur Akzeptanz (nicht entgegen der Ziele zu handeln oder Veto-Optionen zu nutzen), sondern viel mehr Motivation (aktiv zu werden) gefördert werden.

Für eine erfolgreiche WRRL-Umsetzung muss eine große Zahl und Vielfalt an Akteuren beeinflusst werden – egal ob es um Information, Akzeptanz oder Motivation geht. Aber, „aus Praktikabilitätsgründen ist es unmöglich, alle potenziellen Stakeholder aktiv und zu sämtlichen Aspekten einzubeziehen." [1] Die Teilnehmerzahl ist zum Erhalt der Arbeitsfähigkeit von Prozessen begrenzt. Deswegen werden viele Akteure häufig nur repräsentiert. Durch den Verbleib der Entscheidungskompetenzen bei den Akteuren müssen Teilnehmer Nicht-Teilnehmer im Sinne der Prozessziele beeinflussen, um einen flächendeckenden Effekt zu erzeugen. Beispielsweise müsste ein Bauernverbandsvertreter die Landwirte der Gegend beeinflussen oder der kommunale Spitzenverband die durch ihn vertretenen Kommunen: eine gute Repräsentation der verschiedenen Interessengruppen allein ist nicht ausreichend, Multiplikation ist nötig, was wenige Prozess-Organisatoren auch explizit als Prozess-Ziel benennen. Aber sowohl Organisatoren als auch Teilnehmer haben berichtet, dass Multiplikation kaum stattfindet, und befragte Nicht-Teilnehmer sehen sich durch diese Prozes-

Schlüsselfaktor	**Beispiel(e)**
Sind die zu beeinflussenden Akteure überhaupt involviert?	persönlich oder repräsentiert durch einen Verbandsvertreter oder eine Person aus derselben Gruppe
Gibt es überhaupt einen Multiplikationskanal zu repräsentierten Akteuren?	E-Mail-Verteiler, nachfolgende Prozesse, persönliche Netzwerke etc.
Ist der Multiplikationskanal adäquat für die Prozess-Ziele?	Eine E-Mail mag nicht den gleichen Effekt auf Akzeptanz oder Motivation haben wie ein persönliches Gespräch.
Gibt es „unbeteiligte" Dritte mit Filterfunktion?	Poststellen in Kommunen, die gegebenenfalls Informationen nicht so verteilen wie erhofft, z. B., weil es keinen Ansprechpartner für das genannte Fachgebiet gibt
Welche Kapazitäten hat der Empfänger für die Aufnahme?	Versteht ein Laie auf dem Gebiet wasserwirtschaftliche Informationen oder deren Relevanz? Ist es eine weitere E-Mail von vielen?
Welchen Einfluss hat der Empfänger, sein Entscheidungsverhalten anzupassen (Einflüsse anderer Akteure/ Abhängigkeiten)?	Nimmt ein Bürgermeister Einfluss auf die Entscheidungen des wasserwirtschaftlichen Mitarbeiters, der aufgrund der Informationen sein Handeln ändern würde, aber nicht kann.
Prozesseigenschaften	**Beispiel(e)**
Erlauben die Prozesscharakteristika eine Multiplikation?	Protokolle, die erst mehrere Wochen oder gar Monate nach dem Meeting verteilt werden dürfen, weil sie erst beim nächsten Meeting bestätigt werden müssen, verpuffen. Unklarheit darüber, ob und welche Informationen weitergegeben werden dürfen, ist nicht förderlich.
Sind sich Repräsentanten ihrer Multiplikationsrolle bewusst und gewillt sie auszuüben?	Manche Personen repräsentieren aus Sicht der Organisatoren eine größere Gruppe, z. B. die Wasserkraft, nehmen aber nur aus eigenem Interesse teil und nur solange, wie das Interesse besteht.
Was wird offiziell/ individuell als wichtig zum Multiplizieren eingestuft und kommuniziert?	Ein regelmäßiger Teilnehmer mag wegen eines geringen persönlichen Neuigkeitswertes viel weniger Informationen als verteilungswürdig einstufen als ein Nicht-Teilnehmer

Tabelle 3: Schlüsselfaktoren und Prozesseigenschaften für die Multiplikation von Teilnehmern an Beteiligungsprozessen zu Nicht-Teilnehmern

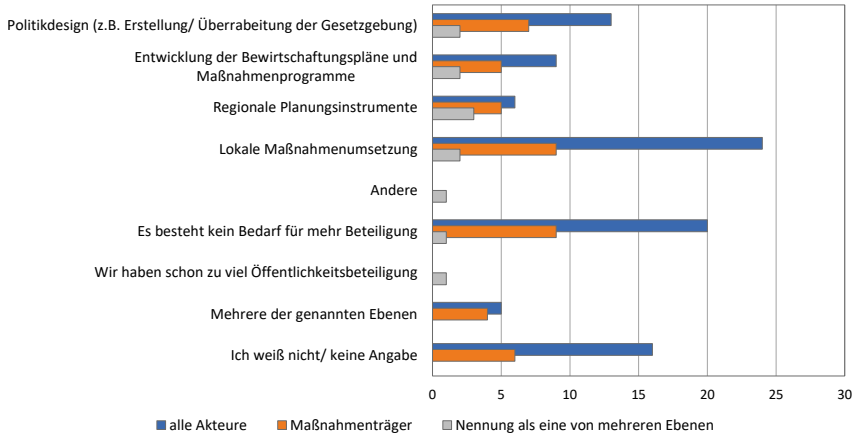

Abb. 4: Ebenen mit größtem Bedarf für Öffentlichkeitsbeteiligung (n=93)

