4. Empirical Analysis of the Guadalquivir

In this chapter, I analyse the case study of the Guadalquivir River Basin District (RBD). The process under investigation is the implementation of the European Union (EU) Water Framework Directive (WFD) from 2009 to 2019, thereby covering the first and second planning cycle. The empirical focus lies on decision-making processes on the reduction of agricultural water consumption. The aim of this chapter is to analyse independent and dependent variables that have been theoretically discussed in Chapter 2, and which have been embedded in the study's research design in Chapter 3.

I analyse four Action Situations in this chapter (for an introduction to the empirical context of the Action Situations, see Chapter 3), and thereby uncover various patterns of interaction. The empirical analysis reveals two *hybrids*, composed of *hierarchy* and *idea-based competition,* and one pure form of coordination, namely *incentive-based hierarchy* (for definition of the variables, see Chapter 2). Furthermore, I identify a *conflict* outside of the official governance process between non-state actors of the agricultural and environmental sector; and lastly, *information exchange* followed by a *gap in interaction* in one Action Situation. These different patterns mostly emerge from a combination of formal and informal rules. *Cooperation* has not been identified in any of the Action Situations.

Furthermore, the empirical analysis reveals relatively low levels of performance at the level of the overarching governance process, i.e., across the different Action Situations (see Section 4.3): Process performance, understood as *coordinated behaviour,* is rated low. This is, most importantly, due to a lack of alignment of incentives of irrigators to reduce their water consumption; as well as of governmental actors to enforce this reduction. Policy output performance – understood as *River Basin Management Plan (RBMP) implemented* – of the second planning cycle of the WFD implementation is low, with many measures not yet having been implemented. Last, environmental outcome performance of the process is low, due to an increase of agricultural water use and irrigated surface area in the last decade. Nevertheless, water status of water bodies according to the WFD assessment of the first and third planning cycle remained stable.

The chapter proceeds as follows. In Section 4.1, independent variables that are specific to the case study, and therefore constant across Action Situations, are characterized (*contextual conditions, characteristics of heterogeneous actors*). In Section 4.2, four different Action Situations are analysed. Thereby, independent variables specific to the Action Situation are presented first (*overarching rules, social problem characteristics*), followed by analysing patterns of interaction (*cooperation, competition, hierarchy, information exchange, conflict,* and *gaps in interaction*). Then, performance is assessed at the level of the respective Action Situation (*coordinated behaviour, intermediate output performance*). The chapter concludes with section 4.3, outlining the performance across Action Situations, i.e., at the level of the RBD (*process performance, policy output performance, environmental outcome performance*).

4.1 Independent variables specific to the case study

In this section, I describe independent variables that are specific to the case study, clustered along *contextual conditions* and *characteristics of heterogeneous actors*. Independent variables that are specific for Action Situations, i.e., *overarching rules* and *social problem characteristics*, are described in Section 4.2 before turning to the respective Action Situations.

4.1.1 Contextual conditions

Geographic and hydrological characteristics of the River Basin District

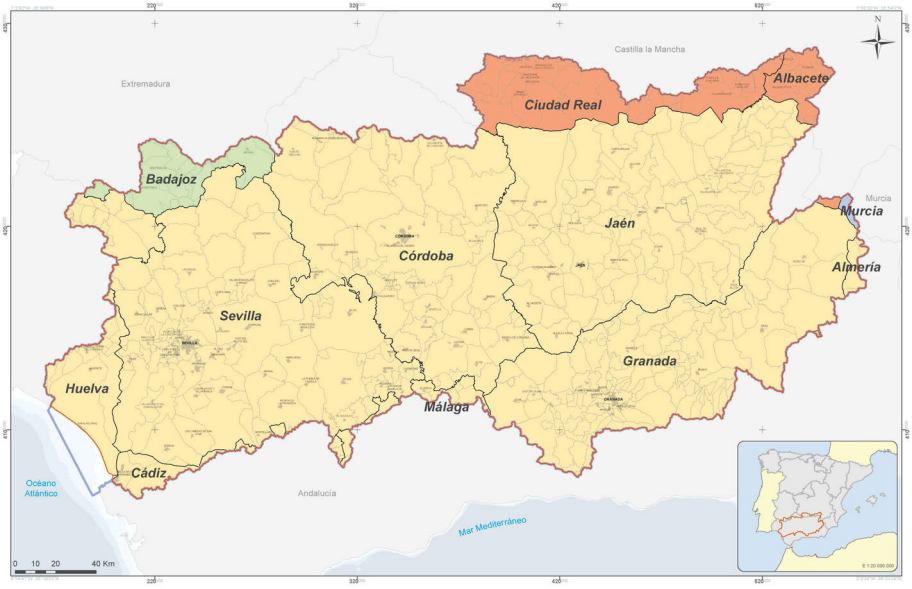
The Guadalquivir RBD is located in Southern Spain, extending over four *Comunidades Autónomas* (hereafter: region), namely Andalusia that covers more than 90% of the area, Castilla-La Mancha (7.11%), Extremadura (2.65%), and Murcia (0.12%) (see Figure 4) (CHG 2015c). The basin covers 57,184 km² with a population of 4.3 Million inhabitants, of which 98% live in Andalusia (CHG 2015a). The Guadalquivir therefore largely is an Andalusian RBD, which is why I only consider the role of Andalusia in this study and leave out the other regions.

The geography of the Guadalquivir is characterized by mountainous areas of the Sierra Nevada in the south-eastern part of the RBD, reaching altitudes between 1,000 m and 3,480 m, and by low altitudes of the valley in the west. These differences are also reflected in the agricultural production systems. In the hillier upstream part of the river, such as in Granada, irrigators are mostly smallholders, whereas the regions of Seville, Cordoba and Jaen are dominated by larger production systems of relatively water-intensive crops such as olives, rice, and cotton. The climate is Mediterranean with irregular rainfall, both temporarily and spatially, varying between 293 mm in the sub-basin of the Guadiana Menor and 1,321 mm per year in the mountainous area. The annual average of precipitation is 582 mm per year. Further,

there are long periods of drought with high temperatures (CHG 2015a). In hydrological terms, the RBD consists only of one major river basin, the Guadalquivir itself with its different tributaries (see Figure 5). Dams are located on different tributaries, which is why the different systems are all indirectly connected to each other, making the Guadalquivir one "gigantic channel" (Interview 7/2018).[1]

The most important ecosystems in the Guadalquivir are the Doñana wetlands, being among the largest wetlands and richest ecosystems in Western Europe. The wetlands are a UNESCO World Heritage Site, and protected under the Ramsar convention, an international intergovernmental treaty for the protection of wetlands. Doñana depends on surface and groundwater of the Guadalquivir. Its ecosystems are seriously threatened, inter alia by nearby rice cultivation in the Guadalquivir which is very water intensive (De Stefano et al. 2014). According to the WFD assessment, 36.8% of surface water bodies of the RBD are affected by point source pollution, 33.2 % by water abstraction, and 17.6% by diffuse source pollution (European Commission 2015b).

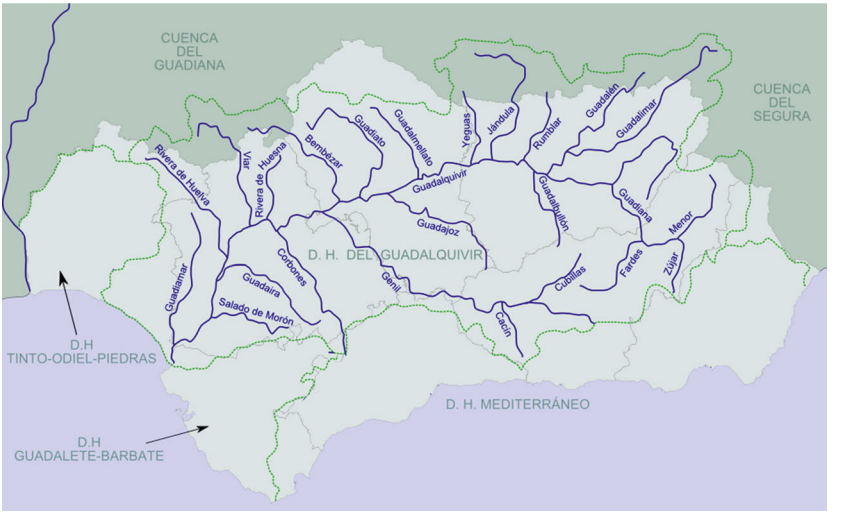
Figure 4: Administrative map of the Guadalquivir River Basin District



Source: CHG (2015c)

1 Quotes from interviews citied in this work were translated from Spanish to English by the author.

Figure 5: Map of rivers in the Guadalquivir River Basin District



Source: Modified based on image licensed under Creative Commons – Attribution – Share-Alike – 2.5 by Té y kriptonita

Socio-economic role of irrigated agriculture

In the following, I discuss the socio-economic role of agriculture for the Guadalquivir. In cases where specific numbers for the RBD are lacking, I refer to Andalusia although only 59 % of the region belongs to the Guadalquivir (CHG 2015a). Most important economic sectors in the Guadalquivir in terms of their contribution to the Gross Domestic Product (GDP) are service (70%), followed by industry (14%) including the agri-food industry, construction (6%), agriculture (5%) and lastly the energy sector (CHG 2019a). In contrast, at the national level, agriculture accounts for only 2.6 % of the national GDP (Instituto Nacional de Estadística 2018), which shows that compared to the rest of Spain, agriculture in the Guadalquivir is of relatively high importance. Further, employment in agriculture is high, with 7.4% in 2012 (CHG 2015a). While these numbers refer to agriculture as primary sector, the agri-food industry is also of high importance in the RBD, contributing to 22% of its industrial employment (CHG 2020b). Further, employment in the agricultural sector has even increased after the economic crisis of 2008/09. This contrasts with other sectors, mostly industry and construction, from which workers shifted to the agricultural sector (European Parliament 2016; CHG 2019a). Nonetheless, the crisis has hit Andalusia particularly hard, and Andalusia has one of the highest

unemployment rates in Spain with 25.5 % in 2017,[2] and one of the lowest GDP per capita with EUR 19,132 in 2018.[3]

In 2015, irrigated agriculture in the Guadalquivir covered 768,210 ha, compared to 1,897,727 ha of rainfed agriculture (CHG 2019a). Irrigated agriculture thereby accounts for 23% of Spain's total irrigated land even though the RBD only represents 11% of the country (Expósito 2018). Further, the economic role of irrigated agriculture is particularly high. According to the CHG (2019a: 184), crops like cereals, fruits, and vegetables are only productive if they are produced under irrigation; and productivity of other crops which can be produced under rainfed and irrigated agriculture is 5.5 times higher if grown under the latter. Furthermore, irrigated agriculture contributes to 64% of the agricultural production in Andalusia, generates 67% of farm income, and accounts for 63% of the agricultural employment in the region (European Parliament 2016).

