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HOW DOES POWER AFFECT INTERNATIONAL WATER COOPERATION?

SYSTEMATIC LITERATURE REVIEW, ANALYSIS AND CASE APPLICATION

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ABSTRACT

International cooperation on water is crucial to find a mutually beneficial and sustainable resource management for all riparians. While the application of moral norms on allocation schemes has been studied intensify, the effect of prevalent power relations between states is still neglected. A systematic literature review is conducted to explore and fill this gap. It reveals that power is used implicitly in most publications. However, the term is rarely defined and mostly applies to conflict rather than cooperation. Furthermore, the results hint at an incomplete understanding of the power concept. Therefore, a review-based analysis further explores the relevance of power in water cooperation, finding that it has enormous explanatory power. Water is used as a means of coercion, while at the same time the international environment imprints power on states through water-related institutions, structures, and norms. Applied on the case of the Nile River, it comes in the realm of possibility that Egypt will lose its hegemonic position due to its failure to engage in negotiations with all riparians earlier and Ethiopia's strategic accumulation of power from different sources.

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List of Abbreviations

GERD = Grand Ethiopian Renaissance Dam

HYDROMET = Hydro Meteorological Surveys Project of the Upper Nile

ILA = International Law Association

NBI = Nile Basin Initiative

TECCONILE = Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Upper Nile

UN = United Nations

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1 INTRODUCTION

In 1929, Britain, representing Sudan and its East African colonies, signed a contract with Egypt, which was then under strong British influence, about the water use of the Nile river. The agreement said that the major part of Nile waters belongs to Egypt alone, while giving it a veto right to all upstream water uses, based on "natural and historical rights" (Anglo-Egyptian Treaty, 1929). Sudan was guaranteed a small share. The dependence of upstream states on the Nile water was ignored. In 1959, the unfair share was recognised. The treaty was adapted, granting Sudan more of the Nile's water resources, while also increasing the fixed amount for Egypt (Republic of the Sudan and the United Arab Republic, 1959). Upstream states were still neglected, an unchanged situation from British rule in North/ East Africa until now. Such treaties are an example of an old preference that defines the water questions until up to date, reinforcing power structures that hinder further agreements. What has changed, however, is that the international community formally agreed to a right to water, a treaty on non-navigational use of water, and international principles of fair distribution. Being consent-based UN resolutions, they are ratified by many nations but have no binding force. Much academia builds on these normative bases, ignoring underlying power structures as underlying sources of cooperation struggles.

Research has been conducted on the relation between water and politics about distribution, possible cooperation or conflicts, and existing, failed, or planned agreements. The difficulty is that water is crucial for human existence, it is limited, and it cannot be substituted. It becomes increasingly scarce, even as means to cover the most basic need, through the re-enforcing factors of population growth, economic development, and climate change (Leb, 2012).

While such work is important to find solutions for water allocation, it overlooks an underlying set of questions: Does every human need the same amount of water? Is water for agriculture more important than for technology? Is the current or the future need relevant, and how do we find out what the latter will be? These questions are normative questions on how we see and wish our world. Consequently, they need normative answers.

When dealing with water issues, states frame situations to give such answers, creating an environment in which their narrative is the most convincing. Zeitoun and Warner (2006) state that water events such as conflicts indeed shape relations among states, even if they are silent or cold wars. The relation between states, in turn, is the set on values that emerge and remain (Finnemore and Sikkink, 1998). Norm creation and diffusion, besides open conflicts, bring power to light.

There is, however, only little literature on how a state's power influences water co-

operation. Promising work in that field has been done by Zeitoun and Warner (2006) who analyse the relation between power and the likelihood and intensity of water conflicts. They suggest that while dispute exists, water wars are rare because they would not be in the interest of the hegemon. The hegemon remains in power, by giving others enough water to remain in conflict but to avoid an escalation that could cause power shifts.

The authors do not, however, analyse how states exercise their power towards cooperation to obtain favourable outcomes in international water negotiations. This will be the task of this work. Drawing on Yoffe et al. (2001), I see cooperation as any "positive" form of joint behaviour towards a shared goal, including diplomacy, negotiation and bargaining, treaty-making (including binding forces), and joint mechanisms of management, i.e. special commissions or institutions with the order to supervise and establish a mutually benefitting *modus operandi*. Agreements, treaties, and other forms of securitisation are seen as evidence of cooperation between the respective states. Accordingly, I assume that framing leads to norm diffusion between the involved states, which in turn becomes an important source of power in the process of cooperatively handling a watercourse.

Hence, I aim to answer the question:

"How Does Power Affect International Water Cooperation?"

I will show that different conceptions of power are all present in the debate on allocation, management, and use of international waters, even if water is often framed as a moral and unpolitical issue. I will therefore proof the following hypothesis:

"The outcome of international water cooperation can be explained by power analysis." , including two specifications, namely:

1. The international debate on water is normative, and
2. Framing power is superior to traditional power sources.

The work begins with the definition of power on which I base my argumentation and which helps to clarify the intended scope of this work (section 2). This is followed by illustrating the methodology used for the systematic literature review, including some practical considerations (section 3). Then the actual literature review follows (section 4), split up in a short quantitative section to give an idea of the number of different contents, and a qualitative summary of the most compelling arguments and contents. The literature review is based on the systematic literature search only, thus it reflects the current state of research, and builds a base for the following section. In section 5, the inputs from the review are analysed and contrasted with the concept of power in international relations. It is shown that despite being neglected in the review, power is

essential to explain how cooperation emerges among riparian states, also assessing its potential to explain in what form cooperation takes place. To do so, a broader body of literature is consulted, thus embedding the argumentation in the realm of international relations. To illustrate my findings I will then introduce the struggles towards cooperation on the Nile river, including its most current developments (section 6). In the discussion (section 7) I will argue why the power concept received so little attention, what limitations apply to this work and what implications my results may have on relations among riparian states.

2 THE CONCEPT OF POWER

To define power, it is necessary to differentiate between what power can effect and where power results from. Broadly accepted among different schools is that power is the ability to bring another actor to do something that otherwise he would not have done (Dahl, 1957, 202f). In the case of nation-states this general definition can be translated: a more powerful state can bring a less powerful state to do something despite the latter's sovereignty in an anarchic world. The specification is important as it excludes power games in colonial situations, where a stable and independent form of internal leadership cannot be assumed. This definition is further limited to state actors, thereby neglecting the effect of influential non-state actors in international relations.

As Barnett and Duvall (2005, 49f) criticise, Dahl's definition expects an actor with a certain intention, who exercises his ability to change the other's behaviour through some form of coercion (military or other). The authors suggest a broader understanding instead: "power is the production, in and through social relations, of effects that shape the capacities of actors to determine their circumstances and fate" (Barnett and Duvall, 2005, 42). Power yet exists before or even if no action is taken against the other, and there must not be any intention or dispute for power to exist. Dahl's definition meets only one of the four forms of power in Barnett and Duvall's taxonomy, namely compulsory power, the capacity to make others do something while neglecting the capacity to build a beneficial environment for one's power exercise (see below).

Realist schools originally know one simple source of power: the sum of military ability, including the potential to build it (resources, population, etc.) (Mearsheimer et al., 2001). Power becomes only present when different states' interests clash, and is at the same time the only measure to solve conflicts since the world's structure is anarchy. Realist schools do not expect cooperation to be mutually beneficial, but rather a risk to their independence (Waltz et al., 1979). Also, weak states are not expected to exercise considerable power due to a relative lack of material capabilities and the certainty to lose when challenging the existing order (Legro and Moravcsik, 1999).

The absence of water wars despite water being a scarce resource (Zeitoun and Warner, 2006) indicates that relations among states are not merely shaped by military threats or interventions. On the contrary, cooperation exists at least to a certain extent on most international water bodies.