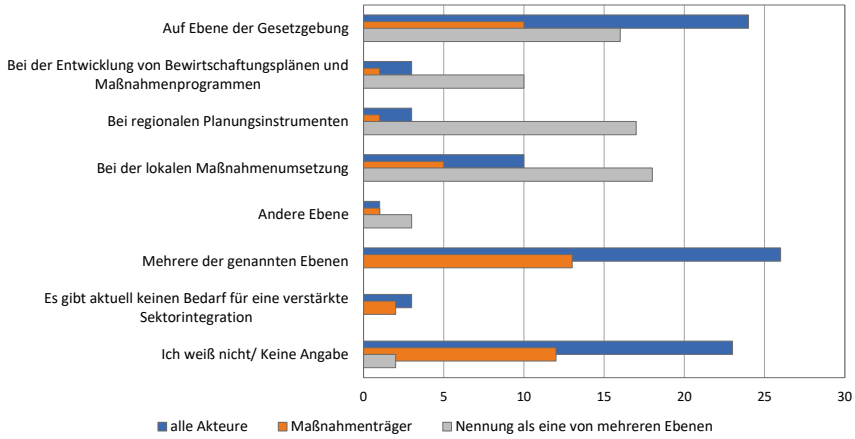

Abb. 5: Ebenen mit größtem Bedarf für die Integration verschiedener Sektoren (n=93)

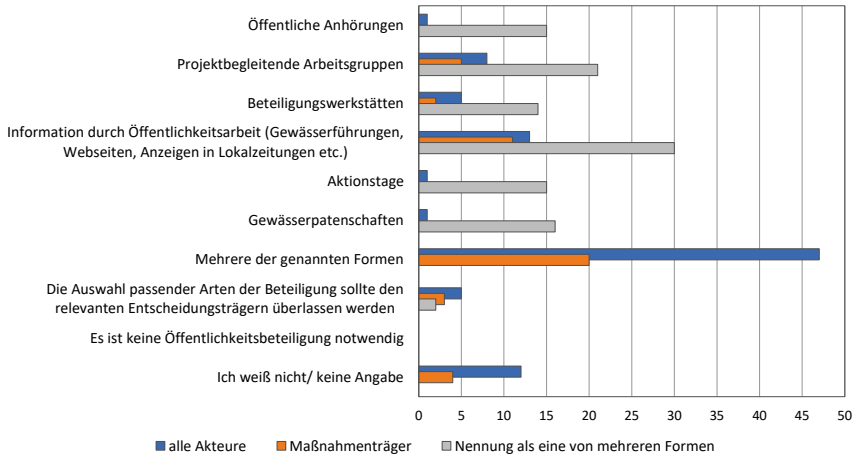

Abb. 6: Passende Form von Öffentlichkeitsbeteiligung für die WRRL-Umsetzung (n=93)

se nicht beeinflusst. Die Multiplikation wird, wie die Untersuchung gezeigt hat, durch zahlreiche Schlüsselfaktoren begrenzt sowie durch bestimmte Aspekte der Prozessgestaltung nicht gefördert (siehe Tabelle 3). Darüber hinaus setzt eine erfolgreiche Multiplikation Erfolg bei den Teilnehmern voraus, das macht eine geeignete Prozessgestaltung (dazu gibt es bereits zahlreiche Veröffentlichungen z. B. [6, 7]) unabdingbar, aber keineswegs einfacher.

So sind Akteure enttäuscht von Beteiligungsprozessen, weil mit ihnen keine Problemlösung möglich sei, es ein Verhinderungsarbeitskreis sei, weil es keine intensive Zusammenarbeit gebe und keine Zusammenarbeit zu konkreten Projekten. Die tatsächliche Mitbestimmung sei nicht gut, auch die beratende Funktion wird in Frage gestellt. Der Informationsaustausch sei zu einseitig, es handele sich nur um Informationsaustausch, aber es passiere nichts und es gebe keinen sichtbaren Erfolg. Es handele sich um uninteressante Vortragsthemen, zu hohe oder zu niedrige Praxis-Anteile, die präsentierten Inhalte seien schon bekannt oder das Wissen habe keinen Anwendungsnutzen. Im Gegensatz dazu wird auch berichtet, dass Akteure durch die existierenden Prozesse schon näher zusammengerückt seien. Einiges davon deckt sich mit den Ergebnissen der teilnehmenden Beobachtung. Angemerkt sei aber, dass dies nur Schlaglichter sind, dass gerade diese persönlichen Wahrnehmungen verschiedenster Akteure sich im zeitlichen Verlauf ändern können und variieren je nachdem, wer zum selben Prozess gefragt wird, so wie sich auch Prozesse desselben Formates im zeitlichen Verlauf unterscheiden.