Agriculture in the Guadalquivir is very diverse. Most important irrigated crops in terms of land use are olive (387,697 ha), covering 45% of the irrigated land in the Guadalquivir, followed by extensive winter crops (68,770 ha), cotton (56,280 ha), and horticulture (54,081 ha) (CHG 2015a). While these numbers show that olive cultivation is very land-intensive, it only accounts for 21.2 % of agricultural water demand (CHG 2015a). Olive cultivation is of high relevance for the agri-food industry, due to the processing of olives, olive oil and fats, which are exported to EU Member States and third countries (Junta de Andalucía 2018). In the 2000s, the olive sector underwent major structural change, shifting from rainfed to irrigated agriculture, mainly triggered by financial incentives through the EU Common Agricultural Policy (Interview 8/2018). Productivity within the olive sector nevertheless varies, ranging from high-yield groves to medium and only marginal-yield production in some mountainous regions (Berbel, Mesa-Jurado, and Pistón 2011; Junta de Andalucía 2014b). In addition, it is to mention the high socio-economic importance of rice cultivation in the downstream part of the Guadalquivir, nearby the Doñana national park mentioned above. While only covering 4.1 % of irrigated land, it is the most water-intensive crop in the RBD in relative terms, accounting for 13.4 % of agricultural water demand. Water productivity of rice, describing total sales per hectare in relation to amount of used water, is one of the lowest in the basin (0.21€/m^3), whereas citrus and olive tree have the highest rates in the basin (1.19 and 1.11€/m^3, respectively) (Berbel, Mesa-Jurado, and Pistón 2011). Rice cultivation is nevertheless considered important for the local population, being the main income source in an area which always has been "one of the poorest" in the Guadalquivir (Interview 8/2018). Yet, rice

2 https://ec.europa.eu/eurostat/cache/RCI/myregion/#?reg=ES61&ind=12-2_lfst_r_lfu3rt (accessed 27.04.2022)

3 https://ec.europa.eu/eurostat/cache/RCI/myregion/#?reg=ES61&ind=18-2_nama_10r_2gdp (accessed 27.04.2022)

farmers strongly depend on subsidies through the EU Common Agricultural Policy, compensating for low prices at the international market (De Stefano et al. 2014).

Water supply and demand

The amount of water supply in the Guadalquivir is 4,111 hm^3/year (CESUR 2021),[4] mostly composed of surface water, which is highly regulated through large-scale dams, followed by groundwater. The amount of water resources transferred from other RBDs, as well as treated wastewater resources are marginal with 23 hm^3/year in 2018/19 (MITECO 2020a). Desalinated water does not exist in the Guadalquivir.

Total water demand in the Guadalquivir is 3,815 hm^3/year, indicating that water demand approximates water supply. Agriculture represents approximately 88% of total water demand with 3,356 hm^3/year (CHG 2015a). Irrigation is based mostly on surface water (2,163 hm^3/year regulated and 334.73 hm^3/year unregulated surface water), and on groundwater with 858.84 hm^3/year (CHG 2015a: 65), which is why both types of water resources are included in this study. However, due to high illegal groundwater use in the Guadalquivir, which I will discuss below, numbers of water demand are most likely higher than predicted official numbers.

4.1.2 Characteristics of heterogeneous actors

The two most important public actors in the Guadalquivir are the River Basin Organization of the Guadalquivir, the so-called *Confederación Hidrográfica del Guadalquivir* (hereafter: CHG) which is part of the national Ministry for the Ecological Transition and the Demographic Challenge. The CHG is responsible for the WFD implementation in the RBD. Second, the Regional Department of Agriculture, Fisheries and Rural Development of Andalusia (*Consejería de Agricultura, Pesca y Desarrollo Rural*, hereafter: Regional Department) is in charge of irrigation management. These two actors will be further characterized in the following section, together with introducing other actors of the case study.

Financial and human resources of actors

The first actor group in relation to the case study focus are national and regional governmental actors, namely the CHG and the Regional Department. Broadly speaking, these governmental actors suffer from lack of financial and human resources, which was further exacerbated by the financial crisis. Since Andalusia was particularly hard hit by the crisis compared to other Spanish regions, lack of financial and human resources is also more pronounced in the Regional Department compared to the CHG.

4 In contrast to the RBMPs of the Jucar and the Mediterranean Basins, the RBMP Guadalquivir does not include numbers on the amount of available water resources for the different types of water resource.

This is because the CHG, as any *Confederación Hidrográfica,* is in addition to taxes and tariffs by water users funded by the national government (Blomquist et al. 2007). In the Regional Department, employment of new people was restricted in the last decade, and retired people were most often not replaced (Interview 7/2018). Availability of financial and human resources is particular important in the Action Situation Increasing Irrigation Efficiency; but also for organizing participatory processes in the Action Situation Development of the RBMP, which will both be discussed below.

The second important group of actors are water user associations (WUAs). In the early 2000s, there were more than thousand WUAs for surface water in the Guadalquivir, thereby being one of the RBDs with the highest numbers in Spain; and approx. 40 groundwater user associations (Ortega et al. 2009). Most of these WUAs are also organized in federations, or umbrella organizations of several WUAs. In Andalusia, there are three of them, which is relatively unique compared to other regions. These are, first, the Feragua Association of Irrigation Communities of Andalusia (*Asociación Feragua de Comunidades de Regantes de Andalucía,* hereafter: Feragua*)*, founded in 1994, who consider themselves as "leading association of Andalusian irrigation".[5] Indeed, at the level of Andalusia, they represent one third of WUAs, covering 300,000 ha. However, in the Guadalquivir, the share must be significantly higher since only few WUAs of the Andalusian intra-regional RBDs are member of Feragua. Furthermore, there are the umbrella organizations Andalusia Irrigators Association (*Asociación de Regantes de Andalucía,* hereafter: AREDA*)*, founded in 2005, covering 210,000 ha; and the Association of Irrigation Communities of Andalusia (*Asociación de Comunidades de Regantes de Andalucía,* CREA), founded in 2007 and representing WUAs of 100,000 ha. Information on their financial and human resources is not available. I therefore understand the amount of water rights as proxy, influencing the relative power of WUAs. Among the WUAs that hold a relatively large number of water rights, there are WUAs in the area of Seville, which are organized within Feragua and concentrate most of the existing water rights (Interview 14/2018); as well as the more than 1,000 rice farmers organized in the Federation of Rice Farmers, whose interests are well represented in the different authorities (De Stefano et al. 2014). In contrast, in the province of Jaen, WUAs have few or hardly any water rights and therefore depend on the annual granting of so-called extraordinary or "precarious" irrigation through the Dam Release Commission (see Section 4.2.2). Furthermore, many of these water users are additionally organized in trade unions organizations, such as the Union of Farmers and Ranchers of Andalusia (*Unión de Agricultores y Ganaderos de Andalucía,* COAG), or the Association of Young Farmers of Andalusia (*Asociación Agraria de Jóvenes Agricultores,* ASAJA*)*, both

5 https://feragua.com/ (accessed 16.08.2021)

representing small and medium-scale family farmers and cattle breeders. Agricultural water users are thus often organized under different umbrellas, i.e., in WUAs as well as in agricultural trade organizations. Besides these very well-organized water users, there are so-called historic WUAs in the mountainous areas around Granada. They rely on rainfed agriculture and are therefore more indirectly affected by river basin management planning, which is why they also participate to a lesser extent in the political decision-making processes (Interview 12/2019).

Third, there are environmental non-governmental organizations (ENGOs) and civil society organizations, including most importantly WWF España, Ecologists in Action (*Ecologistas en Acción*), and the Foundation New Water Culture (*Fundación Nueva Cultura del Agua*, FNCA). These groups have lesser financial and human resources than those in the agricultural sector, which is why their members often work on a voluntary basis, covering a wide range of topics related to water or environment. WWF thereby is an exception, having one of their two Spanish regional offices in Doñana. An important focus lies on the national park, implying that WWF allocates more financial and human resources to their work in the Guadalquivir compared to other RBDs. In general, ENGOs in the Guadalquivir are described as increasingly influential, highly skilled and with broad international networks (Interview 13/2018).

Narratives on water management

A large group of actors, consisting of the CHG and WUAs and partly also the Regional Department, adheres to the *demand-side* as well as *supply-side narrative.* In the context of the former, water scarcity is seen as a problem of excess in demand, which is why reducing water demand at the farm level is assumed to lead to an overall reduction at the basin level (Cabello, Kovacic, and Van Cauwenbergh 2018). More specifically, many private and public agricultural actors, as well as the CHG therefore lobby for the increase of irrigation efficiency (Interview 6/2018, 8/2018, 9/2018, 20/2018) (see Section 4.2.3). It can be seen as most prominent measure reflecting the *demand-side* narrative. Similarly, among mentioned actors, there is a relatively widespread perception that flood irrigation is inefficient due to its allegedly high losses of water. Actors therefore call for replacing flood irrigation by drip irrigation (see Interview 12/2019). Further, mentioned actors also support the *supply-side narrative*, assuming that the lack of water resources is due to deficiencies in water infrastructure (Cabello, Kovacic, and Van Cauwenbergh 2018). In line with the dominant hydraulic paradigm in Spain (Sampedro Sánchez and Del Moral 2014), actors thus lobby for building small- as well as large-scale infrastructure during the development of the RBMP (see Interview 8/2018, 15/2018). The CHG, for example, considers a water transfer from the neighbouring RBD Tinto-Odiel-Piedras, approved in 2017, as the most important measure to reduce over-consumption of groundwater in Doñana (Interview 8/2018). The underlying reason is the high importance of agriculture for the region which "used to be poor, has always been poor, and now, for the

first time in their history, they have a thriving, modern, agriculture. You cannot ignore this" (Interview 8/2018). An agricultural organization even calls for infrastructure that connects all Spanish RBDs to mutually exchange water among the regions, instead of unidirectional water transfers. Thereby, territorial tensions would be reduced (Interview 15/2018). The dominance of the *supply-side narrative* by the CHG on technical measures is criticized by interviewees of the Regional Department. They argue that the CHG would often equate "planning" with the construction of infrastructure in order to generate more water (Interview 13/2018), and that "all problems [the CHG] is solving, they are solving it with construction works" (Interview 7/2018).

A second group of actors composed of ENGOs and civil society organizations adheres to the *knowledge and governance narrative*. The narrative is based on the idea that water scarcity needs to be solved through improved governance and available information (Cabello, Kovacic, and Van Cauwenbergh 2018). In the context of the RBMP development, actors followingly lobby for the monitoring of groundwater use as well as the closure of illegal wells, especially in the area of Doñana (WWF 2016, Interview 11/2018). Many WUAs also support these measures, perceiving illegal groundwater consumption as threat for their future demand (Interview 16/2018, 18/2018). Furthermore, in the context of this narrative, ENGOs and civil society organizations (Interview 10/2018, 11/2018), some actors in the Regional Department (Interview 13/2018), but also certain WUAs (Interview 16/2018) advocate for the reduction of water rights after the increase of irrigation efficiency.