Although liberals agree with the idea of states as rational actors in an anarchic system, they assume cooperation to be a suitable way to solve conflicts: as Sterling-Folker (2016) notes, anarchy is a vacuum that can be filled with supranational institutions to

facilitate cooperation (through trade promotion, economic development, trust-building, rules). As such, absolute gains of power are a feasible option, also interests can change over time (Jervis, 1999). Liberals assume that economic contact, rather than military power, shapes relations among states, while also stabilising the existing order (Sterling-Folker, 2016). The main argument here is that war is costly, while mutual dependency promotes a peaceful relation among states (Moravcsik, 2008).

The key point missing is that institutions in liberal theories are built for a certain purpose; growing interdependence is possible, but cooperation remains limited to this end. The liberal approaches thereby miss the side effects of a relation, namely the process of common history that brings new norms and traditions and the emergence of moral standards. Sharing water, for example, is never beneficial for the upstream state from an economic perspective, but cutting the flow for downstream states would cause moral scruples (Eididi and Corbera, 2017, 125f).

At this point, reflective theories enter into the debate (lead by constructivist and other non-traditional schools). Wendt (1992) argues, it is rather practices, than institutions that constitute the relation among states. International organisations, the United Nations, in particular, established principles and procedural rules to imprint a social interaction:

One vote per state in the General Assembly enables weaker states to have the same saying in international debates, guaranteeing a formally equal standing at least in the protected sphere of the UN. But also the Human Rights Catalogue, rules as to how wars are intended to proceed, limitations to sovereignty, and other more specific norms for vulnerable people put moral and legal constraints to all states likewise. The structure, given by norms and institutions, defines who states are, while at the same time it is states' actions that mutually constitute that structure (Hurd, 2008). This does not mean, that military or economic power is out-ruled, but rather that

1. their perception is socially constructed (Wendt, 1992), and
2. in addition to those, other sources of power must be added: the ability to profit from collective meanings due to a profound knowledge on how to secure the own identity in a seemingly anarchic world (ibid.).

This allows poor states to exercise the same voice since they do not depend on capital, but rather on framing capability: agenda-setting, reasoning, and persuasion to create and spread norms and make other internalise them (Finnemore and Sikkink, 1998).

I see power as an abstract, immaterial "constructed" concept, allowing to add up power from different sources to a state's total power. Hence, I assume riparians relations to be determined by their combined power capabilities. Here, besides com-

pulsory power, the other three forms of Barnett and Duvall's taxonomy come to relevance: power is also exercised through institutions (indirect control through rules of interaction.), structures (that determine who actors are in relation to others), and the production and development of new meanings that constitute all actors (Barnett and Duvall, 2005, 51, 52f, 55).

The permanent existence of power between states allows to analyse the effect of power even in peaceful or cooperative situations. States seek to find an agreement on their shared water body, they do negotiate. They try to line with international standards of fair distribution, while at the same time promoting solutions beneficial to them. Being powerful means to be the one who sells his needs best, whose argumentation convinces others, and who, in the end, defines the greater part of an agreement. Power is not necessarily in the spotlight of water cooperation but becomes effective through skilful handling of the determining factors in negotiation.

3 METHODOLOGY

3.1 Structural Search Term Selection

The pre-requisite of a systematic literature review is an objective and reproducible selection process of publications (Boell and Cecez-Kecmanovic, 2015, 164). This is achieved by creating structural search queries automatically, using the litsearchr package in RStudio that is designed to reduce the researcher's bias in term selection and reproducibility (Grames and Stillman, 2019). Therefore, a first manual search query with Boolean operators is built.

```
("geographic determinism" OR dependencies OR resources OR territory  
OR "unchanging condition" OR impediments OR incentives) AND (negotia-  
tion OR "unequal power" OR communication OR "key position" OR "power  
in cooperation" OR "international cooperation" OR "relative power" OR bar-  
gaining OR diplomacy OR "interest group")
```

The selected terms should link international politics and natural resources, simply put they ask "What has power to do with water?". At the same time, they should exclude unrelated, irrelevant, or too broad publications (i.e. no use of "power" alone to avoid conflating meanings of other disciplines). This pre-search serves to find a bundle of publications that fit the author's field of interest on different peer-reviewed data platforms (Scopus, GreenFile, WebOfScience, and ProQuest). To fit the platform's demand, the formula needs to be slightly adapted (see Appendix) for Scopus, WebOfScience, and ProQuest. It is additionally limited to title, keywords, and abstract with Scopus and WebOfScience, and respectively "all except full text" on ProQuest. The pre-search results in 262 publications. These are used for an automated keyword extraction (around 5000 key-words). A network between these key-words is computed according to their relatedness derived from their co-occurrence in papers. Key-words often occurring together are drawn close to each other, and the nodes are linked. Rarely used or unconnected terms have low node importance and are excluded. However, the cut-off line is to be widened from 0.8 (default from Grames and Stillman (2019)) to 0.99, since the papers seem to be very little interrelated. 330 search terms remain. Of those, non-related terms are excluded by hand (another 58), while the remaining rest is sorted into four groups for the next search query:

1. resources (water, scarcity, basin, river etc.)
2. actors (states, organisations, institutions, regions, levels etc.)
3. power (implications, relations, agreements, conflicts, action and reaction, frameworks, political theory, abstract concepts etc.)

4. normative terms (i.e. justice)

The four groups serve to build the final Boolean search query to conduct a scientific search, this time free of the author's selection bias in search terms. It is noteworthy, that although the power term is included in the pre-search terms, it does not appear in the results that form the second query nor in its results, see section 4.2.7.

3.2 Manual Publication Selection

Resulting from the final structural search were a bunch of around 1200 publications, the total body of literature this systematic review is based on. This literature body was reduced first by a title, then a title-abstract exclusion. The main criteria for articles to remain was a hint towards water to a social situation, be it a treaty, a conflict, a game-theoretic model, or anything that describes what effects water may have on social relations on the international level. Hence, mostly articles from natural sciences were excluded. The title exclusion left 220 publication, the following abstract reading excluded another 111. Of this body, another 29 articles were not accessible, leaving a total literature body of 82 publications for the systematic literature review.

3.3 Evaluation

The reduced body of literature is assumed to be an objective cross-section through the state of the art on topic related academic material

Since the literature body is still extensive, the evaluation is conducted with a two-fold approach: a quantitative overview and a qualitative summary. The first evaluates the publications formally to help the reader to get an impression of the main fields of work. The second part presents the main arguments and the content of studies, assigned to seven inductively created categories (see figure 1). It is important to interpret both parts together to avoid concealing the true amount of articles arguing towards the same end when similar argumentations may be combined in the second part.

The literature review serves as a base for the following analysis. Due to the topic's interdisciplinary nature, a solid review helps to get a full picture of relevant arguments, rather than a biased view through the own academic lenses.