4 Welches Potenzial besteht, Beteiligung und Umsetzung zu verbessern?

All diese Prozesse sind verhältnismäßig neu und damit wie die gesamte WRRL-Umsetzung in einer Testphase, die kritisches Hinterfragen und Anpassungen umfassen sollte: Welche Ziele können damit erreicht werden und welche nicht? Was lässt sich verbessern?

Die Umfrage mittels Fragebogen ergab, dass aktuell (Stand 2019) der höchste Bedarf für Öffentlichkeitsbeteiligung auf Ebene der lokalen Maßnahmenumsetzung gesehen wird, gefolgt von der Ebene des Politikdesigns (siehe Abbildung 4). Dies ähnelt der Wahrnehmung des höchsten Bedarfes für die Integration verschiedener Sektoren. Hier wird allerdings eine gemischte Strategie, die alle Ebenen berücksichtigt, als wichtiger erachtet (siehe Abbildung 5). Hinsichtlich der Form von Öffentlichkeitsbeteiligung wird eine Mischung verschiedenster Formate favorisiert (siehe Abbildung 6). Obwohl die Interessengruppen verschiedenster Sektoren als Teilnehmer in den aktuellen Beteiligungsprozessen dominieren, soll die Integration verschiedener Sektoren im Sinne der Konfliktlösung bei verschiedenen Interessen interessanterweise nicht lokal oder regional, also in Beteiligungs- und Koordinationsprozessen, erreicht werden. Konflikte sollen stattdessen gesetzlich oder auf höheren Ebenen gelöst werden bzw. sind stärkere Instrumente zur Durchsetzung der fachlichen Ziele der WRRL gewünscht (siehe Abbildung 7). Dafür gibt es verschiedene mögliche Erklärungen: Die aktuellen Beteiligungsprozesse werden nicht als zur Konfliktlösung geeignet betrachtet.

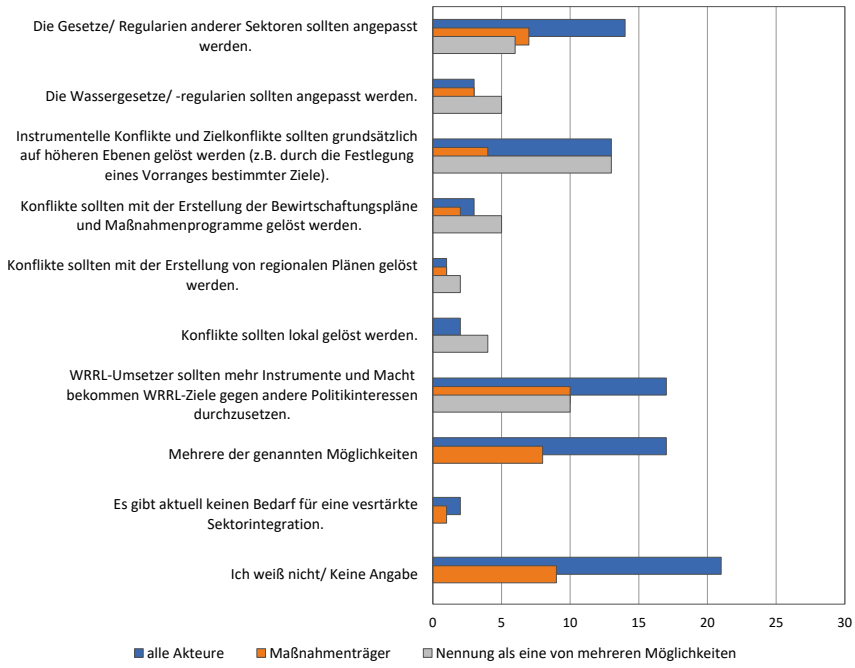

Abb. 7: Formen zur Behebung des Mangels an Integration der Interessen verschiedener Sektoren (n=93)

Oder die Umsetzung wird als rein fachlich-orientierter Planungsprozess, basierend auf wissenschaftlichen Erkenntnissen (Sachproblem), betrachtet statt als politischer Planungsprozess, welcher auch gesellschaftliche Interessen einbezieht und Lösungsalternativen sucht (Ermessensproblem) [8].