Beyond the analysis of narratives, it is to mention the often-conflictive relationship between the CHG and the Regional Department going back to a dispute over competencies in the 2000s. In 2009, competencies to manage the Guadalquivir were transferred from the national level to Andalusia; and in 2011, following a constitutional court ruling, again back to the national level (Thiel 2014a). This conflict is still present in the background and resurfaces especially when there are different governing parties at the two levels. Indeed, the Regional Department traces the reason for a "lack of coordination" back to the fact that a largely Andalusian RBD is governed by the national level (Interview 7/2018). In contrast, a CHG representative criticizes that decisions taken by the Regional Department in the period between 2009 and 2011, such as the granting of many water rights, still has negative impacts on their own work (Interview 8/2018).

4.2 Analysing and evaluating Action Situations

In the following, I analyse and evaluate four Action Situations, namely Development of the RBMP, Dam Release Commission, Increasing Irrigation Efficiency, and Reduction of Water Rights (for the selection of Action Situations, see Chapter 3). Every Action Situation is outlined in a different section, all of which are structured as

follows. First, I outline independent variables that are specific to the respective Action Situation, namely social problem characteristics (*uncertainty*, *asset specificity*, *frequency*, *scale* and *excludability*) and overarching rules (*de jure autonomy* and *formal rules for coordination)*. Then, the empirical process is described, focusing on the respective patterns of interactions, which are described and traced back to formal and informal rules. I thereby distinguish between *cooperation*, *competition*, *hierarchy*, and *hybrids*, as well as *information exchange, conflicts* and *gaps in interaction* (for their definitions, see Chapter 2). The analyses of each Action Situation conclude with a performance assessment at the level of the respective Action Situation, including *process performance* and *intermediate output performance*.

4.2.1 Development of the River Basin Management Plan

The Action Situation Development of the RBMP focuses on the planning phase for the WFD implementation, ranging from bilateral meetings and formal participatory processes to the approval of the RBMP by the River Basin Water Council. More specifically, in the beginning of the process, the CHG organized bilateral, informal meetings with WUAs and governmental actors to discuss main water management issues. These informal meetings were followed by formal participatory processes organized by the CHG as required by the WFD (Art. 14). In line with the WFD, the CHG presents the Draft Scheme of Important Topics (*Esquema de Temas Importantes*) (Art. 14), as well as the Draft RBMP, to which stakeholders may then submit written statements. The last step relates to the River Basin Water Council and National Water Council, which both need to approve the RBMP. Then, they pass it to the National Government which formally adopts the RBMP. As I will outline below, I identify a *hybrid* pattern of interaction in the empirical process. It is composed of *hierarchy* and *idea-based competition* between the CHG, the Regional Department, WUAs, ENGOs, and civil society representatives, based on formal and informal rules.

Independent variables specific to the Action Situation

Regarding *overarching rules* specific to this Action Situation, I look at *de jure autonomy,* defined by the 2001 National Water Law as well as the WFD. It is rated moderate for the CHG, and low for all other actors. More specifically, the CHG is in charge of development, monitoring and revision of the RBMP (Art. 23, Water Law). Furthermore, the Water Law says that all national, regional and local authorities have the duty of "reciprocal coordination", as well as "mutual information and collaboration" regarding their activities which have any impact on the general water domain (Art. 128). Similarly, following the WFD, the CHG shall "encourage the active involvement of all interested parties" as well as gather and disseminate information related to the RBMP (Art. 14(1)). Furthermore, the CHG shall allow the public to comment in writing on the draft RBMP for a period of at least six months (Art. 14(2)). These for-

mal rules thus grant considerable competencies to the CHG, but also indicate a mutual dependence of actors due to different coordination requirements. Thereby, the CHG's *de jure autonomy* is somehow restricted in the process of RBMP development. All other actors which have been characterized above (see section 4.1.2) can participate in the Action Situation and thereby contribute to the RBMP development, but have, for example, no formal authority to introduce measures into the RBMP. *De jure autonomy* of all other actors is therefore low.

Regarding the second variable, *formal rules for coordination*, there is the River Basin Water Council as main coordination instrument in this Action Situation. It includes state, private, and civil society actors and has to formally approve the RBMP. After the RBMP approval by the River Basin Water Council, the RBMP is passed to the National Water Council, which also needs to approve; and then, it is passed to the National Government, which formally adopts the RBMP.

Social problem characteristics of this Action Situation point towards medium to high coordination requirements of the CHG with involved actors. First, *uncertainty* in this context relates to the questions whether stakeholders' interests will be integrated into the RBMP (*input-related uncertainty*); whether measures will be implemented (*process-related uncertainty*); and whether the WFD goals will be achieved through the RBMP (*output-related uncertainty*). Overall, *uncertainty* is high. From the perspective of actors participating in the planning process, there is considerable *uncertainty* whether the CHG will integrate their interests into the RBMP. This may negatively affect actors' motivation to contribute to the planning process and thereby increase their opportunistic behaviour. From the perspective of the CHG, there is moderate *uncertainty* whether actors in charge of implementation of measures will comply with their commitments, and actually implement them. This is because the RBMP is not binding and the CHG has no authority to enforce implementation of measures. The non-binding character of the RBMP also implies that for other state as well as non-state actors, implementation of measures by the CHG is somehow uncertain. However, I argue that it is neither in the interest of the CHG nor of other authorities in charge of implementation to submit a completely unrealistic RBMP to the European Commission, since this would harm their credibility in the long run. Regarding the attainment of environmental objectives of the WFD, though, *uncertainty* is high. This is because on the one hand, cause-effect relationships in environmental systems which are influenced by a variety of factors are difficult to predict; and on the other, WFD objectives are also relatively ambitious, which is demonstrated by the fact that no Member State has achieved them yet. These high levels of uncertainty imply that opportunistic behaviour of actors also increase.

Further, compared to other Action Situations, *frequency* is low since the RBMP has to be developed once every six years. While this means that the *relative* need for coordination is high, we can assume that it decreases from the first to the third plan-

ning cycle. This is because the structure of the RBMP as well as the way how participatory processes are organized are similar across the three planning cycles. Third, the *scale* to which the RBMP refers is the river basin district. Since it crosses several administrative boundaries, it implies a high need for cross-level coordination. Forth, *asset specificity* is medium. In the context of policy decisions, asset specificity inter alia depends on the target group, since diverse target groups often require the development of more differentiated solutions. The target group of the RBMP is very heterogenous, including private, public, and civil society actors from different levels and sectors, representing a large variety of (local) water management problems. Measures included in the RBMP therefore need to be developed specifically to the problems of different user groups and cannot be easily transferred. On the other hand, irrigation efficiency measures, for example, are also included in the RDP and are thereby "transferred" from one policy to another (Interview 8/2018), which reduces *asset specificity*. Last, *excludability* of the RBMP is low. This is because the RBMP, in the form of a policy, presents a public good. Actors, thus, cannot be excluded from either negative or positive spillover effects of the RBMP.

Pattern of interaction: Hybrid of hierarchy and competition

In this Action Situation, I identify a *hybrid* pattern of interaction, consisting of *hierarchy* and *idea-based competition*. First, *hierarchal* patterns of interaction emerge due to an asymmetric relationship between the CHG on the one hand, and non-governmental actors as well as the Regional Department on the other hand; based on the interplay of formal and informal rules. As explained above, the CHG is ultimately responsible to compile the RBMP, which grants it the formal decision-making power, although coordination with concerned actors is required (*aggregation rule*). While formally, the CHG is therefore in a superior position vis-à-vis the other actors, this is also complemented by informal rules. Indeed, according to interviewees, many decisions were unilaterally taken by the CHG (*aggregation rule*): An ENGO representative explains that discussions during participatory processes are often based on documents that have already been internally decided upon by the CHG (Interview 10/2018). The interviewee criticizes that this would hinder actors to jointly "build a future", "define things together", or reach real agreements between the water administration, irrigators, and environmentalists (Interview 10/2018). These asymmetries, being an indicator for *hierarchical* relationships, also become apparent concerning interactions between the Regional Department and the CHG. In this context, *informal aggregation rules* are again decisive, according to which the CHG takes unilateral decisions: The Regional Department criticizes that the CHG would often put measures into the RBMP that overburden and exceed the Department's financial capacities (Interview 7/2018). A CHG representative confirms to often decide on measures on behalf of the Regional Department, but because the latter does not provide the required information: "We first go to the Regional Department to see what

they have in mind, then the Regional Department generally doesn't respond at all, then we say: 'this is necessary'... I'm [talking] ironically..." (Interview 8/2018).

These *hierarchical* traits are overlapping with *idea-based competition* between various stakeholder groups who bring forward competing interests to the CHG, based on formal *choice rules*. More specifically, stakeholders propose their usually competing ideas and demands to the CHG, either in participatory workshops or through submitting written statements. In the second planning cycle, 89 statements were submitted, including 29 from the agricultural sector, 26 from the administration, and 17 from platforms and NGOs (CHG 2015d). While some statements were indeed included in the RBMP (Interview 8/2018, 16/2018), interviewees argue that the CHG at this stage usually does not make "changes in essence" anymore, but rather adapts small details (Interview 6/2018; see also 10/2018) (*aggregation, scope rules*). The CHG thereby takes the role of a single "consumer", while between the different stakeholder groups, there is no physical interaction (*position, choice rule)*.

A further instance of *idea-based competition* concerns participatory processes that where organized by the CHG during the process of RBMP elaboration (*choice rule)*. Workshops on the first RBMP documents were organized separately for the different sectors of urban water use, industry, irrigation, and the civil society. Later workshops on the draft RBMP were organized along geographical districts, but approx. three-quarters of participants belonged to WUAs and private companies, and only a minority to the public administration, research, ENGOs and civil society (CHG 2015d) (*boundary rule)*. Physical, cross-sectoral interaction therefore hardly took place. The *competitive* behaviour therefore has the form of actors bringing forward competing claims to the CHG. An illustrative example are the competing interests regarding the management of water rights, articulated by the different user groups (see Section 4.2.4): On the one hand, there are ENGOs and civil society organizations who argue for reducing the so-called historic water rights to the amount used by water users (see Section 4.2.4); further, they argue to only carry out irrigation efficiency measures under the conditions of reducing respective water rights and allocating freed water resources to meet environmental flow requirements (WWF in CHG 2014b; Interview 10/2018, 21/2018). In contrast, FERAGUA argues to adapt allocation of water resources to respective water availabilities through the Dam Release Commission, "but not through granting of water rights with endowments that are of permanent deficiency" (FERAGUA in CHG 2014b) (see Section 4.2.2); while another group of WUAs also asks for changes in water rights, but to re-distribute them among irrigators, and to only reduce water rights of those actors that already have a high number of rights (Interview 16/2018).