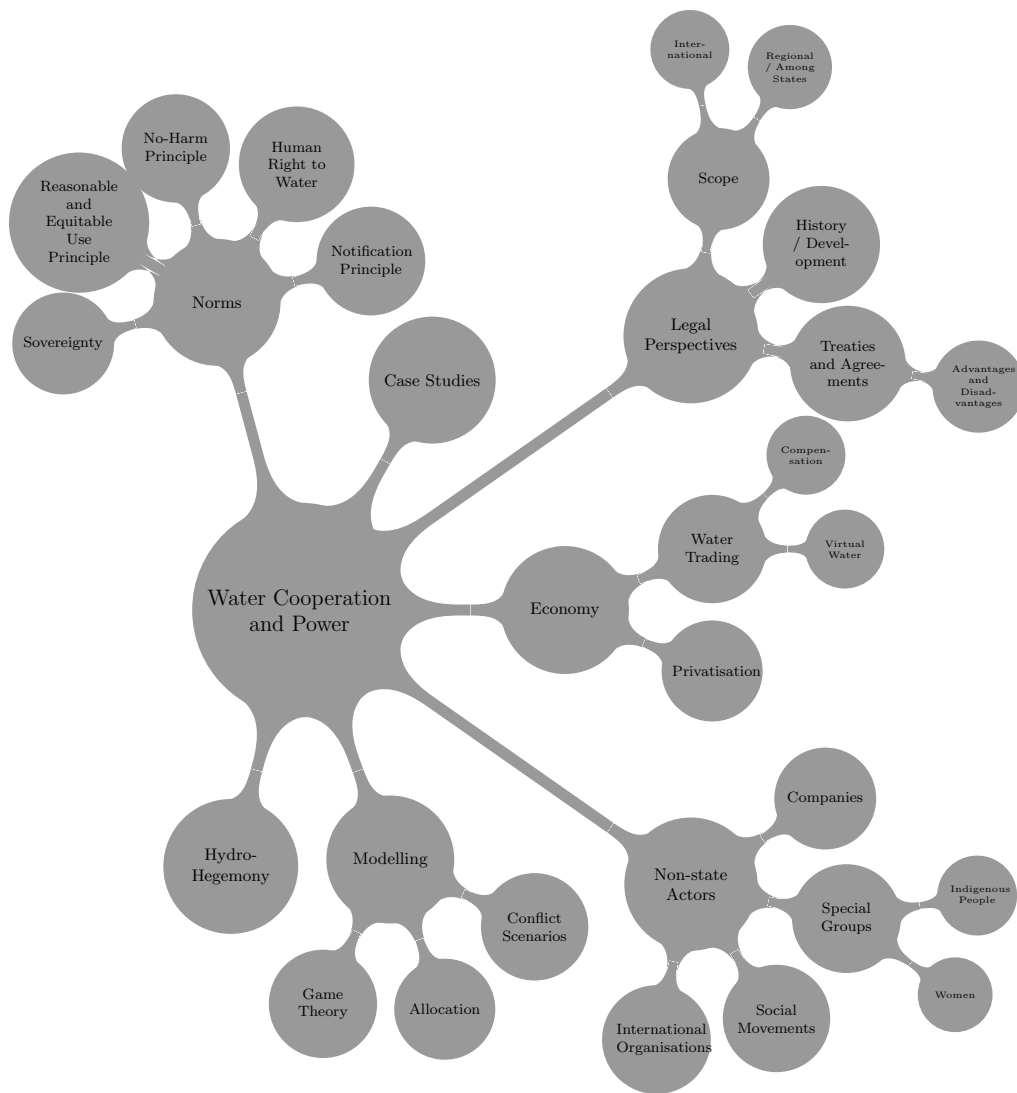


Figure 1: Categorisation of Different Subtopics found in the Systematic Literature Search.

4 SYSTEMATIC LITERATURE REVIEW

The literature review gives a broad insight into current research in the field of water co-operation. It synthesises the main contents and discrepancies of different disciplines. The review does not qualify to reproduce all arguments, but rather extract and combine all those that link water to some form of power, even if the latter is only implicitly suggested. This section builds on results of the systematic literature search only; in-depth original work, interpretations, and assessments follow in section 5.

4.1 Quantitative Summary

82 papers are included in the systematic literature review. They originate from a broad variety of disciplines (see figure 2), indicating the topic to be interwoven with many adjoining research fields. Law, International Relations, and Engineering were among the disciplines with most publications in the literature body. Also, the study types (see figure 3) show a wide variety, ranging from descriptive to analytic works in both theoretical and practical approaches. Most present were pure case studies, followed by reviews and modelling approaches. Different economic perspectives are also present. Cases were included in most studies, however often as examples only, hence those publications did not qualify as a case study. Other than expected, only 16% of the papers had a clear power concept included (see figure 4). Power concept hereby did not refer to a comprehensive definition, but rather at least a simple understanding of what the term power could mean. Figure 5 gives an overview of the geographic focus of the literature body. For studies that compared various water bodies, all such are included in the illustration. However, studies were not used if the riparians were no independent nation-states (as US or Indian federal states), when the respective basin was not stated, or when the study consisted of a theoretical paper without practical cases. Compared to a map of the number of riparians per basin (see figure 6), it can be seen that much research is conducted on basins with four or more riparians.

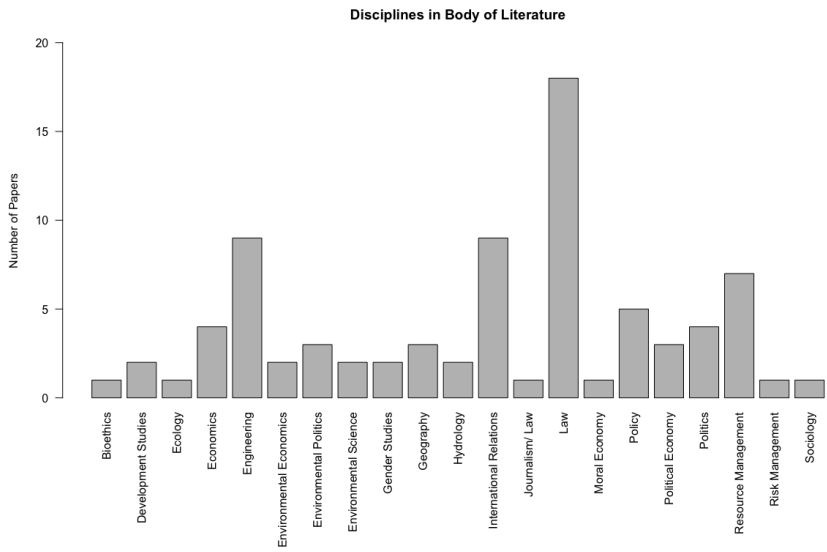


Figure 2: Bar Plot Depicting the Number of Papers Found in the Literature Search per Discipline.

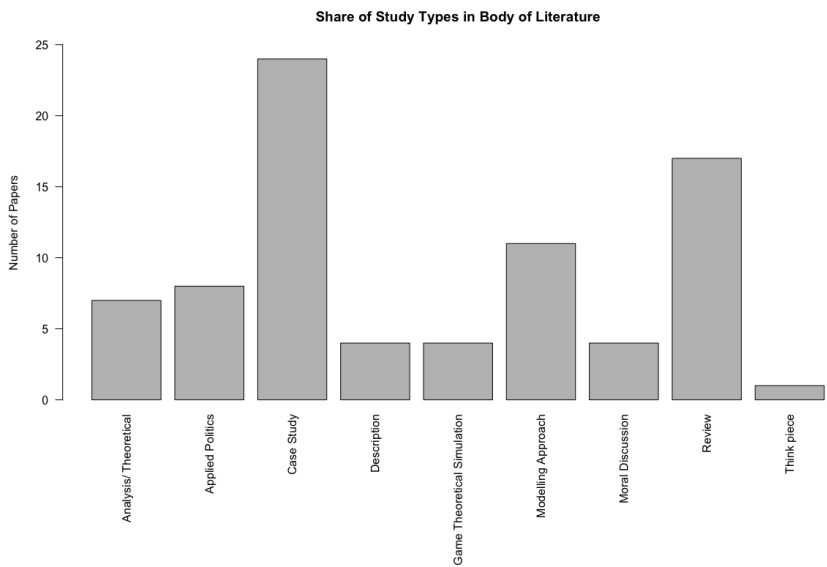


Figure 3: Bar Plot Depicting the Number of Papers Found in the Literature Search per Study Type.