Unter Berücksichtigung der aktuellen Governance-Strukturen in den untersuchten Bundesländern ergeben sich die folgenden Empfehlungen zur effektiveren Nutzung von Beteiligungsprozessen für die WRRL-Umsetzung:

(1) Ebenen, Formate und Inhalte der Beteiligungsprozesse sollten besser auf die **Art der zu treffenden Entscheidungen** ausgerichtet werden. Ein Akteur kann andere nur glaubhaft und transparent an Entscheidungen beteiligen, die er selbst trifft – ein Ministerium also beispielsweise an Entscheidungen zur Ausarbeitung von Steuerungsinstrumenten, soweit diese nicht weitere Abstimmungsprozesse durchlaufen, und ein Maßnahmenträger an der Auswahl von Maßnahmen. In den Händen der Organisatoren liegt nur, was sie in Prozesse hineingeben und was sie aus den Prozessen für ihre eigenen Entscheidungen mitnehmen, nicht aber, was Teilnehmer und Nicht-Teilnehmer mitnehmen und tatsächlich nutzen. Dies sollte bei Prozess-Zielen und Prozessgestaltung zukünftig mehr Berücksichtigung finden, um keine falschen Erwartungen an den Prozess zu wecken. Wenn keine Entscheidungsbefugnisse auf Prozesse übertragen werden, dann sollte zumindest immer wieder transparent gemacht werden, wie Teilnehmer trotzdem zur verbesserten Entscheidungsfindung beitragen.

(2) Die Ziele sollten dem **Potenzial** der verschiedenen Prozess-Formate angepasst werden – oder umgekehrt (siehe Tabelle 4). Die tatsächlichen Beteiligungsformate werden immer eine Mischung aus Information, Konsultation, Koordination und Austausch sein, das Hauptziel aber sollte zur Leistungsfähigkeit des Prozesses passen. Die Leistungsfähigkeit hängt dabei auch davon ab, was Organisatoren und Teilnehmer in den Prozess einbringen können – und was systembedingt von vornherein nicht.

(3) Die häufig anzutreffende frontale Informationsvermittlung entspricht eher einer passiven als einer **aktiven Einbindung** der Beteiligten. Informationen sind die Grundlage jeder Beteiligung, insofern immens wichtig, aber die vielen positiven Erwartungen (siehe [1]) an Beteiligungsprozesse beruhen auf dem aktiven Umgang mit und der Verarbeitung von Wissen im Miteinander – Diskussionen in großer Runde, aber noch viel mehr in kleiner Runde am Rande der Prozesse und in den Pausen. Die aktive Einbindung braucht mehr Raum. Manchmal bedarf es auch aktivierender Methoden für die Gesprächsführung und die Anregung (oder Ermöglichung) von Teilnehmerbeiträgen.

(4) Die unterschiedlichsten Erwartungen an die Rolle von Beteiligungsprozessen, aber auch an Bedarf bezüglich Ebenen und Formaten legt die Wichtigkeit einer intensiven **Zielgruppenbetrachtung** für Beteiligungsprozesse nahe. Durch Änderungen im zeitlichen Verlauf sollte diese wiederholt stattfinden und auch Gründe für die Nicht-Teilnahme ausloten. Bei relativ stabilen Teilnehmerkreisen bietet sich die Prozessgestaltung mit den Teilnehmern an. Änderungsvorschläge, die Zustimmung gefunden hatten, sollten dann aber nicht ins Leere laufen. Das mag mehr Unzufriedenheit mit dem Prozess erzeugen, als wenn die Möglichkeit zur Prozessmitgestaltung erst gar nicht bestanden hätte. Gleiches gilt, wenn Prozesse die Möglichkeit der Einflussnahme versprechen, den Teilneh-

mern ihr Einfluss aber nicht ersichtlich wird (aus mangelnder Transparenz oder weil es keinen Einfluss gab).

(5) Da aufgrund der Vielzahl unabhängiger Akteure nie alle Akteure an einem Prozess teilnehmen können, ist es wichtig, **Beteiligungsprozesse als räumliches und zeitliches Netzwerk** zu denken. Prozesse, die einer engen Definition von Beteiligung Genüge tun, sollten mit Informations- und Austauschprozessen (siehe Tabelle 4) vernetzt werden, um, wie es der CIS-Leitfaden erwähnt, „das Wissen vor Ort auf der Ebene des Flusseinzugsgebietes oder der Flussgebietseinheit nutzbar zu machen“ [1].Umgekehrt könnte Wissen der oberen Ebenen (z. B. Hürden für die Durchsetzung geforderter Steuerungsinstrumente) zu mehr Verständnis auf den unteren Ebenen führen. Die Vernetzung von Prozessen kann den Informationsfluss zwischen Ebenen und Sektoren verbessern und so dazu beitragen, dass Akteure horizontal, vertikal und sektorübergreifend leichter voneinander lernen können. Teilnehmerüberlappungen und Diskussionsberichte aus anderen Prozessen können vernetzend wirken. Ein Teil der Veranstaltung könnte für Akteure höherer/ niedrigerer Ebenen oder Vertreter anderer Gruppen außerhalb der Zielgruppe des jeweiligen Prozesses geöffnet werden, die (gegebenenfalls abgestimmte) Inhalte weitertragen.