This form of *idea-based competition* is additionally also present in the formal decision-making process of the River Basin Water Council, resulting from a combination of informal and formal rules. According to the National Water Law, decisions are taken by majority vote (*aggregation rule*), which is why the composition of the

Council is important: there are 76 members, including CHG staff and representatives from national and regional governments (54); WUAs, water supply companies, industrial users, and hydropower companies (26); and agricultural, environmental, and trade union organizations (6) (De Stefano 2020: 51) (*boundary rule*). According to formal rules, actors therefore *compete* for votes on the RBMP; even though informally, RBMPs are usually adopted by the River Basin Water Council without any further discussion or amendment. This implies that consensus among the majority is already reached before the official meetings (*aggregation rule)*. Although administrative actors have the absolute majority, an interviewee explains that the CHG considers votes by water users in favour of the RBMP as particularly important to have a greater political support of the RBMP (Interview 6/2018). This is, arguably, why the CHG holds informal bilateral meetings with most important water users during the process of RBMP elaboration (Interview 6/2018) (*choice rule)*. These informal meetings are also considered very important by WUAs, facilitating their own work (Interview 14/2018, 16/2018), and allowing WUAs to be in "direct relations to the CHG" (Interview 14/2018). The two opposing groups in the River Basin Water Council are the CHG and water users on the one hand, and the Regional Department as well as environmental actors on the other hand, who both voted against the (draft) RBMPs in the two planning cycles (Interview 8/2018). The voting behaviour of the Regional Department can be explained by political unanimities between the central and the regional government which go back to the conflict of competencies in the first decade of the 2000s described above (see Section 4.1.2). Further, their voting usually depends on the current parties in power at the two different levels (Interview 8/2018, 22/2018), and thereby also contrasts with the technical relationship among bureaucrats described as very positive (Interview 8/2018, 13/2018). Yet, due to the lack of deliberation during the Council meeting, this conflict is rather subtle and is not played out openly. Indeed, an ENGO representative perceives the meeting as being merely about providing information and establishes that their vote "never is decisive" (Interview 21/2018).

Performance assessment

Coordinated behaviour of this *hybrid* pattern of interaction is assessed to be medium, based on the following three criteria. First, *information exchanged* between different constellations of actors is medium, concerning the flow of information during the process itself, as well as information available on the output of this Action Situation, i.e., the RBMP. Regarding the former, information exchange between the CHG and the Regional Department (Interview 7/2018, 8/2018), and the CHG and WUAs (Interview 12/2019) is described positive. However, provision of information by the CHG to environmental stakeholders is criticized: "When they know that something is difficult, and they know that you will use it for your work… […] they always wait for the last minute [to give the information], when they think it's opportune" (Interview

10/2018). Further, cross-sectoral information exchange between stakeholders is also hindered due to the fact that participatory processes are organized separately for every sector. According to the FNCA, referring also to other RBDs, this only allows "each sector to listen to itself and maximize its sectoral demands, which […] implies maintaining an exclusively bilateral relationship between each of these sectors and the basin organization, which in practice weakens the capacity of public participation to influence decision-making" (FNCA 2019: 10, own translation). Also the bilateral exchange between the Regional Department and the CHG is sometimes hindered due to mentioned political conflicts at higher level. An interviewee argues that some administrative actors would be "afraid of informal meetings", thereby hindering a "more fluid relation" (Interview 13/2018). Furthermore, availability of information on the RBMP is assessed differently by actors. On the one hand, the different Spanish RBMPs are very detailed, providing a "significant amount of detailed information" (European Commission 2015b: 9); but on the other, it is argued that comprehensibility of this information is limited. Indeed, environmental representatives argue that the RBMP is "a horror to read" (Interview 10/2018), and "an immense battery of data related to water, to agriculture, but then this is not easily transmitted to the citizen, and furthermore it is not transmitted either in the decision-making process." That is why the provided data "is not helpful when it is about taking a decision" (Interview 21/2018).

Second, *competing interests considered* is also evaluated as moderate. While WUAs perceive to be well represented in the informal and formal decision-making processes, as well as in the final output of the RBMP (see Interview 6/2018, 9/2018, 16/2018), an ENGO representative argues that their input to the RBMP is seldom considered (Interview 21/2018); and a Regional Department's representative criticizes the strong focus of the RBMPs on infrastructure measures (Interview 13/2018). Furthermore, only few ENGO or civil society representatives are member of the River Basin Water Council, with water users and governmental actors having a clear majority. This further hinders the equal consideration of different interests.

Lastly, *aligned incentives* refers to the question whether actors are incentivized to also implement measures of the RBMP at a later stage. It is also rated moderate. As mentioned above, the Regional Department complains about the large number of measures envisaged in the RBMP, overstraining their financial capacities (Interview 7/2018). On the other hand, I argue that evaluation reports by the European Commission (see European Commission 2015b; 2019b), and the legal obligation to comply with the WFD aims represent external incentives for the CHG and other governmental actors to also implement respective measures.

The *intermediate output performance* in this Action Situation relates to the *RBMP effectiveness*, defined as the extent to which the RBMP is likely to achieve a reduction of agricultural water consumption. The RBMP is assessed to be marginally effective. To understand the RBMP effectiveness, I analyse the way the two measures irrigation

efficiency and reduction of water rights are operationalized, namely whether actors in charge of i) implementation and ii) financing are defined, and whether iii) actors affected by the respective measures are specified (see Chapter 2). First, irrigation efficiency measures fulfil all three mentioned criteria. As I will elaborate below (see section 4.2.3), actors in charge of implementation are defined, as are responsibilities for financing. Also a budget is allocated: the reduction of pressures by water extraction represents the second most important group of measures in terms of budget allocation, after the reduction of point-source pollution (CHG 2015b). Among the former, irrigation efficiency measures are the most important ones, summing up to EUR 433 Million (CHG 2015b). Lastly, affected actors are also specified, meaning that WUAs which are going to benefit from subsidies are listed in the RBMP (CHG 2015b). However, public benefit of irrigation efficiency measures, i.e., how much water will be saved where and by whom is not discussed.

In contrast to the way irrigation efficiency measures are addressed in the RBMP, only one out of three mentioned criteria are defined for the measure water rights reduction. More specifically, the CHG is defined as actor in charge of implementation, but no budget is assigned for this measure. Further, the RBMP does not specify whose water rights will be addressed and only speaks about an "update" of water rights (CHG 2015a; 2015b), thereby concealing that the measure should be about *reducing* water rights.

Adding to that, it is to mention the general critique by the European Commission on the Spanish RBMPs, stating that "measures to satisfy water demand […] are not targeted to the WFD objectives, and might even hamper their achievement" (European Commission 2015b: 71). Furthermore, the contribution of irrigation efficiency measures to the environmental objectives "is generally not assessed and not quantified", which should be done "on a case by case basis" (European Commission 2015b: 71). Indeed, and as mentioned above, the amount of water saving has not been calculated in the RBMPs (CHG 2015b). This critique has been reiterated for the second planning cycle (European Commission 2019b). Thus, despite the fact that irrigation efficiency measures are very well specified, I assess the RBMP to be marginally effective. This is due to the broad evidence that irrigation efficiency measures risk to increase agricultural water consumption if they are not complemented by a sound water accounting system and the reduction of water rights (Grafton et al. 2018). Although measures for the reduction of water rights are included in the RBMP, the fact that they are not much elaborated in the RBMP may hamper their implementation at a later stage.

4.2.2 Dam Release Commission

This Action Situation is about decision-making processes in the Dam Release Commission, a participatory organ within the CHG, which decides on the annual alloca-

tion quota of surface water stored in dams. The Commission decides upon the filling level of reservoirs during the wet season and upon the schedule and volume of water releases during the dry season. It thereby adapts the water share allocated to the different organized user groups within the RBMP to the actual availability of water. WUAs can then decide by themselves on how to distribute water among their respective members. The Commission meets twice a year and is chaired by the CHG President. I identify a *hybrid* of *idea-based competition* and *hierarchy* between the CHG and WUAs, resulting from the combination of formal and informal rules, as well as differences between these rules.

Independent variables specific to the Action Situation

Overarching rules look at *formal rules for coordination*, which here refer to the Dam Release Commission itself, as a participatory decision-making body. In the Guadalquivir, there is only one Dam Release Commission. Members of the Commission are representatives from user associations (irrigation and municipal water use), national ministries, and CHG staff, namely Water Commissioner, Chief of Operation, and Technical Director.

De jure autonomy of Commission members is assessed as moderate since on the one hand, actors are granted decision-making power on the allocation of water resources; while on the other, actors depend on, and thereby mutually restrict each other. More specifically, the mode of decision-making is majority vote; all members except the CHG staff and its president have voting rights according to the National Water Law. Commission members with voting rights shall suggest the timing for and amount of released water from the reservoirs to the CHG staff and the President (Art. 33, Water Law). Furthermore, the law states that in case the suggestion by members is unanimous, and the CHG staff – i.e., Water Commissioner, Chief of Operation, and Technical Director – agree on it, the proposal is binding for the CHG president. Otherwise, he or she will decide on the basis of the diverging opinions (Royal Decree 927/1988) (Bhat and Blomquist 2004). Thus, these formal requirements to involve WUAs in the decision-making, as well as the respective mode of decision-making (i.e., majority vote), restricts the *de jure autonomy* of the CHG.

Social problem characteristics in this Action Situation indicate a relatively low need for coordination, compared to the other Action Situations. This is because *frequency* is medium, with the Dam Release Commission meeting twice a year. Second, *asset specificity* is also medium. Since decisions of previous years are usually the basis for the upcoming year, investments by the CHG in the Dam Release Commission are not unique to the respective meeting. Further, as argued above, *asset specificity* of policy decisions depends on the target group, which in the case of this Action Situation, are represented by water rights holder. Compared to other Action Situations, they are a relatively homogenous group. Indeed, neither the Regional Department nor ENGOs, which usually represent different interests than WUAs, are part

of the Dam Release Commission. Third, *scale* refers to the river basin district. However, the fact that the RBD cuts several administrative boundaries – which would require higher coordination – is not of relevance in this Action Situation, since regional actors are not involved. Fourth, *excludability* is high, since the decision of the Dam Release Commission basically grants the right to water users to withdraw water, thereby representing a private good. Since it is about regulated surface water, it is physically possible to prevent other irrigators to use the water.

Last, *uncertainty* is assessed again at two analytical levels. From the perspective of the CHG, *uncertainty* is low, referring to the question whether WUAs will accept and later also follow their decision. Due to the fact that the Dam Release Commission decides upon the allocation of highly controlled surface water, there is little margin for WUAs to behave in a deviant manner. This is because in contrast to groundwater, water users cannot physically extract more water than what is allocated to them. Furthermore, there is no possibility for WUAs to legally challenge the decision taken by the Dam Release Commission. From the perspective of WUAs, *uncertainty* is medium. It refers to the question whether the CHG will adapt water allocation compared to previous years. In years of reduced water availability, the CHG tends to change the quota, but the exact amount of reduction is difficult to predict for WUAs, as will be discussed below.