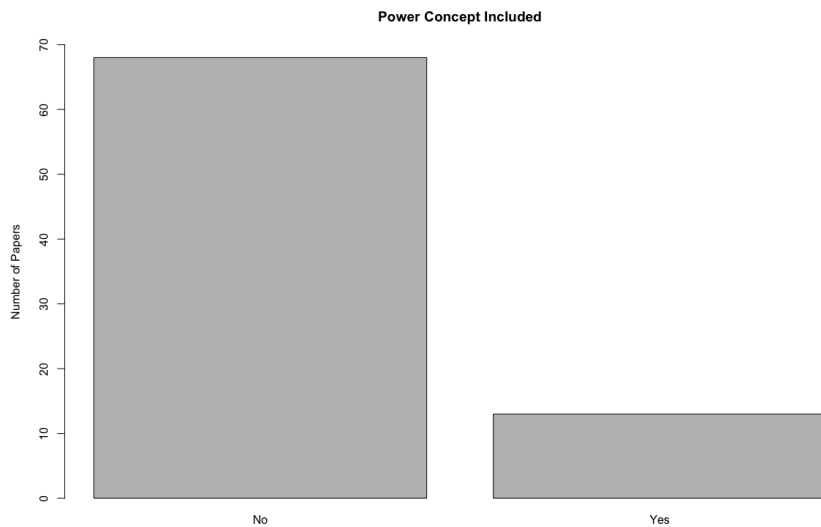


Figure 4: Bar Plot of the Proportional Share of Papers Using a Power Concept to Explain Water Events.

4.2 Qualitative Summary

4.2.1 Hydro-Hegemony

The framework of hydro-hegemony is linked to power: the hydro-hegemon must not be the most powerful in all respects, but at least the one riparian leading use and distribution of a water body, thereby exercising control over others. Consequently, the concept is better suited to explain the degree of stability between riparians than cooperation among them (Lopes, 2012, 252ff).

Most authors refer to at least one of the three pillars, hydro-hegemony is built on,

- riparian position,
- exploitation potential,
- power, see i.e. in Lopes (2012, drawn from Zeitoun and Warner 2006).

The riparian position favours the upstream state, as that is free to extract as much water as wanted. This also enables that state to some extent to set rules of water sharing and control the resource (Talozi et al., 2019, 918). It is foremost a topography position. Some authors, like Daoudy (2008, 90), see topography as a more important factor in water debates than actual water-scarcity. It returns a stronger position, no matter, whether scarcity is experienced, or not, because of its rivalling dynamic between upstream and downstream countries. A hegemon is in a better position when developing storage capacities, such as dams, or when hydropower plants make use

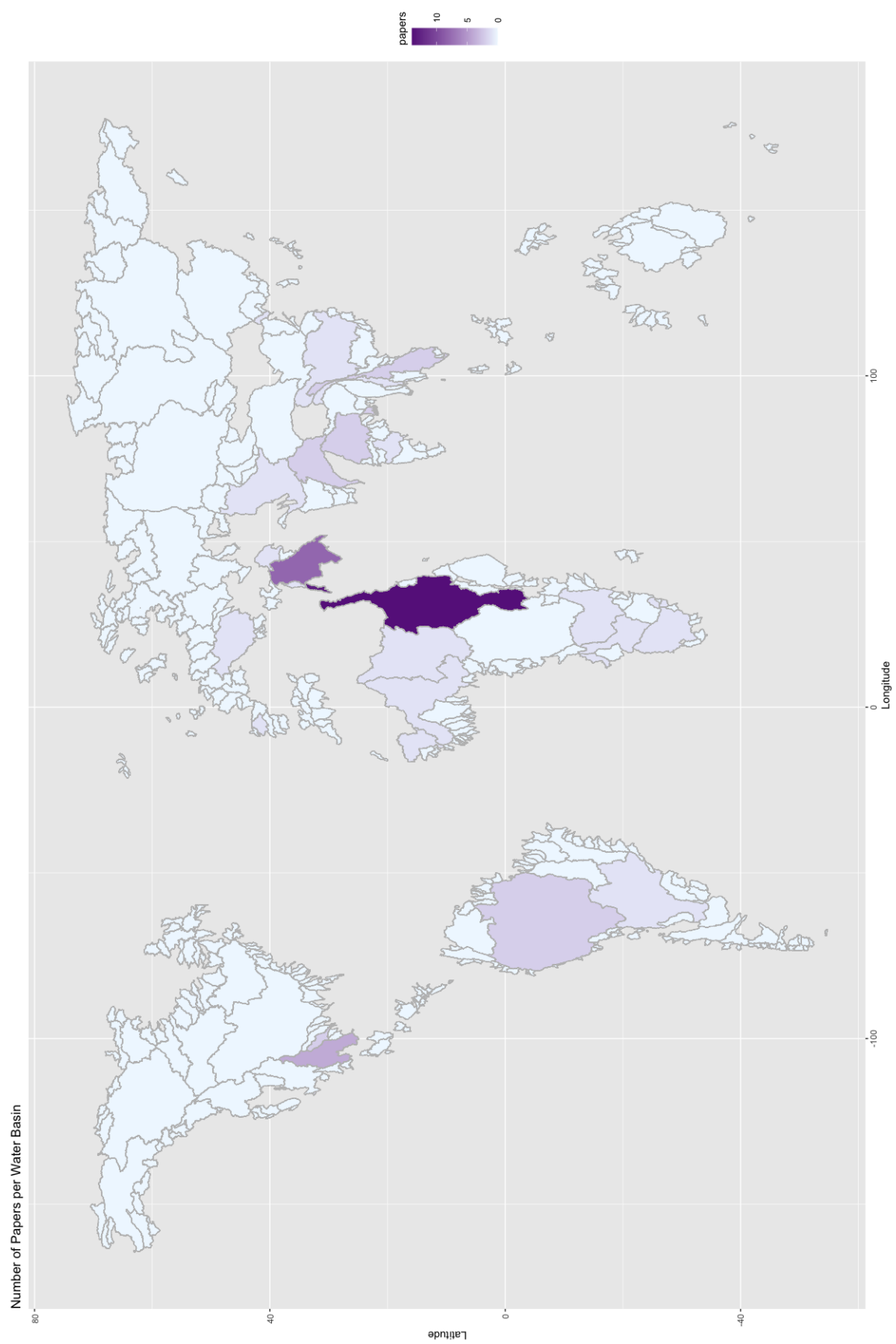


Figure 5: World Map Visualising which Transnational River Basins Are of Particular Interest in the Literature. High Colour Intensity Indicates a High Number of Papers on the Respective Basin.

