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Schröder, Nadine

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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

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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.

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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.

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