Pattern of interaction: Hybrid of hierarchy and competition

I classify the pattern of interaction in this Action Situation as a *hybrid* composed of *idea-based competition* and *hierarchy* between the CHG and WUAs. Prior to the Commission meetings, and concerning day-to-day management of water releases, the CHG organizes regular informal bilateral meetings with the most important WUAs and their umbrella organizations, even though the latter are not members of the Commission themselves (Interview 14/2018, 16/2018, 17/2018). Around 120 to 140 people, including members and guests, usually attend the Commission's meetings (CHG 2018a), where the CHG Technical Director announces allocation quota, which I will describe below. Decision criteria are annual precipitation rate, water level in the reservoirs, type of crops (or number of inhabitants in case of urban water supply), and existing water rights. The announcement by the Technical Director is then followed by a round of requests and questions (CHG 2018a).

The *hierarchical* pattern of interaction in this Action Situation is determined mostly by informal aggregation rules according to which the CHG, as superior actor, takes decisions that are de facto binding for WUAs, as inferior actors. Although formal rules stipulate that Commission members suggest allocation quota to the CHG president (see *de jure autonomy*), it is de facto the Technical Director who announces water allocation quota to the WUAs. Indeed, WUAs report that decisions on allocation quota are usually taken by the CHG prior to the Commission's official meetings (*aggregation rule*) (Interview 14/2018, 16/2018). According to

an interviewee, the CHG has "drawn up everything prepared from the meetings they have had previously, and everyone knows what they are going to say. The topic is closed" (Interview 14/2018; similarly: Interview 3/2018). He further continues, "we can have a lot of water user associations [on our side], but if the CHG says no… then you can fight forever…" (Interview 14/2018). I see this as a further indicator of an asymmetric, hierarchical relationship. Stakeholders therefore distinguish between the "private" and the "public", more informative, act of the Commission, where in the latter the CHG "publishes" the amount of water releases (Interview 12/2018, 16/2018). Further, suggestions by the CHG are usually not adapted, as argued by interviewees (Interview 14/2017, 16/2018) and documented in minutes (CHG 2018a; 2017) (*aggregation rule)*. These are all indicators for *hierarchy*, where the CHG has both, authority and power to enforce a decision, based on a combination of formal and informal rules. Further, this *hierarchical* pattern of interaction is also reflected in the so-called Permanent Committee of the Dam Release Commission, consisting only of the CHG staff and President. If water availability in reservoirs changes after the official decision-making, the Permanent Committee can decide to adapt previous decisions (*aggregation rule*) (Royal Decree 927/1988). Quite regularly, situations emerge where the initially granted amount of water needs to be either restricted or expanded. In the latter case, water users are asked to submit applications for so-called extraordinary irrigation, but they are not involved in the decision-making as such (Interview 8/2018, 16/2018, 18/2018).

In addition, I observe *idea-based competition* where WUAs compete among each other in presenting their preferences – in the form of suggestions on water allocation – to the CHG, based on a combination of formal and informal choice rules. The CHG, then, assumes the role of a single "consumer", deciding which suggestion will be integrated in their decision-making. Empirically, this form of competition refers to the above-described bilateral, informal negotiations between the CHG and WUAs (*boundary* and *choice rules*). Indeed, these meetings are considered particularly important in years of reduced water availability (Interview 8/2018). Moreover, it also refers to the Commission's official meetings, when stakeholders bring their ideas to the attention of the CHG. In these contexts, there are two opposing groups of WUAs, asserting their competing claims – instead of cooperating with each other and trying to reach a consensus, based on trust and reciprocity. I see this as characteristic for *competition*. Indeed, these groups have different views regarding the reduction of their own water consumption for the benefit of upcoming, potentially dryer years (Interview 6/2018). On the one hand, most of the WUAs defend the general idea to continue business-as-usual, or to even increase allocation quota (CHG 2018a; 2017). This contrasts with a minority of agricultural actors who suggest being more conservative about releasing water in order to increase the guarantee for the near future

(Interview 14/2018).[6] Additionally, they argue that social criteria should be applied when reduced amounts of water need to be distributed, such as the number of people involved, or the amount of work created by the respective WUAs. In this context, the interviewee explains:

> "You have to go down to earth a little and stop believing and trusting so much in statistics and numbers, it is the social implication that we ask the administration [CHG] for, because in the end you are dealing with people and you are releasing water that people are going to use, and they depend on it." (Interview 3/2018)

However, this form of interaction depends on the hydrological situation, since it is mostly in situations of drought, or reduced water availability, when actors tend to disagree on the allocation of water (Interview 8/2018, 16/2018).

Performance assessment

Coordinated behaviour of this Action Situation is assessed to be moderate, based on the following three criteria. First, *information exchanged* during the process as well as on the output of this Action Situation is evaluated as high. Concerning the former, stakeholders describe the availability and flow of information between WUAs and CHG on the exploitation of water resources as well as on water release of dams as very positive (Interview 9/2018, 14/2018, 16/2018). In relation to information availability on the output of this Action Situation, all minutes are publicly accessible on the CHG website. Minutes include specific information on allocation quota for the upcoming period, as well as discussion points raised by participants.[7] Furthermore, data related to water storage and water releases is updated daily, and during the irrigation campaign, some WUAs are even in daily direct exchange with the CHG about water release and storage (Interview 17/2018, 18/2018).

In contrast, *competing interests considered* is low. This is because environmental and civil society organizations as well as the Regional Department are not members of the Commission. These actors therefore ask for changing the official composition to also become a member (FNCA 2018, Interview 7/2018), which I interpret as an indicator that they do not perceive their interests to be well represented. Adding to this, even some of the WUAs criticize the CHG for putting to low restrictions, which means that future interests of irrigators may not be sufficiently taken into account. Against this background, a WUA representative explains: "We ourselves said we had to restrict, can you imagine? […] in the end it was the users themselves who told the CHG: 'establish a restriction', and they put 10%, which is very little." (Interview 6/2018).

6 http://cuadernoagrario.com/?p=11693 (accessed 20.08.2021)

7 https://www.chguadalquivir.es/comision_desembalse (accessed 04.04.2022)

Last, *aligned incentives* are moderate. On the one hand, there is no possibility for WUAs to circumvent the decision taken by the Dam Release Commission, also because this is physically not possible. However, the CHG does not provide any incentive for WUAs to use less water than granted through the Dam Release Commission, and thereby contribute to an overall reduction of water consumption. Indeed, some WUAs ask the CHG to establish incentive mechanisms through the Dam Release Commission to save water. A WUA that uses less water than the officially allocated amount could, for example, get granted more water than others in times of water restrictions (WUA in CHG 2018b, Interview 14/2018).

Performance assessment also refers to the *distribution of surface water adapted*. This variable is rated as moderate; and it is understood as the extent to which surface water distribution has been adapted in the Dam Release Commission, compared to what would be required to meet ecological flow requirements. The assessment is difficult since there are no official calculations on the amount needed to fulfil requirements for ecological flows. I therefore rely on anecdotical evidence according to which despite several relatively dry years in a row, water allocation was reduced very late by the Dam Release Commission in 2018 (Interview 21/2018). A WUA representative confirms that there were "thousands of indicators that this would happen", referring to low levels of water in the dam during the same period (Interview 6/2018). Furthermore, in the hydrological year 2017/18, 54% of controlled surface water bodies in the Guadalquivir did not meet the requirements for minimum flow rates (MITECO 2020a). While other Action Situations certainly also influence the compliance with environmental flow rates, this high non-compliance is an indicator that the Dam Release Commission did not fulfil its purpose either.

4.2.3 Increasing irrigation efficiency

The Action Situation Increasing Irrigation Efficiency is about the implementation of measures included in the RBMP to substitute gravity irrigation by local drip irrigation, as well as canals and acequias by pipes. I identify two patterns of interaction, namely *incentive-based hierarchy* between WUAs, the Regional Department, the State Society for Agricultural Infrastructure (*Sociedad Estatal de Infraestructura Agraria S.A.*, SEIASA) and the CHG; as well as a *conflict* outside of the official policy process between ENGOs and WUAs.

Independent variables specific to the Action Situation

As part of *overarching rules*, there is first *de jure autonomy* of public actors from the agricultural sector, evaluated as moderate. It is regulated by the RBMP, the Rural Development Program (RDP) and the European Agricultural Fund for Rural Development (EAFRD). The Regional Department or the National Ministry of Agriculture are officially responsible for irrigation efficiency measures, depending on the spe-

cific measure (see also below). The latter, however, has outsourced the concrete implementation to different state-owned companies, most importantly SEIASA. According to the RBMP, approx. 70% of the costs for irrigation efficiency measures are borne by the Regional Department and the National Ministry of Agriculture, respectively, financed by the RDP of Andalusia (CHG 2015b).[8] The EAFRD thereby sets specific requirements for the funding of RDP measures by the EU, such as the existence of water metering or the potential to achieve water savings (see also below). These requirements restrict the *de jure autonomy* of the Regional and National Ministry in their implementation. Indeed, the awarding of subsidies is highly regulated, requires coordination with the CHG, among others, and allows the two actors to operate only within a clearly defined legal framework.

Regarding *formal rules for coordination*, there are contractual agreements between the implementing authority and the respective WUAs, which regulate implementation of concrete measures. Furthermore, the RDP stipulates information exchange between the CHJ, the Regional Department and WUAs regarding whether requirements for subsidies are fulfilled by WUAs.

Social problem characteristics of this Action Situation indicate a high need for coordination for main actors in charge, i.e., the Regional Department and the National Ministry of Agriculture or SEIASA. On the one hand, *asset specificity* is high: investments are unique to the respective WUAs and cannot be used by the neighbouring one. The risk of opportunistic behaviour therefore increases (Ménard 2004), which is why hierarchical agreements to reduce this risk may be necessary. *Frequency* for the implementing authority is also high due to the large number of irrigation infrastructure projects. Further, the *scale* at which irrigation efficiency measures are implemented refers to the WUA, which also indicate high needs of coordination.

On the other hand, *uncertainty* from the perspective of implementing authorities is low. There is no empirical evidence that WUAs would change their behaviour in the process of implementation, which is why implementing authorities can be relatively certain about the procedure. This is not the case for WUAs who are confronted with moderate *uncertainty* regarding the question whether measures included in the RBMP will be implemented. Indeed, interviewees report a considerable delay in implementation due to lack of funds (see also below on *process performance*). WUAs therefore often do not know the timeline of implementation, even if subsidies have already been confirmed. Last, *excludability* is high since only owners of the irrigation

8 In the period 2007–2013, larger irrigation infrastructure measures ("*actuaciones en alta*") in Andalusia where also financed through the European Regional Development Fund (ERDF), see https://www.juntadeandalucia.es/export/drupaljda/PO%20FEDER%20V.3.pdf. (accessed 01.09.21). The Operational Program of Andalusia for the period 2014–2020 did not include irrigation efficiency measures anymore.

infrastructure can make use of it, whereas other actors can be easily excluded from its consumption.