Number of Riparians Sharing an International River Basin

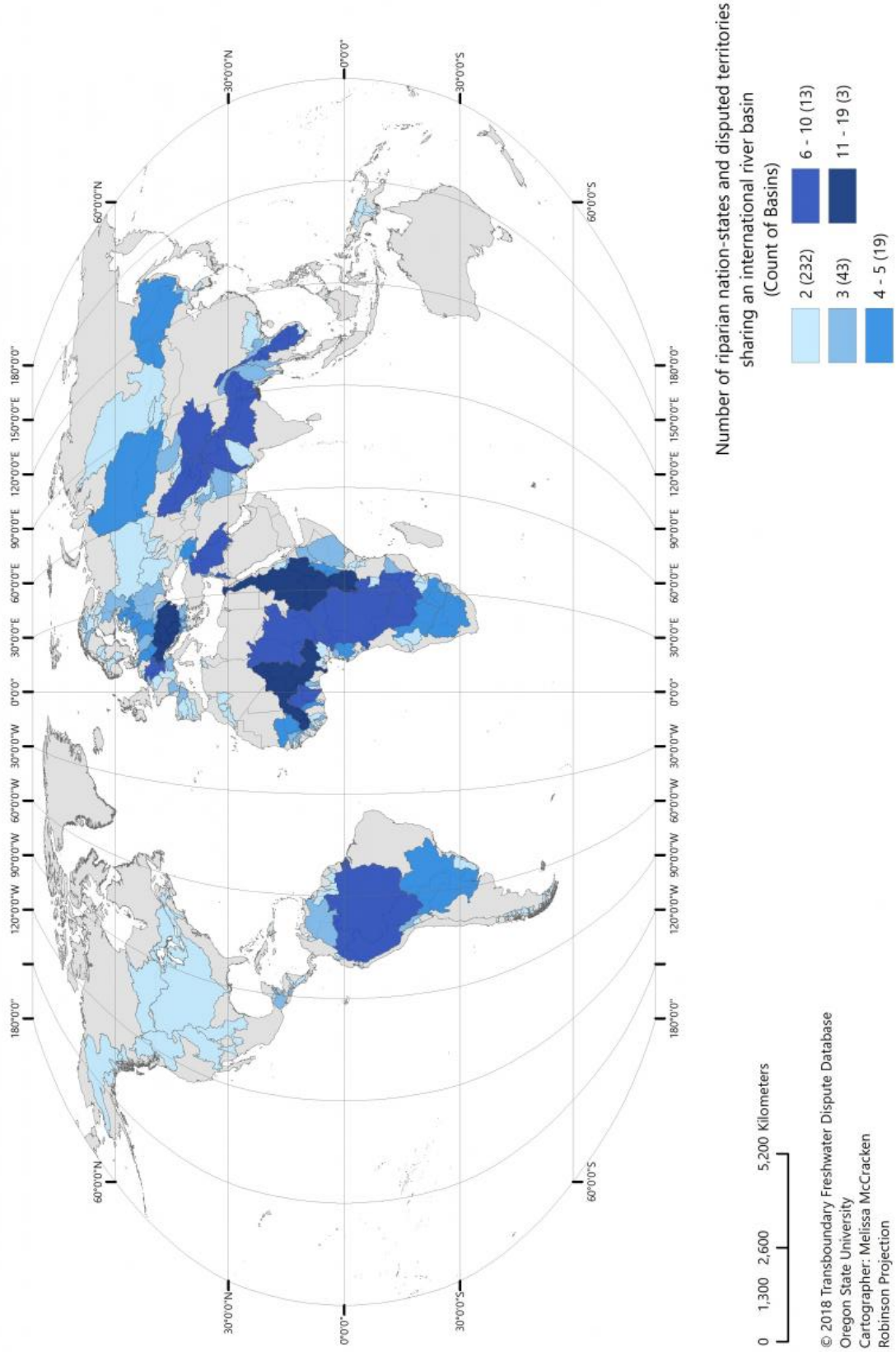


Figure 6: World Map Illustrating the Number of Riparians in Transnational River Basins, drawn from McCracken (2018)

of the water. The water itself has only limited value, rather the capability to use it technically or extract it for agriculture or industry makes it a source of power (Lopes, 2012, 256).

Hence, the riparian position is limited by the exploitation potential. It can technically stabilise the status quo, as it decreases the dependency on natural water flows and generates a constant flow. It can work as a buffer in the water-scarce system when well established.

The power resulting from a riparian position is further dependent on how good the adoption of water resources and control strategies is, or a country's ability to enforce a strategy (ibid.).

Power can be material, i.e. economic or military power, or abstract, i.e. bargaining power: how to frame one's interests, how to shape the agenda, how to link those with the exploitation potential and or the ability to coercion (like physically withhold the water) (Lopes, 2012, 263ff; Daoudy, 2008, 94). In this respect, a dam or water storage facility is a means of power, as are institutions, structures, or language (El-Sayed and Mansour, 2017, 231). As Goff and Crow (2014, 159) note "Control over water can and often does afford individuals and groups significant social and economic power." He compares water to money due to its dynamic character, changing hands, locations, purposes continuously while enabling its owner to use it in his interest (ibid.), thereby giving a good insight into the complexity water has in political relations.

For weaker states it can be advisable to refer to legal structures like the international law as a base to build on in bargaining processes and limiting the hegemon's alternatives for water allocation, hence challenge the hegemon's position

Hydro-hegemony becomes important when there exists asymmetry in water allocation that triggers conflicts. Neo-realist Hegemonic stability theory suggests that such conflicts would only arise when initiated by the hegemon, as other countries would lose in the case of a conflict (Daoudy, 2008, 90). Since conflict is not in the interest of the hegemon, see section 4.2.7, he has an incentive to not letting asymmetries grow too profound.

The advantage of hydro-hegemony is that it can bring predictability and stability to a region, rather than hostile and open wars, as one powerful actor can manage the dispute and avoid escalation (Lopes, 2012, 256).

This comes with disadvantages as it cements inequalities, limits the capabilities of vulnerable groups, and legitimates the power position of the strongest (Vink, 2014, 744). The strongest can shape treaties in his will and secure its own best distribution of the resource (Talozi et al., 2019, 918; El-Sayed and Mansour, 2017). This is particularly relevant when the hegemon is the upstream country, since withholding water and excluding downstream states' access becomes even easier (Vink, 2014, 749). Thus,

hydro-hegemony is rather describing stability, not cooperation. Also limiting the concept's use is its state-centrism. It can only describe the cooperation between states, neglecting non-state actors, such as companies, international organisations, refugees, etc. further discussed in section 4.2.6.

A string of newer literature is concerned with the question of how perceived hegemonic structures can be overcome: common dependence on the amount and quality of water resources make joint management a more sustainable way than national exploitation (Kaniaru, 2015, 382). Securing the own survival is only possible by shared efforts, that are executed by local or regional trust-based cooperations to strengthen all riparian (Kaniaru, 2015, 391f).

There is a shift from a potentially destructive to the bargaining position being the most powerful. Who can frame his perspective in a way that others understand and support it? El-Sayed and Mansour (2017) show how framing power is influential even in classical concepts like hydro-hegemony: He gives an interesting insight on the Jordan river, where Israel is particularly good in constructing a water crisis, even if they extract so much water that they can sell a part to Jordan: "the most powerful riparian state has the means [...] to securitise its water discourse often at the expense of weaker states, even though the latter could be facing an objective - as opposed to a constructed - crisis." (El-Sayed and Mansour, 2017, 231). Jordan is weaker on all power facets, consequently, they are unable to resolve the objective water crisis they face.

Hence, the outcome of water agreements according to hegemonic theories is only determined by the power relations of riparian countries. There is no higher international authority, nor any binding law, that would limit a state's actions or punish him when he breaks the rules, rather the hegemon itself is what comes closest to that position (Yetim, 2003, 7).

4.2.2 Norms

Norms are reflected in almost all publications, however partly only between the lines. Norms differ from rules as they are commonly understood and people accept good norms intuitively. Norms are nested within culture, different cultures have different norms. It is challenging to find commonly accepted norms in the international field, that fit all interests. Still, norms are the only way for the international community to find at least some common sense and promote some common ideals to foster cooperation. Norms regulate almost all human behaviour, including the handling of water resources. They apply generally, not context-specific. International norms and principles are supposed to encourage states to find agreements on water use, to establish joint institutions, and to find resolutions to water disputes (Rieu-Clarke, 2015, 8).

They serve as guidelines on what behaviour is socially accepted, but no enforcement is attached (Brooks, 2007, 228). This makes it difficult to translate norms into treaties (Talozi et al., 2019, 912).

International norms emerge in institutional frameworks, usually, the United Nations, which facilitates cooperation between countries by fostering exchange, creating and diffusing norms (Lopes, 2012, 266). New norms are adopted when perceived as appropriate and efficient (Parks and Morgera, 2015, 357f). Continuous adaption and the integration of new norms into the already existing set play a significant role in compliance (McIntyre, 2006). Such compliance can lead to fruitful negotiations, breaking old power relations, and introducing new customs (McIntyre, 2006, 164).

The first norms on non-navigational water use emerged in the 19th century when industrialisation became more present, and intensified in the 1950s and 1960s when colonies gained independence (Talozi et al., 2019, 912), see also figure 8.