Praktisch bedeutet dies, dass ein hoher Beteiligungsaufwand für die Erstellung von Bewirtschaftungsplänen und Maßnahmenprogrammen sowie mittelskaliger Konzepte und Planwerke nur sinnvoll erscheint, wenn diese die tatsächliche lokale Maßnahmenauswahl oder andere Entscheidungen signifikant beeinflussen. Durch die eingeschränkte Bindungswirkung der Pläne und die Unabhängigkeit der Maßnahmenträger ist das bei Maßnahmen zur Hydromorphologie und Durchgängigkeit nur bedingt der Fall (siehe Teil 1, [9]). Hinzu kommt, dass die Ebene der Planungen es der Öffentlichkeit erschweren kann

(große) Informationsveranstaltungen
Hohes Potenzial: Große Veranstaltungen können einer großen Teilnehmerzahl zugänglich gemacht werden. Einfache Stimmungsbilder können eingeholt werden. Eine breite Öffentlichkeit kann informiert werden. Es können auch fachlich tiefergehende, aber übergreifend wichtige Informationen vermittelt werden, die bei vielen Teilnehmern dann die Qualität einer Fortbildung haben. Kombinierte Veranstaltungen können Laien und Erfahrene abholen, wenn die Grundlagen zeitlich vorangestellt werden, so dass Erfahrene später dazustoßen können.
Niedriges Potenzial: Intensive Diskussionen sind nur möglich, wenn im Laufe der Veranstaltung Teilgruppen gebildet werden.
Konsultationsprozesse
Hohes Potenzial: Konsultationsprozesse wie Beiräte eignen sich durch ihre mittlere Teilnehmerzahl für intensivere Diskussionen und Beiträge der Teilnehmer zu gemeinsam abgestimmten Fragestellungen. Sie können genutzt werden, um aktiv Interessenüberlappungen, also nicht nur Interessengegensätze, zu erarbeiten und Handlungsspielräume auszuloten. Sie können genutzt werden, um gelebte Feindkulturen abzubauen, wenn das auch nicht immer einfach ist. Inhaltlich sollte sich die Erarbeitung der Interessen an den zu beeinflussenden Entscheidungen der Organisatoren orientieren. Die Organisatoren können transparent machen, wie ihre Entscheidungen durch die Diskussionen beeinflusst werden, damit die Teilnehmer sich ihres Einflusses bewusst werden. Grundsätzlich können Konsultationen auf verschiedenen Ebenen für verschiedene Fragestellungen genutzt werden. Berücksichtigt werden sollte, welchen Beitrag Teilnehmer leisten können: Beiräte auf ministerieller Ebene, wie aktuell der Fall, werden meist von Lobbyverbandsvertretern bespielt. Diese können strategisches Wissen einholen, beitragen und substanziell erörtern, aber gegebenenfalls weniger fachliches Praxis-Wissen. Interessenvertreter ohne Lobbyverbandsstrukturen können gegebenenfalls mehr eigenes Erfahrungswissen einbringen, brauchen aber eventuell Unterstützung für die Anbindung an ihre Interessengruppe. Vereinzelt hat es sich schon bewährt, eine Interessengruppe durch zwei Personen vertreten zu lassen – Lobbyverbandsvertreter und eine Person aus der Praxis.
Niedriges Potenzial: Wenn Beiräte vorrangig zum Informieren genutzt werden, werden nur wenige Akteure erreicht. Andernfalls müssten die zur Multiplikation genannten Schlüsselfaktoren berücksichtigt und aktiv gestaltet werden. Dies wird aber nie vollumfänglich möglich sein.
(lokale und regionale) Koordinations- und Austauschprozesse
Hohes Potenzial: Verschiedene Formate können unterschiedliche Funktionen erfüllen: zum einen den Austausch innerhalb von Akteursgruppen (z. B. untere Wasserbehörden eines Einzugsgebietes oder Gewässernachbarschaften), zum anderen Akteursgruppen-übergreifend. Ersteres kann dem Erfahrungsaustausch zur praktischen Umsetzung, aber auch zu strategischem Wissen dienen sowie der Akteursgruppen-spezifischen Streuung von Informationen, der Koordination innerhalb der Gruppe, aber auch der Meinungsbildung. Für manche Gruppen erfüllen Lobbyverbände eine ähnliche Funktion. Letzteres kann dazu dienen, die anderen Akteure der Region oder des (Teil-)Einzugsgebietes kennen zu lernen und zu erfahren, wie diese aktiv sind und welche Interessen sie haben. Wichtig ist auch hier, Interessenüberlappungen und Handlungsspielräume aktiv herauszuarbeiten. Dies ist ebenfalls der geeignete Rahmen für Exkursionen zum Austausch von Erfahrungswissen. Zukünftiger nachbarschaftlicher Hilfe kann dieser Austausch den Weg bereiten.
Niedriges Potenzial: Derlei Prozesse erreichen meist vor allem besonders engagierte Akteure und solche mit einem akuten Problem (welches durch die Teilnahme potenziell gelöst werden könnte). Je höher die Hürden zur Teilnahme sind (z. B. Anreise oder Kosten), desto wahrscheinlicher ist die Nicht-Teilnahme. Kooperationen können aus den grundsätzlichen Netzwerkmöglichkeiten entstehen, ein Automatismus ist dies aber keineswegs, weshalb sich aktivierende Methoden anbieten.
Maßnahmenspezifische Prozesse
Hohes Potenzial: Auf dieser Ebene kommt es besonders auf die Akzeptanz der breiten Öffentlichkeit, der Eigentümer, Pächter und Anwohner an, da sich hier Widerstand durch Veto-Macht in Planfeststellungsverfahren oder durch Protestbewegungen, die politischen Gegenwind erzeugen, formieren kann. Wenn sich die Bevölkerung begeistern ließe, könnte auch politischer Druck erzeugt werden, der die Maßnahmenumsetzung unterstützt. Wenn Konflikte nicht übergeordnet zu lösen sind, dann treten sie spätestens hier auf, weshalb Beteiligungsprozesse hier besonders wichtig sind. Gerade hier können lokale Akteure aber auch wirklich planungsrelevantes Wissen einbringen.
Niedriges Potenzial: Diese Prozesse sollten in den Händen derjenigen liegen, die über die Maßnahmenplanungen konkret zu entscheiden haben. Wenn dies nicht gegeben ist, ist die Wahrscheinlichkeit hoch, dass es zu Abweichungen kommt zwischen den in den Prozessen abgesprochenen Aspekten und den letztlich umgesetzten Planungen. Transparenz über die Entscheidungsfindung kann dann schwieriger hergestellt werden. Das Vertrauen in die Sinnhaftigkeit des Prozesses kann wegen der eher nur theoretischen Einflussnahmemöglichkeit sinken.