Pattern of interaction (1): Incentive-based hierarchy

In this Action Situation, I identify *incentive-based hierarchy* as main pattern of interaction shaped by formal and informal rules. The Regional Department or SEIASA offer financial incentives to water users; while the CHG exchanges information with these actors as part of the hierarchical relationship. Irrigation efficiency measures that are declared to be in the general interest of the region are implemented by the Regional Department, and measures that are in the interest of the national state – usually, larger and more expensive ones – by SEIASA (Interview 20/2018). Generally speaking, the procedure is as such that WUAs submit a funding application for irrigation efficiency measures to one of the two actors, who decide on the granting of the subsidy.

This form of *incentive-based hierarchy* is on the one hand based on the provision of subsidies for WUAs to increase irrigation efficiency. Formal rules of the RDP stipulate that up to 50% of costs are subsidized (*payoff rule*); and that those infrastructure projects are prioritized which produce net water savings, which have positive effects on the environment, and where organic farming is employed (*scope rule*) (Junta de Andalucía 2014c; and Interview 7/2018). Thereby, further incentives are created for WUA to implement irrigation efficiency that comply with these regulations.

The *hierarchical* element is also reflected by the fact that the two implementing authorities are in a superior position vis-à-vis the respective WUAs, deciding on the granting of the subsidy based on above-mentioned formal requirements by the EAFRD (*choice rule*). These formal requirements stipulate, inter alia, that in water bodies of a good water status, investments are only eligible if there is an ex-ante assessment of water savings at the farm level of at least 5% to 25 %. If investments affect water bodies whose status is less than good due to quantitative reasons, "an effective reduction in water use" shall be ensured at the farm level, amounting "at least 50% of the potential water savings made possible by the investment" (*scope rule*) (Art. 46, EAFRD). Further requirements are the existence of an RBMP at the river basin level, as well as the existence of water rights, and the use of water meters by the respective WUAs (Art. 46, EAFRD). The Regional Department or SEIASA needs to verify that these requirements are fulfilled by the respective WUAs (*choice rule)* thereby putting them again in a superior position. However, the RDP of Andalusia does not provide further information on the enforcement of the reduction of water consumption in water bodies whose status is less than good.

In addition to these formal rules, there are also informal rules shaping the *hierarchical* relationship. More specifically, in the first years of the WFD implementation, the Regional Department apparently granted subsidies to WUAs which did not possess the required water right (Interview 10/2018, 18/2018), even though this does not

seem to happen anymore (Interview 18/2018) (*scope, choice rule*). According to interview partners, the reason why the Regional Department did not follow the EAFRD requirements are a lack of knowledge (Interview 10/2018) and of awareness concerning the need to reduce water consumption, and respective ways to implement it (Interview 3/2018). Also at the national level, many justifications by SEIASA to grant subsidies were "artificial" and "lax" according to an interviewee. He argues that it often remained unclear how certain irrigation projects would meet the requirement of water savings (Interview 13/2018). However, although the Regional Department was apparently aware of these lax justifications by SEIASA and the corresponding subsidies granted to WUAs, they did not disclose these deficiencies. Otherwise, they would have risked national funds being diverted to other regions. Thereby, some "unwanted complicity" emerged between the Regional Department and SEIASA (Interview 13/2018).

The role of the CHG in this context is to exchange information with the Regional Department or SEIASA on the declaration of water saving, and to approve that the project is in line with the RBMP (*choice rule*). As a last step, the Regional Department approves the project and grants the respective funds to the WUAs. In irrigation efficiency projects implemented by SEIASA, they are also in charge of implementation and maintenance of the infrastructure, including annual inspections of the exploitation of the irrigation systems by the WUAs for a period of 50 years (Interview 13/2018, 20/2018). I consider this as a further hierarchical element.

Pattern of interaction (2): conflict

Outside of the official process, I identify a *conflict* between ENGOs and WUAs regarding the question on the effect of irrigation efficiency measures on water consumption. In this book, policy conflicts are understood as situations where actors have divergent positions, perceive positions of other actors as threat, and are unwilling to compromise (Weible and Heikkila 2017). I classify it as additional pattern of interaction within the Action Situation since ENGOs are part of this *conflict*, but not of the above-described *hierarchical* relationship.

More specifically, there has been a highly politicized debate between WWF and the National Federation of Irrigation Communities of Spain (*Federación Nacional de Comunidades de Regantes de España*, FENACORE), a nationwide association of WUAs, about whether a rebound effect occurred or not. WWF, on the one hand, published an influential report arguing that water consumption at the basin level increased (WWF/Adena 2015). The report has caused many headlines also at the national level (Interview 21/2018), produced a "trauma" within the agricultural sector and hardened front lines between the environmental and agricultural sector in the Guadalquivir (Interview 13/2018). Directly referring to the WWF, FENACORE argues in another report that agricultural water consumption has been reduced by 6.8% in Spain (Gutiérrez-Martín and Montilla-López 2018). While the report

by WWF relies on data from single case studies (WWF/Adena 2015), FENACORE uses surveys among irrigators (Gutiérrez-Martín and Montilla-López 2018). The reliability of both reports could therefore be questioned. Although these reports are not specific to the Guadalquivir but also address other RBDs, the topic is considered particularly salient in the Guadalquivir, and was mentioned in several interviews (see Interview 10/2018, 13/2018, 20/2018). Indeed, it is argued that FENACORE has had a strong impact on the discourse of denying risks of a rebound effect in the Guadalquivir – "at the level of the Mediterranean, they are leading all irrigators" in that regard (Interview 13/2018). Since the participatory processes organized by the CHG do not allow for cross-sectoral interaction, this conflict is not openly acted out. Nevertheless, both actors directly address each other – in contrast to other Action Situations, where they merely have bilateral relationships with the CHG –, and try to shape the public debate and narratives surrounding the increase of irrigation efficiency.

Administrative actors do not openly contribute to this discussion and are therefore not part of the *conflict*. According to a representative of the Regional Department, nobody would openly admit that the "rebound effect exists", even though internally, several people would acknowledge it (Interview 13/2018). At the national level, an interviewee goes in the same direction, by saying "I understand the critique [on modernization of irrigation], even more when you are selling it as 'oh, this is water saving!' Sell the complete picture" (Interview 22/2018).

Performance assessment

Coordinated behaviour of actors relates to the *incentive-based hierarchy* and is rated as low. *Coordinated behaviour* of the identified *conflict* is low by definition (see Chapter 2) – actors stick to their contrary opinions and refuse to compromise. They therefore do not align or coordinate their behaviour.

First, *exchanged information* is low. This relates to exchanged information during the process of implementation, as well as information provided about the implementation of measures. Regarding the former, WUAs perceive information exchange with the Regional Department in the phase of implementing irrigation efficiency measures as positive (Interview 14/2018). However, the CHG is more critical about it. A CHG representative explains that they would usually approach the Regional Department to ask "'tell us what you are going to do on that, and on that', and they inform us, and later, they change everything without informing us" (Interview 8/2018).

Regarding information provided about implemented measures, an interview partner criticizes lack of information on the number and amount of investments by public authorities (Interview 11/2018). Even more importantly, data on the development of water consumption before and after the increase of irrigation efficiency were neither published nor generated (Interview 13/2018). Instead of real data

on water use, data in the RBMP are based on estimations (European Commission 2015b), and actors such as SEIASA rely on survey data among WUAs (see, for example, SEIASA 2018a; 2018b). In this context, an interviewee states:

> "These are not really data of what comes out of the reservoirs, nor data of evapotranspiration, nor data of the returns. Based on this, political decisions are taken. This is no longer legitimate because it has a very important impact on the environment." (Interview 21/2018)

However, this concerns not only the Guadalquivir, but most of the Spanish RBDs and is therefore also criticized by the European Commission (2015b), ENGOs (WWF/Adena 2015), as well as in the literature (López-Gunn, Mayor, and Dumont 2012; Corominas and Cuevas 2017).

Second, *alignment of incentives* is assessed at two levels, namely for governmental actors and for WUAs. It is rated as low. At the level of governmental actors, incentives for the Regional Department and SEIASA to follow higher-level rules, i.e., EAFRD requirements, were apparently not sufficient. This is because of the above-described critique that in some cases, both actors granted subsidies to WUAs which either did not have the required water rights, or where promised water savings were unlikely to materialize. Also at the level of WUAs, incentives seem not to be aligned with rules established by the RBMP and the EAFRD. In contrast to the political aim to save water, WUAs usually decide to implement irrigation efficiency measures in order to improve their working conditions (Interview 6/2018, 9/2018, 13/2018, 22/2018).

Third, *competing interests considered* is low. This is because actors representing environmental interests are not part of this Action Situation. Although formal rules provide the possibility to conduct an Environmental Impact Assessment, which would open the Action Situation to other actors, it is hardly made use of it (Interview 21/2018). Further, so-called traditional WUAs which use unregulated surface water perceived political pressure by politicians and engineers of the Regional Department to implement irrigation efficiency measures in order to achieve water savings (Interview 12/2019). I see this as an indicator that actors representing different views concerning irrigation are underrepresented in the Action Situation. Indeed, the idea to achieve water saving through irrigation efficiency measures is described as a dominant paradigm within the public administration and among engineers (Interview 12/2019).

The second aspect of performance assessment is the *status of implementation of measures*, rated medium. Since official information on the status of implementation is, to my knowledge, not available, the assessment relies on interview data. They indicate that fewer measures were implemented compared to what has been stipulated in the RBMP. National and regional governments are required to co-finance RDP measures, but since they were heavily affected by the financial crisis, investments were reduced (Interview 7/2018, 20/2018). Thus, despite the broad range of

national and regional policies addressing irrigation efficiency, measures were limited not only in Andalusia but also in other Spanish regions to those that were subsidized through the RDPs by the EU (Gómez-Limón and Villanueva 2017). Indeed, also the Regional Department is highly dependent on EU funds (Interview 13/2018). The overall effect was that the demand of WUAs for irrigation efficiency measures could not be satisfied, and in some cases, subsidies were formally granted but projects were not implemented due to lack of funds (Interview 16/2018, 17/2018).

4.2.4 Reduction of water rights

The Action Situation Reduction of Water Rights analyses the process of reducing water rights after the implementation of irrigation efficiency measures, as well as the adaption of so-called historic water rights which exceed available water resources in the RBD. The emerged pattern of interaction is *information exchange* between the CHG and the Regional Department; followed by a *gap in interaction* among the CHG, the Regional Department and WUAs. Thus, although the CHG and the Regional Department do exchange information relevant to carry out the water rights reduction, this is not followed by any action – the CHG refuses to enter a relationship with WUAs to actually reduce their water rights. Further, the Regional Department does not respond to the lack of enforcement by the CHG either. While the *information exchange* results from formal rules, the *gap in interaction* is based on the combination of informal and formal rules, as will be explained below.