The first concept was absolute territorial sovereignty (Harmon Doctrine): all water on a country's territory belongs exclusively to the country. The idea to link natural resources to states was yet included in the Draft International Covenants on Human Rights 1954 (Tyagi, 2015, 597), a process closely linked to the idea that indigenous populations shall dispose of their resources in their interests, rather than colonisers (Tyagi, 2015, 603). However, it provoked opposition, namely the absolute territorial integrity (Natural Flow Doctrine): water could only be used as long as there was no effect on downstream states (Talozi et al., 2019, 912; Lopes, 2012, 252; Parhi and Sankhua, 2013, 258).

These extreme positions were replaced by the concept of limited territorial sovereignty. The principle aims to find a balance between the own usage and effects on downstream states. This includes the evaluation of corresponding factors like alternative water sources, economic and social needs, and the development of the watercourse, among others (Talozi et al., 2019, 912). Water cooperation is translated into a rights and obligations catalogue (Rieu-Clarke, 2015, 7). This concept is represented in two norms:

1. Reasonable and equitable use of water
2. No significant harm principle

The Human Right to Water (as Human Rights generally do) stands above those principles (Leb, 2012, 4). While it is designed to ensure access to water to all individuals, it is often not the focus of water allocation discussions.

Generally, an upstream country would opt to base an agreement on the equitable use principle, securing at least a fair share, while a downstream country would prefer the "no-harm" principle, to prevent upstream states from splitting the resource (Jarkeh et al., 2016, 12; Elmusa, 1995, 233).

The "equitable use principle" was formulated in the Helsinki Rules (1966), a document from the International Law Association, which brought the topic on the international agenda for the first time (Katz and Moore, 2011, 3; Marchiso, 2000, 245). This was later complemented by the "no harm principle" in the 1997 Water Convention on the Law of Non-Navigational Uses of International Watercourses (Stoa, 2014, 583) by the UN General Assembly, albeit only ratified by 37 states so far (October 2020) and coming into force in 2014 (United Nations Treaty Collection, 2020). However, "the principles adopted by the Convention have become norms of international legal practice and contribute towards progressive development and codification of international water law" (Rahaman, 2009, 219).

These norms can oppose each other: "Presented in tandem, [it] is unclear [...] how the two should or can coexist" (Stoa, 2014, 583). There is a fierce dispute in the literature on which one is more important. Likely, it depends on the individual case: "No use of an international watercourse is inherently superior to any other use" (Lebotse, 1999, 176).

To find a solution for this clash between the principles, the ILA's Berlin Rules added the "vital human needs priority", which is only a small adaption to be prioritised over the others (Stoa, 2014, 584; Rahaman, 2009, 220f). In most cases this adaption does not solve conflicts, the literature review has not provided any successful examples of an application of this principle. Rather, it is argued that the focus on the most basic water needs shadows the relevance of a broader discourse (Goff and Crow, 2014, 161).

As norms are formulated vaguely they are interpreted differently. Many authors try to work this imprecision out, often beginning with the unclear terms of "equity" (Jarkeh et al., 2016, 12) and no "significant" harm (Leb, 2012, 5; Rahaman, 2009, 211). The narrative that lies behind it as well as how the numerous specific factors (Rahaman, 2009, 210f) are linked and included in the narrative define the quality of a state's argumentation and the outcome of water cooperation.

Interpretation becomes visible when international norms "[are] authored and continually negotiated by multiple actors who influence how the right is applied." (Karunanathan, 2019, 244). A problem is not that a norm is not being accepted, but rather that it will be interpreted to gain an individual advantage (Elmusa, 1995, 233f). Often, however, argumentations are not congruent: if one line of argumentation is based on cultural and historic reasoning, while the opposing argument focuses on scientific findings, a common ground is hard to find. This becomes apparent in the argument between Egypt and Ethiopia, see section 6.

Further, there is also a critique of those principles: Mekonnen (2010) states that vaguely formulated norms and unclear terms rather obscure the real problem than

helping to solve it. Garrafa and Porto (2003, 402) argue similarly when calling to stop veiling the explosiveness of water-related issues through soft term definitions.

Also, such principles tend to overlook other consequences: Lopes (2012, 252) sees the risk to lose sovereignty as one of the main hindering factors to water cooperation. Shuval (2000, 612) gives an interesting insight into why the Johnston plan (a resource developing plan for all riparians by a US ambassador) on the Jordan river was not adopted, arguing that by agreeing to it, the Arab states would have de facto recognised Israel as a state.

Although there has already been a shift from rights to need-based allocation principles (Wolf, 1999, 4), some authors still call for a deeper inclusive approach by including capabilities drawing on Amartya Sen. "Water capabilities can be defined as those abilities one can perform by means of water. They could be applied to a multitude of scales, including but not limited to: humans, households, ecosystems, animals, cities, nations or even the entire planet" (Vink, 2014, 743f), thus enabling a meaningful rather than a basic human life (*ibid.*).

In sum, norms are deliberately formulated vague and therefore subject to interpretation. international norms on water try to encourage cooperation among states and can shape negotiations, even when not ratified by all states. They work through reducing external factors such as unequal power relations. This might work in the protected UN setting, but as will be shown later it does not in practical cooperation ambitions, see section 5.

4.2.3 Modelling

There are a lot of modelling approaches, particularly case specific water allocation (Mimi and Sawalhi, 2003, Shuval, 2009; Phillips et al., 2007b; Ringler et al., 2004) or alternative water sources to minimise water stress (Chandrasekharam et al., 2020). Other authors compare different allocation models in general terms, i.e. Juizo and Lidén (2010).

Most models try to put the UN-principles of equitable use and no significant harm into practice, They assess the availability and demand of each riparian, depending on multiple factors such as population size and economic demand to find a fair allocation scheme.

As most modelling approaches to estimate water use, distribution, and the likelihood of cooperation are based on game theory, I will shortly introduce some general characteristics: Game theory originates from an economic background, which is noticeable, as water is typically seen as a commodity with a monetary value. Game-theoretic models are both used to explain prevailing situations and to suggest solutions to existing disputes. A game has players with goals and rules. The goal of water coop-

eration is stability and certainty through treaties. Stability exists when all players are sufficiently happy with the situation, in this case with their share of water. Hence, it is crucial to find incentives that make the players willing to cooperate. Game-theoretic models for water cooperation try to find out whether it is possible to find positive-sum games where all actors would gain. While equity is difficult to achieve, authors often start with equality as a proxy (Phillips et al., 2007b, 46). Phillips et al. (2007b, 51) suggest assessing demand and alternative water sources jointly to receive a full picture. It is assumed that players are acting rationally to maximise their benefits. As such, stable cooperation is only likely when states receive incentives that surpass the status quo (Jafroudi, 2018, 709f). While players and goals are identifiable, rules are typically not clear nor necessarily binding. Rules rely on a stable setting, international debates however do not have such but are set up individually for every debate.

Referring to water, Jafroudi (2018, 710) assumes that water is limited, uni-directional, thus the downstream country depends on the upstream's goodwill, water transfer, or other forms of compensation. In most models in the literature, there are only two types of actors, upstream and downstream countries, the first generally seen as prioritised (Liu et al., 2020). Yetim (2003, 5) adds that the sheer fact is enough to put upstream states in a generally better bargaining position. The extent of cooperation is dependent on rival or un-rival and exclusive or un-exclusive uses of water resources (ibid.). While similar to hydro-hegemony concepts in those points, game-theoretic models usually expect and find that there is room for mutually benefitting cooperation.

The risk in game theory is non-compliance: Jafroudi (2018, 711, citing Rinceanu) sees three reasons for non-compliance:

1. Lack of capacity
2. Lack of resources
3. Lack of diligence or will

Most interesting is the last point, as it could instantly be changed. It results from varying expectations, private information as to what are the minimum settlement conditions, and the expectance of delaying strategies (Yetim, 2003, 10). A country's risk of non-compliance is considered as high in international relations (Jafroudi, 2018, 711f). As there is no international authority to legally punish treaties violation. Side-payments or cost-sharing schemes could help to promote cooperation on the local level (Zagonari and Rossi, 2014, 70). Also, previous experiences with each other can determine current negotiations (Jafroudi, 2018, 713).