Tabelle 4: Potenzial verschiedener Formate für die Beteiligung

sich zu beteiligen: Die Planungen sind zu grobskalig, um lokales Wissen einzubringen (z. B. durch Bürger), und zu fachlich, um strategisches Wissen einzubringen (z. B. durch Lobbyverbände). Eine Anpassung der Prozesse würde also die Einflussnahmemöglichkeit verbessern und den Beitragsmöglichkeiten der Beteiligten entgegenkommen. Der vermehrte Austausch von strategischem Wissen (siehe Tabelle 1) kann in dem von Machbarkeit geprägten Umsetzungssystem dazu beitragen, die fachlichen Ansprüche der WRRL besser umzusetzen – dies hängt aber von den Bedarfen der Zielgruppe eines Prozesses und den Möglichkeiten des jeweiligen Systems ab (der insgesamt vorhandenen Prozesse sowie deren Zugänglichkeit). Als Ebene mit der größten Einflussnahmemöglichkeit und Betroffenheit der breiten Öffentlichkeit sollten Maßnahmenträger in der Organisation von Beteiligungsprozessen unterstützt werden. Sie bringen dafür ebenso unterschiedliche Kapazitäten und Kompetenzen mit wie für die Maßnahmenplanung selbst (siehe Teil 1 und Teil 2).

Der CIS-Leitfaden unterscheidet die Integration verschiedener Nutzungen, Funktionen und Werte in einen ordnungspolitischen Rahmen, die Integration verschiedener Interessengruppen und der Öffentlichkeit in die Entscheidungsfindung und die Integration verschiedener Ebenen der Entscheidungsfindung. Er nennt Vorteile der Beteiligung auf verschiedenen Ebenen und die Möglichkeiten unterschiedlicher Zeitpunkte und Intensitäten hinsichtlich der Einflussnahme auf Entscheidungen – mit Anhörungen (hier nicht untersucht; siehe [10] zum geringen Einfluss von Stellungnahmen auf die Erstellung von Bewirtschaftungsplänen und Maßnahmenprogrammen) auf der untersten Stufe und Selbstbestimmung auf der höchsten Stufe [1] (zu den Stufen siehe auch Arnsteins Beteiligungsleiter [11]).

Die Wahl von Ebenen, Formaten, Zeitpunkten und Intensitäten für Beteiligungsprozesse ist ein Abwägungsprozess. Aus der Demokratieperspektive stellen sich die Fragen, an welcher Art von Entscheidungen beteiligt werden kann und soll und wie weitreichend die Beteiligung sein soll. Aus der Umsetzungsperspektive stellen sich die Fragen, wo und in welcher Form Beteiligungsprozesse einen Mehrwert für die Umsetzung haben. Die Abwägung ist je nach Bundesland und organisierendem Akteur unterschiedlich ausgefallen, wenn sich auch festhalten lässt, dass die Auswahl eher den Entscheidungen der einzelnen Prozessorganisatoren zuzuordnen ist als einem übergreifenden Ansatz, der die Einzelprozesse miteinander verzahnt, wo möglich oder nötig bündelt oder trennt.