Independent variables specific to the Action Situation

To assess *overarching rules*, I first analyse *de jure autonomy* which is specified in this Action Situation by the RBMP and the 2001 National Water Law. More specifically, the RBMP states that "finally, associated with modernization, there must be a review of water rights, adapting rights to the new, reduced water consumption resulting from modernization" (CHG 2015b). This is backed up by the National Water Law which provides for the possibility to reduce water rights after the increase of irrigation efficiency (Art. 65). However, the RBMP is not legally binding for the CHG, and the National Water Law only states that water rights *may* be reduced. There is thus considerable leeway for the CHG, which is why I argue that the *de jure autonomy* of the CHG is high. Within the CHG, the Water Commissioner is in charge of taking decisions on granting, modifying and reducing water rights. Further, the Regional Department and SEIASA are also involved in this Action Situation. Their *de jure autonomy* is limited, however, to the provision of information to the CHG on completed implementation of irrigation efficiency measures; and is therefore assessed as low.

Formal rules for coordination are only marginally defined. The RDP specifies that beneficiaries of subsidies for irrigation efficiency must inform the CHG about the planned infrastructure projects after respective subsidies are granted, including po-

tential and expected water savings (Junta de Andalucía 2020b: 364). However, it is not clear how the CHG and water users coordinate for the actual reduction of water rights. Furthermore, the coordination process between the Regional Department and the CHG is not further stipulated; it is only referred to formal rules of the Ministry for the Ecological Transition which are not accessible to me. According to interview data, the Regional Department must inform the CHG about completed infrastructure projects (Interview 7/2018).

Social problem characteristics in this Action Situation point towards intense need for coordination for the CHG with the different WUAs. First, the *scale* of this Action Situation refers to the individual water user. This is also why *frequency* is high, since although the reduction needs to be carried out only once for every water user, large number of water users are addressed by this measure. Further, also *asset specificity* is high since investments by the CHG to reduce water rights – e.g., in the form of coordinating with the respective water users – are unique to the WUA. *Excludability* is high as well since water rights represent a private good. Costs for giving up these water rights are therefore high and concentrated on the individual water user. One can therefore expect that water users would rather oppose a water rights reduction.

Last, and most importantly, *uncertainty* is high for the CHG regarding the process and output of this Action Situation. This is because it is unclear whether water users will accept the reduction, or whether they will sue the CHG's decision in court – which is possible due to the strong legal protection of water rights (see also below). I argue that there is thus a high risk of opportunistic behaviour by the CHG. Additionally, *uncertainty* is also high for the individual water users. I argue that because the measure is not well specified in the RBMP (see section 4.2.1 on the *effectiveness of the RBMP*), its implementation remains unclear. Thus, although WUAs know that the CHG has not enforced water rights reduction in the past, it is uncertain whether the CHG will change its approach in the future. Indeed, empirical evidence from interviews confirms that some WUAs did not apply for subsidies for irrigation efficiency measures to not lose their water rights (Interview 14/2018).

Pattern of interaction: Information exchange, gap in interaction

In this Action Situation, I identify a sequence of *information exchange* between the CHG and the Regional Department, resulting from formal rules; followed by a *gap in interaction* between the CHG, WUAs and the Regional Department, arising from a combination of informal and formal rules. More specifically, the Regional Department informs the CHG about the completion of irrigation efficiency measures, as explained above (*information rule)*. However, this *information exchange* is not followed by action. Indeed, according to a representative of the Regional Department, they informed the CHG which subsequently "stored the reports in their desks", without reducing the respective water rights (*choice rule)* (Interview 7/2018). Similarly, a CHG interviewee explains the following:

> "What happens is that we do not exercise [the reduction of water rights] automatically to all, but to those who are arriving for any change [of water use]. Then if someone comes here for something, we change it. But the rights in practice are not exercised today because there is no water. In the case of the regulated waters of the dam, these are linked to what the Dam Release Commission says." (Interview 08/2018)

However, there is no empirical evidence that water rights were reduced at later stages. Although the Regional Department is aware of this inaction by the CHG, they explain that "what we do not do, because it is politically not [desired] either, […], is to insist" on the reduction of water rights (Interview 13/2018). Thus, while it is to acknowledge that the Regional Department does not have the legal rights to enforce a reduction by the CHG (see *de jure autonomy)*, they seemingly do not seek dialogue either. Further, the granting of subsidies for irrigation efficiency measures by the Regional Department is not affected by the CHG's inaction. I therefore classify this behaviour as mutual *gap in interaction* between the Regional Department and the CHG.

Second, the lack of reducing water rights can also be understood as a *gap in interaction* between the CHG and WUAs. Formally, the CHG is entitled to initiate the coordination procedure with the WUAs and reduce respective water rights, although it is not legally obliged to do so (formal *choice rule*). The underlying reason why the CHG does not initiate this process (informal and formal *choice rule*), though, is arguably the avoidance of conflicts with irrigators (Interview 21/2018). Indeed, the CHG explains that the reduction of water rights would be a "complicated" procedure since farmers would usually "protect that right" (Interview 8/2018). There is therefore a high risk for the CHG, but also for other *Confederaciones*, that water users will sue the CHG in court if they reduce their water rights (Interview 21/2018). Indeed, this is possible because water rights are very well protected under the Spanish Law (Interview 10/2018, 18/2018). This latent risk is reinforced by the fact that a water rights reduction is widely contested among water users in the Guadalquivir. An agricultural actor explains:

> "We honestly don't understand why. Because there's one thing that's clear, when there's water, you can use it, right? […] Irrigation itself isn't bad. So why do we have to keep reducing? If you get that decrease in water use, why can't you irrigate more hectares? […] We are trying to see how [this rule] can be changed." (Interview 12/2018)

In the same context, another interview partner explains that in areas where water rights are already very limited, they should not be further reduced after the increase of irrigation efficiency (Interview 16/2018).

A further empirical process in this Action Situation is the reduction of so-called historic water rights by the CHG, also classified as *gap in interaction*. These historic water rights can be seen as *de jure* rights which are not exercised anymore, since they exceed the availability of water resources. According to a representative of the Regional Department, they "would need an Amazonas" to supply the amount of water that is anchored in the existing water rights in the Guadalquivir to the different users (Interview 7/2018). Formal rules of the National Water Law therefore provide the possibility to the CHG to reduce these rights (Art. 65) (*choice rule)*. However, also in this context, the CHG does not carry out the administrative procedure, thereby following again a combination of informal and formal *choice rules*. Instead, a CHG representative explains that the Dam Release Commission adapts historic water rights of surface water users: "no matter what right [irrigators] have, the Dam Release Commission never says more than 6,000 [hm^3]" (Interview 8/2018). In contrast, historic water rights grant usually up to 8,000 hm^3 to the respective water users. Further, in the case of groundwater, historic water rights are not exercised by users due to high energy costs for pumping groundwater, as argued by an interviewee of the CHG (Interview 8/2018).

This approach of not reducing historic water rights is contested by some of the WUAs, as the following quote indicates: "What does AREDA ask, on what FERAGUA does not agree? […] That water rights that are very high are adapted to the reality of the crops, and that they are reduced" (Interview 16/2018). They therefore argue to put an end to "discrimination and privileges of false historic water rights" (in CHG 2014b: n.p.). The underlying rationale is that the Guadalquivir would then not be classified as a "basin in deficit" anymore, but that new water rights could be granted. Indeed, there are many farmers in the area of Jaen which do not have official water rights, but which de facto, have the legal right to use surface water for irrigation. This is because they are granted so-called "extraordinary irrigation" through the Dam Release Commission. However, irrigators depending on extraordinary irrigation are disadvantaged compared to water rights holders, since they are not allocated water until the demand of water rights holders is satisfied.

Performance assessment

Coordinated behaviour in this Action Situation is low. First, *information exchanged* is medium. On the one hand, the Regional Department and the CHG do exchange information, as explained above. Yet, there is no information provided neither in relation to the process and status of implementation, nor to the output of this Action Situation. Although the National Water Law asks to publish information on water rights in the so-called Register of Water, including also modifications of water rights, it is not accessible to the public (Interview 10/2018, 21/2018).

Second, *competing interests* are low. This is because on the one hand, actors who genuinely represent environmental interests, such as ENGOs or civil society rep-

resentatives, are not part of this Action Situation. On the other hand, some of the WUAs themselves ask to reduce historic water rights, as described above. This implies that only some interests that are represented in the agricultural sector – namely regarding the keeping of water rights – are considered by the CHG.

Alignment of incentives is also evaluated as low. In this Action Situation, *alignment of incentives* refers to the question whether there are any incentives from higher levels – e.g., in the form of rules – according to which it is rationale for the CHG to carry out water rights reduction. Yet, this does not seem to be the case. Indeed, a civil society representative explains that „the problem is not that they [CHG] have not reduced water rights, the problem is that they never thought they would reduce them" (Interview 4/2019). Thus, although the European Commission asks for a "systematic review of water rights" in order to ensure that "efficiency measures contribute to environmental objectives" (European Commission 2015b: 78), this criticism has not yet led to further action by the EU. Similarly, also the Regional Department is not incentivized to "convince" the CHG to reduce water rights.

The second dimension of performance assessment relates to the *status of implementation of water rights reduction*, compared to what has been prescribed in the RBMP. It is rated low. As discussed, water rights were not reduced in the Guadalquivir, neither after the increase of irrigation efficiency, nor in the context of historic water rights (European Commission 2015b; 2019b).

4.3 Performance across Action Situations

In this section, I assess performance in the Guadalquivir across all Action Situations, i.e., at the level of the overarching governance process on the reduction of agricultural water consumption. This performance assessment includes *process performance across Action Situations*, followed by *policy output performance* which refers to the overall RBMP implementation, and lastly, *environmental outcome performance*.

Process performance across Action Situations

Coordinated behaviour across Action Situations is rated as low. I assess it along two variables, namely *information exchanged* and *alignment of incentives*. I do not include the variable *competing interests considered* – which was addressed for the performance assessment at the level of individual Action Situations – since it does not add further insights beyond the values that have already been discussed for every single Action Situation. The other two variables, in contrast, help to uncover the interrelationship between the different Action Situations.

Information exchange at the level of the overarching governance process is rated as moderate. On the one hand, it relates to information exchanged between different Action Situations, and on the other, to information provided on the outcome of the

overarching governance process. Concerning the former, there is no evidence that information between the different Action Situations is missing. Even though *within* the different Action Situations, in particular ENGOs and civil society representatives criticize the lack of information, this does not seem to affect actors to carry out their tasks in other Action Situations.