According to game theory, successful cooperation can emerge, when cost and benefits are balanced better than without cooperation, which can be managed by high

consequences of non-compliance. On the other side, cooperation stands at risk when a deviation is detected (Jafroudi, 2018, 713). Yetim (2003, 4) adds that "crises generally arise when there is an actual or projected discrepancy between total water demand and supply of the watercourse, or when there is a substantial decrease in the quality of water with subsequent detrimental effects, which are primarily economic but also social on lower watercourse states".

The advantage of game-theoretic models is that they try to find a direct translation from theory into practice. Such models simplify to make situations easier to understand and to measure. The disadvantage is that the real complexity is being lost: players are usually not sufficiently characterised, especially in terms of power. Only very few articles do include the term, some left it out intentionally (Jarkeh et al., 2016), none defined what explicitly is meant by it.

Also, they often argue from a moral perspective with terms like "fair allocation", while at the same time being quite rational on demand numbers and other measurable factors. This stands in contrast to the UN principles of "adequate amounts of clean water" (Goff and Crow, 2014, 164). Often, numbers of minimal use for human life are used as basic estimates. Critique comes also from Goff and Crow (2014, 165) and Dinar and Nigatu (2013, 3), demanding for allocation models that created capabilities, not quantities, as a better interpretation of equity.

One further problem with such models is, that the findings only apply to one moment in time. Only a relatively small domestic change can render the whole model useless as new ideas, strategies and interests emerge. Further, often not all relevant actors are included; and actors do not take decisions one after the other, but continuously, simultaneously, and independently (Yetim, 2003, 7).

Other modelling approaches are mainly qualitative analyses on allocation questions. Jarkeh et al. (2016) lead a theoretical negotiation for distribution analysis with numerous cultural, historical, or economic factors included. Spring (2007) builds up a multilevel diplomacy model with all actors, including human, gender, and environmental agents pooling their expert knowledge to find common grounds. Zagonari and Rossi (2014) develop a software-based preference system to facilitate flexible negotiation, based on variable allocation rules, equality in rights and responsibilities, priority for demand management over supply management, monitoring of water quantity and quality, and mediation between competing water use (Zagonari and Rossi, 2014, 82). Other authors build more complex estimation models, arguing that successful water agreements are more likely and economically profitable when linked to other benefiting cooperations like politics, energy, finances, or data sharing (Dinar and Nigatu, 2013, 14; Wolf, 1999, 13).

4.2.4 Legal Perspective

There is no specific starting point for treaty-making, rather customs become rules over time until states decide to securitise them. Dellapenna (2001, 267) illustrates this process by a meadow between two villages without a way at the beginning, until people start to walk over, establishing a path over time, until in the end it is no longer accepted to walk beside the path. Treaties then can either harden such customs or challenge them by establishing new or adapted rules. As such, treaties and agreements become a fact in international water cooperation. There are securitised rules, and states themselves have signed to follow them. While agreements generally reflect the will to cooperate, the difficulty lies in finding the conditions which respect all parties' interests. Following Dellapenna (2001, 266), I differ between special and general customary laws, the former only applying to those who signed, the latter applying generally unless a state explicitly resisted agreeing (see 4.2.2. Local treaties, however, can also become influential international law over time (Wolf, 1999, 4).

Legal documents try to solve potentially conflictual situations permanently. Treaties on water bodies are usually regional agreements between riparians only. However, as Yetim (2003, 9) illustrates, agreements are often found to be agreed upon by some rather than all riparian states.

The advantage of treaties is that they have the potential to stabilise the situation between states and clarify property rights (Jafroudi, 2018, 708; Wolf, 1999,4). Thereby they can prevent unfavourable behaviour between states, like illegal coercion or grabbing. Furthermore, treaties can facilitate information exchange, even leading to joint management institutions (ibid.). Because of all these factors, treaties are a powerful means to prevent open conflicts. Since treaties are only useful when parties comply with it, this is assumed in this section. Compliance is likely when "First, the terms of the agreement [are] acceptable to all sides. Second, at least in appearance, the benefits of reaching an agreement [...] exceed violence or the status quo. And third, all watercourse states [...] believe that securing better terms is unlikely" (Yetim, 2003, 10).

The disadvantages of treaties become apparent in the context of water. The biggest is the low flexibility (Jafroudi, 2018, 708; Talozzi et al., 2019) . Water is a very dynamic resource, and often not behaving the way one would expect it to behave; this includes not only the natural flow but also its demand is fluctuating over time and space. Treaties, especially when they are designed to be valid for long periods, need certain built-in flexibility and need to be adapted continuously. If they are too rigid, they encourage free-riding from negatively affected states (Jafroudi, 2018, 708). This is particularly the case for multilateral agreements. To avoid this inflexibility, authors try to promote short-term agreements, which are more predictable and less

uncertain, and try to make it a natural condition to negotiate the follow-ups (Jafroudi, 2018, 708f), taking into account the determining factors, like changing population size or water supplies.

A further hindering point for complying with treaties can be a lack of institutional and financial capacities (Nanni, 2016, 639), or incomplete or outdated treaties (Frenkel, 2016), sometimes even relicts from colonial times (Nanni, 2016, 640). The question of how far the latter is to be included is particularly difficult to answer when a new agreement is set up (Abseno, 2013). Furthermore, when resources become scarce, the question arises how this burden is to be shared (Appelgren and Klohn, 1997, 91).

Most of the international water treaties reflect international norms (see a comprehensive analysis by (Rahaman, 2009)), however, in case of dissent, it is national courts judging: As Brooks (2007, 228) notes "'rights' are only as strong as the governments that support them". There is no international court interpreting whether an action complies with multi-national treaties. Soyapi (2017) gives an insight into what consequences the interpretation of principles like the human right to water by national courts can have on individuals, emphasising the need to be more precise for securing safe and sufficient water for everybody.

In reflecting norms, a treaty serves to set commonly accepted rules, there is always room for interpretation. Especially powerful states can try to imprint their version by discourse shaping and agenda-setting, before the treaty comes into force, to push the realisation of a treaty in his interests. The process of treaty-making can further be hampered by unclear property rights (Matthews, 2005), volatile political structures (Yetim, 2003, 10), unclear information, due to unveiling it purposefully or due to misunderstanding or delaying strategies (ibid. 11), variability and uncertainty of supplies (Appelgren and Klohn, 1997, 91), among others.

Sometimes treaties on watercourses establish a neutral third party, i.e. a joint commission or expert groups, to mediate the process of treaty-making and respond to changing conditions promptly (McCaffrey, 2014, 14; Appelgren and Klohn, 1997, 92; Talozzi et al., 2019, 914).

4.2.5 Economic Perspective

The conducted literature search yielded few articles on economic perspectives, split into privatisation and water trading approaches. This is surprising since economic models seem to be plausible for many international actors.

The underlying assumption of privatisation of resources is that a private company provides better and cheaper services to the community than the state could give (Boelens and Zwarteveen, 2005, 736). The risk is that market allocation favour the user who is willing to pay most. Particularly in weak states, without the institutional capacity

to deliver water services, economic allocation becomes interesting.

Water trade on the other side is especially relevant for states that experience scarcity. Water trade allows to import water, either virtually (in form of ready products) or as water itself. Water is then exchanged under free-market conditions. Such trading is often part of an agreement of a water body; i.e. the permission to build a dam could be bound to an exchange of water

Both approaches are unified in the idea to put a monetary value on water and focus on its efficient use (Boelens et al., 2007, 97). Monetary considerations can thereby help to assess whether water is used efficiently (Boelens and Zwarteveen, 2005, 735). On international rivers, it is often the case that the more efficient use can be obtained through irrigation and export of fresh products in upstream states, rather than releasing the flow to inefficient uses in downstream states. "As with any other economic good, countries have the potential of allocating water to areas in which it produces the highest economic return" (Dinar and Nigatu, 2013, 2). Furthermore, investments and maintenance in water infrastructure, water savings, tax revenues, and reforms towards democratisation are often expected to be positive side-effects (Boelens and Zwarteveen, 2005, 744). In building up stable relations, water cooperation for economic benefits can become a favourable target.