Der Grad der Beteiligung ist in Deutschland nicht nur „eine Entscheidung zwischen Akzeptanz und Qualität“ [8] – der Furcht der Planer, dass fachliche Aspekte hinter Aspekten des Interessenausgleichs bei der Entscheidungsfindung zurückstehen, sondern auch eine Entscheidung zwischen unterschiedlichen fachlichen Ansichten, was am Gewässer nötig und möglich ist (wissenschaftliche Herangehensweise und Erfahrungswissen vor Ort). Dies entsteht durch die Ebenen- und Aufgabentrennung und die Vielzahl und Vielfalt der Akteure in den Governance-Strukturen insbesondere hinsichtlich Steuerung und Maßnahmenumsetzung und die damit einhergehende Unschärfe, wer eigentlich Planer und wer Beteiligter ist.

Der Beitrag von Beteiligungsprozessen zum Umsetzungserfolg über das Erzeugen von Akzeptanz und Motivation in einem System mit einer derartigen Vielzahl und Vielfalt von Ak-

KW Korrespondenz Wasserwirtschaft

Organ der DWA –
Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e. V.

Herausgeber und Verlag:
GFA
Theodor-Heuss-Allee 17, D-53773 Hennef
Postfach 11 65, D-53758 Hennef
Telefon +49 2242 872-0, Telefax +49 2242 872-151
Internet: www.gfa-news.de

Erscheinungsweise: monatlich

Anzeigenpreise: Zurzeit gilt Anzeigenpreisliste Nr. 9 vom 01. Januar 2022

Satz: inpuncto:asmuth druck + medien gmbh, Bonn
Druck, Bindung: DCM Druck Center Meckenheim GmbH, Meckenheim

Bezugspreis: Der Verkaufspreis ist durch den DWA-Mitgliedsbeitrag abgegolten. DWA-Mitglieder, die Mehrexemplare der *KW* erwerben möchten oder die sich für die Zeitschrift *KA Korrespondenz Abwasser, Abfall* als kostenlose Mitgliederzeitschrift entschieden haben, können die *KW* zusätzlich für 69,50 Euro zzgl. Versandkosten bestellen, online 45,00 Euro.

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Gedruckt auf chlorfrei gebleichtem Papier mit Recyclingfasern.

D-53773 Hennef ISSN 1865-9926

teuren ist automatisch begrenzt. Wie Jörg Sommer [12] so treffend formuliert hat, sind Beteiligungsprozesse keine Akzeptanzbeschaffungsmaßnahmen und schaffen auch keine Konflikte aus der Welt. Auch wenn kein Prozess jemals allen Erwartungen gerecht werden kann, so können diese Prozesse doch mehr Einflussnahme auf unterschiedliche Arten von Entscheidungen ermöglichen und die Akteure in der Umsetzung unterstützen, wenn sie mehr auf diese Aspekte ausgerichtet werden. Hier besteht Optimierungspotenzial.

5 Datengrundlage

Wie in Teil 1 und 2 dieses Beitrages detaillierter dargelegt [2, 3], basieren die obigen Ausführungen auf einer Doktorarbeit zu „Polycentricity and the Implementation of the EU Water Framework Directive in Germany“ [13]. Die Daten stammen hauptsächlich aus:

- 70 semi-strukturierten Interviews mit 78 Personen verschiedenster Ebenen aus Wasserwirtschaft, Naturschutz, Verbänden und weiteren Akteuren in Sachsen, Sachsen-Anhalt, Niedersachsen, Thüringen, Hessen und Nordrhein-Westfalen (2017–2019), und
- einer Umfrage mittels Fragebogen (Herbst 2019; vorrangige Ansprache der Flächenländer): 93 Rückmeldungen aus 14 Bundesländern, davon 45 (potenzielle) Maßnahmenträger, und
- der teilnehmenden Beobachtung von zwölf Beteiligungs- und Informationsprozessen (2017–2019) in den ausgewählten sechs Bundesländern und
- der Analyse von Webseiten, Berichten und Protokollen

Die Doktorarbeit untersucht den Einfluss von Governance-Strukturen und Prozessen auf die Umsetzung von Maßnahmen für Hydromorphologie und Durchgängigkeit. Die hier dargelegten Erkenntnisse können in anderen Bundesländern und für andere Maßnahmentypen durch andere Akteursstrukturen anders ausgeprägt sein.

Dank

Vielen Dank an alle Interviewpartner*innen und Umfrageteilnehmer*innen, dass Sie mir Ihre wertvolle Zeit geschenkt haben, an Simon Henneberg für Feedback und Diskussion zu einer früheren Version des Artikels, an die Hans-Böckler-Stiftung für die Finanzierung meiner Doktorarbeit mit einem Stipendium, an das IRI THESys (Integrative Research Institute on Transformations of Human-Environment Systems) Graduierteprogramm der Humboldt-Universität zu Berlin für die Unterstützung bei der Finanzierung meiner Reisen für die teilnehmende Beobachtung und Interviews, ebenso wie an die AöW (Allianz der öffentlichen Wasserwirtschaft e. V.) für die Ermöglichung der zeitweisen Mitarbeit, ohne die meine Forschungskosten nicht abzudecken gewesen wären.