In contrast, *information exchange* regarding the outcome of the governance process is low. This is mainly because the CHG does not provide actual data on water consumption, as discussed above (Interview 3/2018, 11/2018). Instead, numbers provided in the RBMPs rely on estimations of water consumption. Yet, these are also partly inconsistent, e.g., because of missing data on groundwater use in certain years (see CHG 2019b), or contradicting numbers between the different planning cycles. Even the Regional Department only has "impression, perceptions, but no sound data" on the amount consumed before and after the increase of irrigation efficiency (Interview 13/2018). In this context, it is to also mention the Regional Department who has the competency to provide data on irrigated surface area. However, they published the last so-called "Inventory of Irrigation in Andalusia" almost 15 years ago (Junta de Andalucía 2008), but did not update it due to lack of financial resources (Interview 13/2018). I argue that due to the lack of data provided by the CHG, it would be even more important that the Regional Department assumes its responsibility to provide data which could be used as a proxy for water consumption patterns.

Alignment of incentives also refers to two different levels, namely to whether irrigators are incentivized to reduce their consumption; and to whether governmental actors are incentivized to follow higher-level rules and enforce a reduction of agricultural water consumption. The variable is rated as low. At the level of irrigators, I identify three main instances of unaligned incentives which affect their water use, namely the increase of irrigation efficiency without providing incentives to reduce water consumption; the interplay between the Dam Release Commission and the lack of water rights reduction; and the lack of monitoring water use by the CHG. First, neither the CHG nor the Regional Department or the National Ministry established any incentive mechanism according to which it would be rationale for WUAs to reduce their water consumption after increasing irrigation efficiency. This is most importantly because water rights were not reduced. There are therefore no regulatory mechanisms that would make it rational for WUAs to reduce water consumption. However, the reduction of their own *absolute* water consumption is not necessarily in the main interest of farmers. Indeed, irrigators often decided to implement irrigation efficiency measures to improve working conditions (Interview 22/2018), or to reduce their own water losses (Interview 13/2018). In this context, it is argued that "no farmer modernizes for the environment. They modernize to get economic benefits" (Interview 7/2018). However, economic benefits rarely materialized. This is because of increasing maintenance costs of irrigation systems resulting from rising energy use, as well as increased energy costs in the aftermath of the liberaliza-

tion of the energy market in 2006 (Interview 13/2018, 14/2018). An interview partner therefore states that "it was a ruin [for the farmers] to do that modernization" (Interview 17/2018). Farmers were therefore forced to increase productivity – e.g., by changing towards more valuable, and often more water-intensive crops, or expanding irrigated surface area – in order to compensate for higher amortization and maintenance costs (Junta de Andalucía 2017, Interview 21/2018). These economic constraints to which farmers are subject present negative financial incentives for farmers to reduce water consumption. Last, positive economic incentives to save water do not exist either since water pricing is based on the irrigated surface area. The European Commission (2019b) as well as some WUAs (Interview 16/2018) therefore urge the CHG to implement water pricing which incentivizes rational water use, e.g., through prices based on the amount of consumed water.

Second, I observe *misalignment of incentives* for irrigators due to the interplay between the Dam Release Commission and the lack of water rights reduction. I argue that the strong reliance by the CHG on annual negotiations in the Dam Release Commission – instead of reducing water rights which are valid for 75 years – does not create incentives for WUAs to invest in more long-term, structural changes which could facilitate a reduction of water consumption. According to the National Water Law, the Dam Release Commission shall adapt water allocation to the current hydrological situation, to be able to react to changes of water levels. However, as explained above (see Section 4.2.4), the CHG also makes use of the Commission to reduce the amount of water stipulated in the historic water rights; and the CHG argues to adapt water allocation to the reduced demand resulting from irrigation efficiency – even though there is no further data supporting this claim. Lastly, the granting of extraordinary irrigation (see Section 4.2.4) is a further example of how the CHG relies on the Dam Release Commission as coordination mechanism, instead of carrying out the administrative procedure of granting water rights. Affected WUAs therefore repeatedly claim to get regulated rights (CHG 2018b; 2018a). These different examples indicate that the CHG (re-)negotiates on an annually recurring basis with WUAs on the allocation of surface water. I argue that by doing so, WUAs lack incentives for long-term planning. The CHG thereby may even create expectations that distributions in the upcoming years will again increase.

Lastly, I see the lack of monitoring surface and groundwater use by the CHG as a further lack of incentives for WUAs to reduce their water consumption. The monitoring of water use was not studied as an Action Situation in its own but can be seen as an important factor influencing incentives of WUAs. There is broad empirical evidence on deficient control of especially groundwater use in the Guadalquivir (Interview 8/2018, 10/2018, 21/2018); and a CHG representative also confirms that water use of irrigators with few water rights is not sufficiently controlled (Interview 18/2018). Further, unauthorized wells are rarely closed, or only with considerable delay (Greenpeace España 2018). This concerns especially the Doñana national

park, where "such a bubble of illegality has been created that it is impossible to stop it. […] How do you brush off the other 50% [illegal water use] from one day to another?" (Interview 10/2018). The difficulty for the CHG in closing these wells, however, is that farmers accused of illegal water use often defend their rights in court. Court proceedings can take up to ten years due to a legal property system giving high guarantee to water users (Interview 18/2018). Until a legal decision is taken, water users can continue to extract water from unauthorized wells. Furthermore, I argue that the fact that illegal groundwater use is not mentioned in the RBMP (see CHG 2015a) reduces the likelihood of the CHG tackling the problem in the near future. This large share of illegal groundwater use may give negative incentives for water rights holder to voluntarily reduce their own consumption, presenting a collective action dilemma.

In addition to the lack of *alignment of incentives* for irrigators to reduce their own consumption, I observe *unaligned incentives* for governmental actors to follow higher-level rules set by the EU in relation to the WFD and the EAFRD. First, I argue that the EAFRD does not provide sufficient incentives for the Regional Department to enforce water savings by WUAs. Investments in irrigation efficiency measures must comply with several conditions related to water savings, such as the ex-ante assessment of potential water savings (Art. 46). However, the EAFRD also allows for "interpretations and exemptions", such as the increase of irrigated area under certain conditions, even where water bodies are in less than good status (European Court of Auditors 2021: 51). The RBMP of the second planning cycle of the Guadalquivir indeed makes use of this regulation, by explicitly allowing an increase of irrigated surface area: "In projects of modernization of irrigation that are declared to be of general or regional interest, the Basin Organization [CHG] may allocate up to 45% of the saved water resources to future expansions within the River Basin District" (Royal Decree 1/2016, Annex VII, Art. 16; own translation). Such an increase of irrigated surface area has also been empirically observed in several Member States in the Fitness Check of the WFD by the European Commission (2019a). The European Court of Auditors (2021: 41) therefore criticizes that funding by the EU for irrigation projects has "weak safeguards against unsustainable water use", and therefore risks to "go against the WFD objectives" (European Court of Auditors 2021: 45). The fact that the Regional Department does not insist on the reduction of water rights (see 4.2.4) therefore may inter alia be explained by these weak safeguards.

Furthermore, also the incentive structure for the CHG to comply with WFD requirements seem to be insufficient. On the one hand, the European Commission can initiate an infringement proceeding in the Court of Justice of the EU if it considers that a Member States does not fulfil EU obligations. In December 2020, the European Commission therefore informed Member States about potential penalties in case WFD objectives will not be fulfilled (European Court of Auditors 2021). However, several exemptions apply for the fulfilment of WFD objectives, and the time

frame to fulfil them lasts until 2027. I therefore argue that threats of an infringement proceeding are relatively uncertain, and the European Commission therefore rather operates in a shadow of hierarchy, which does not directly change the incentive structure of the CHG.

Policy output performance

The policy output evaluates the *RBMP implemented*, referring to the overall RBMP; status of implementation of specific measures have already been assessed at the level of Action Situations. It is rated as low. This is because in December 2019, only 10% of measures that were scheduled to be completed by 2021 in the Guadalquivir had actually been finished (MITECO 2020b: 130). Furthermore, only 19 % of financial resources allocated for the planning phase 2015–2021 had been spent at that time (MITECO 2020b: 130). Beyond the implementation status of water rights reduction and increasing irrigation efficiency, there is a lack of implementation of measures considered crucial to reducing water use in irrigation. This concerns the lack of monitoring groundwater use, and closing illegal wells, as well as the lack of implementing water pricing based on consumed water rather than on irrigated surface area. Adding on that, the European Court of Justice also ruled that Spain – in the form of the CHG – failed to fulfil its obligation in terms of taking measures to prevent disturbances caused by groundwater abstraction in the Doñana protected natural area (Case C-559/19, Judgment of the Court (First Chamber) of 24 June 2021).[9]

Environmental outcome performance

Environmental outcome performance is low. This is because agricultural water use and irrigated surface area increased in the last decade, although water status according to the WFD assessment remained stable. More specifically, numbers related to the *development of water use* show that agricultural water use (i.e., net consumption) increased in the analysed period by 8.7%, from 2,569 hm^3 in 2009 to 2,792 hm^3 in 2016/17 (own calculations based on CHG 2013; 2020a). However, since these numbers are only estimations (European Commission 2015b), and the RBMP does not include illegal groundwater use, actual water consumption by irrigation must even be higher. Indeed, in the above-mentioned court ruling, the European Court of Justice also found that the CHG failed to take into account illegal water abstraction in the area of Doñana in the RBMP 2015–2021 (Case C-559/19). According to the WWF, there are 1,000 illegal wells only in Doñana, situated in the Guadalquivir and the Andalusian RBD Tinto-Odiel-Piedras (WWF 2016). Second, the *development of irrigated surface area* points in the same direction. According to the third draft RBMP, irrigated

9 https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:62019CJ0559 (accessed 04.04.2022)

surface area in the RBD increased by 8.6% from 2009 to 2015, namely from 707,033 ha to 768,210 ha (own calculation based on CHG 2019a: 185).

Nonetheless, the *development of water status* has been relatively stable over the last decade. Around 60% of surface water bodies are in good status, without significant improvements over the last years; and the number of groundwater bodies in good quantitative status slightly increased in the last decade from 68% in the first RBMP to 74% in the third planning cycle (see Table 6). Due to the considerable increase in agricultural water consumption and the focus of my work on this indicator, I nonetheless assess the *environmental outcome performance* as low.

Table 6: Status of water bodies in the three WFD planning cycles (Guadalquivir)

Category	**Water status**	**Percentage of water bodies**		
		RBMP 2009	**RBMP 2015**	**RBMP 2022 (draft)**
Surface water bodies (global status)	Good	58 %	61 %	61 %
	Worse than good	42 %	39 %	39 %
Groundwater bodies (quantitative status)	Good	68 %	74%	74 %
	Poor	32 %	26 %	26 %

Source: Based on data from CHG (2019a; 2013; 2015a)