Literatur

[1] Europäische Kommission, 2003. Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC) – Guidance Document n.° 8: *Leitfaden zur Beteiligung der Öffentlichkeit in Bezug auf die Wasserrahmenrichtlinie. Aktive Beteiligung, Anhörung und Zugang der Öffentlichkeit zu Informationen (Übersetzung der englischen Originalfassung)*.

[2] Schröder, N.J.S. 2020. *Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 1 – WRRL-Zielerreichung zwischen Plan und Machbarkeit*. Korrespondenz Wasserwirtschaft (13), Nr. 9: 490–497.

[3] Schröder, N.J.S. 2020. *Umsetzungsprozesse der EU Wasserrahmenrichtlinie in Deutschland: Teil 2 – WRRL-Zielerreichung zwischen Freiwilligkeit und Pflicht*. Korrespondenz Wasserwirtschaft (13), Nr. 12: 687–694.

[4] Newig, J., Jager, N., Challies, E., 2012. *Führt Bürgerbeteiligung in umweltpolitischen Entscheidungsprozessen zu mehr Effektivität und Legitimität? Erste Ergebnisse einer Metaanalyse von 71 wasserpolitischen Fallstudien*. Zeitschrift für Politikwissenschaft (22), Nr. 4: 527–564.

[5] Newig J., 2007. *Does public participation in environmental decisions lead to improved environmental quality?: towards an analytical framework*. Communication, Cooperation, Participation (International Journal of Sustainability Communication) (1), Nr. 1: 51–71. *https://www.ssoar.info/ssoar/handle/document/43196*

[6] DWA, 2008. *Aktive Beteiligung fördern! Ein Handbuch für die bürgernahe Kommune zur Umsetzung der Wasserrahmenrichtlinie*. Hennef, Deutschland.

[7] Uhlendahl, T.C., 2008. *Partizipative Gewässerbewirtschaftung auf lokaler Ebene im Kontext der Wasserrahmenrichtlinie*. Dissertation an der Albert-Ludwigs-Universität, Freiburg im Breisgau, Deutschland.

[8] Muro, M. 2002. *Zur Wirksamkeit der Öffentlichkeitsbeteiligung von Wasserwirtschaftlichen Planungen in Deutschland*. Diplomarbeit an der Technischen Universität Berlin, Deutschland.

[9] Schröder, N.J.S. 2019. *IWRM through WFD Implementation? Drivers for Integration in Polycentric Water Governance Systems*. Water 11(5): 27. *https://www.mdpi.com/2073-4441/11/5/1063*

[10] Rimmert, M., Baudoin, L., Cotta, B., Kochskämper, E., Newig, J. 2020. *Participation in river basin planning under the Water Framework Directive – Has it benefitted good water status?* Water Alternatives (13), Nr. 3: 484–512. *https://www.water-alternatives.org/index.php/alldoc/articles/vol13/v13issue3/589-a13-3-7/file*

[11] Arnstein, S.R., 1969. *A Ladder Of Citizen Participation*. Journal of the American Institute of Planners (35), Nr. 4: 216–224. *https://doi.org/10.1080/01944366908977225*

[12] Sommer, Jörg. 04.03.2021. Vortrag „Der Ertrag aus Pilotprojekten & Erfahrungen zur Öffentlichkeitsbeteiligung seit dem Jahr 2010“ auf der Virtuellen Fachtagung „Öffentlichkeitsbeteiligung in Deutschland – zehn Jahre nach den Ereignissen von Stuttgart 21“ des UfU (Unabhängiges Institut für Umweltfragen) *https://www.ufu.de/wp-content/uploads/2020/04/MOeB_Fachtagung_20210304_gesamt_Veroeffentlichung.pdf*

[13] Die Doktorarbeit ist noch nicht abgeschlossen, aber entsprechend dem kumulativen Promotionsverfahren bereits in Teilen, auf Englisch, veröffentlicht. Aktuelle und zukünftige Veröffentlichungen sowie Vortragsdokumentationen, finden Sie auf meinem Profil, welches ich laufend aktuell halte: *www.watergovernanceresearch.wordpress.com*.

Autorin

Nadine Jenny Shirin Schröder, M.Sc., M.Sc., B.Sc., B.A.
HafenCity Universität Hamburg,
Fachgebiet Umweltgerechte Stadt- und Infrastrukturplanung;
Humboldt-Universität zu Berlin,
IRI THESys Graduierteprogramm (Integrative Research Institute on Transformations of Human-Environment Systems);
Rücken & Partner Ingenieure GmbH (Meppen),
Landschaftsplanung

E-Mail: nadinejennyshirin.schroeder@alumni.hu-berlin.de
n.schroeder@rup-gruppe.de