Water trading approaches can fail, " because of the complexity of the transaction costs associated with its establishment and operation." (Dinar and Nigatu, 2013, 13). Thus, economic approaches to water allocation are controversial in academia. One major problem is that privatisation and water-trading may oppose international principles (i.e. human right to water), as they do not prioritise vulnerable groups (Karunanathan, 2019). Since water in its basic uses for drinking, sanitation, and irrigation cannot be substituted, Appelgren and Klohn (1997, 92) argue it cannot be traded. One more conflict point is the question of how to share costs and benefits (Wolf, 1999, 7f).

Furthermore, water economy might miss finding a language that is understandable to local communities since it relies deeply on Western liberal terms (Boelens and Zwarteveen, 2005). Yet the idea to focus on efficiency rather than traditional collective rights is hard to understand for local communities with a different cultural imprint (Boelens and Zwarteveen, 2005, 737). Defining the dominant language and values of water discourses is an implicit consequence of prevalent power structures.

4.2.6 Non-state Actors

Just recently publications about non-state actors emerged mostly social or grass-root movements. But non-state actors can also be companies, international organisations among others. Most articles found in the literature focused on vulnerable communities in specific regions. Non-state actors challenge the fact that international organisations

and laws are mainly concerned with intergovernmental relations, assuming that the state knows what is best for its people and behaves accordingly. Both conditions must not necessarily be satisfied. Hence, non-state actors tell us, that there is not just one nation-state's perspective (Lopes, 2012, 253; Suhardiman et al., 2017).

As such, the research on non-state actors is very different from hydro-hegemony concepts and is also difficult to be transferred in modelling approaches due to its divergences and many facets. "They [social movements] comprise a dynamic and complex set of hybrid rules, rights and organizational forms: a tremendous diversity of context-defined 'sociolegal repertoires' or 'normative systems' can be found that generally combine non-local rule-making patterns with local organizational arrangements, frameworks of rights and rules for water distribution, system operation and maintenance " (Boelens et al., 2007, 96). Social movements challenge broader societal concepts by representing marginalised groups (Boelens et al., 2007, 103; Earle and Bazilli, 2013), in this context often small-scale farmers or communities, depending on watercourses for irrigation. Other than hegemonic and modelling approaches, UN norms try to include non-state actors by focusing on comprehensive participation; however, decision-making naturally remains in the hand of states.

In contrast to states, non-state actors usually position themselves with a clear standing, they stand for something and against something else (often the establishment or a certain plan). It is very specific and very clear which agency they follow. Non-state actors use different techniques and tools to follow their goals, as other traditional players on the international level. They use symbolism to gain power and become influential, see i.e. (Moreira et al., 2019, 89f). They frame actors in a certain way to influence their perception (Dupuits et al., 2020, 1), or to use them as a flagship (van den Berge et al., 2018, 236). They frame situations in a certain way, especially when they say who benefits and in which way (van den Berge et al., 2018, 226, 230). Hence, they create a narrative and try to convince traditional players, i.e. states, to adopt it (Moreira et al., 2019, 91). The overall goal is to push public awareness on various levels, i.e. through regional cooperations or on a supranational level (Nanni, 2016, van den Berge et al., 2018).

This is particularly difficult since this must be embedded into local culture: "Framing problems and solutions is based on world views, as well as on strategic representations of reality. In this sense, social movements are cultural and political, with a strong political role of discourse, values and ideas" (van den Berge et al., 2018, 233).

A further challenge non-state actors face is that they must impress both sides of a conflict, the ones they need as a support for their claims, but also the ones whose behaviour they intend to change (Moreira et al., 2019, 89f). As Dupuits et al. (2020, 2) say: "What is fundamental is that transnational grassroots movements symbolise the awareness of a shared cause between actors previously isolated from each other".

Non-state actors were traditionally locally or regionally active. In the recent past, there have been more trans-boundary movements and international campaigns. This process is accompanied by the emergence of international governance theories (Dupuits et al., 2020, 2). This is an advantage as they are more influential. At the same time, more bureaucracy is needed and the risk to lose proximity to local people arises. It is also a challenge to organise such a movement, financially, but also in terms of cultural differences, to find common interests and adapt demands to differing local situations (Dupuits et al., 2020).

The concept of power is neglected when the role of non-state actors is analysed in the literature. However, the success of such organisations can be explained by power, particularly with power sources other than traditional, like framing the debate, shaping the discourse, and diffusing norms (Boelens et al., 2007, 99f). The fact that there are non-state actors, being powerful, despite not being hegemons (or similar to such) (Karunanathan, 2019, 244), is a justification for using the concept of power.

4.2.7 Disputes

Disputes are often initiated for other reasons than water, but water comes increasingly in the focus of disputes and can fuel conflicts and increase tensions (Kaniaru, 2015, 384; Gleick, 2019).

Disputes can either be about water itself as a resource or water as a tool to reach other goals. The first can be divided into rival and un-rival uses of water (Tilmant and Kinzelbach, 2012): A hydro-power plant would usually have less conflict-potential as it does not affect the total flow of water, whereas an irrigation scheme consumes water and reduces the downstream flow effectively.

The latter could be i.e. to stop the flow of water to another country to put pressure in negotiations, as shown in the example of Middle Eastern conflict, "water as both targets and weapons of conflict" (Gleick, 2019, 5), or to gain international support. Then water is a source of power, not the capacities you have, but the capacities you are capable to build up. An interesting example here is also the fight for the Sarsang reservoir in High Karabakh; while being a humid region with sufficient water supplies, it was long argued to be a controversial issue that prevents conflict solving of the broader situation (Leylekian, 2016). Now, however, it becomes clear that the conflict has broader roots than that, making water a minor factor to it.

Assuming conflicts on international water bodies to take place only between states is too simplistic. Conflicts emerge when the handling of water disrupts a population's life. Hence, while dispute solving treaties for international water bodies are made between governments, conflicts are possible on the local level. Here, again, the role of non-state actors and international norms become relevant (Gleick, 2019, 11).

Conflicts can also arise when information gaps occur. The Mekong is excessively

exploited for hydro-power by China, and downstream farmers complain about a lack of information, when water is released and when dry periods occur. This is not only a question of between-state communication; in the case of the Mekong, China claims to inform on state-level and the detailed information gets lost within the riparian countries. Also, the wish to control a resource might turn apparent apolitical projects (i.e. hydropower plants) in the focus of opposing parties, since the overall power relation might be affected (Suhardiman et al., 2017, 352).

While having much potential to escalate, water wars remain rare. There is even a trend towards negotiating agreements rather than armed conflicts (Jarkeh et al., 2016, 9). This can be explained by the fact that wars are costly and depend on various factors, including political, economic, cultural, religious, and historical (ibid, drawn from Gleick). Although not in the scope of this work, it should not be underestimated that climate change can aggravate potential conflicts (Algamal, 2011).

5 LITERATURE ANALYSIS

The literature review showed that power is only marginally included in the current publications on water cooperation. This is surprising since international relations assumes power to be the driving force for relations between states. As Barnett and Duvall (2005) note, although power becomes visible in conflict, it is still there in cooperative times. Besides, as Zeitoun and Warner (2006) showed, most relevant water courses create disputes between the riparians; even if no open wars are observable, there is still conflict potential around water. In this section, I will therefore go into detail with how power does influence the relation of riparian states, giving a special focus on non-traditional power sources, which seems advisable in the realm of applied international principles.

5.1 Power and Water

Power and water are interrelated, this has been shown in the literature review twofold: water is needed to create power on various levels (feeding the population, developing the economy, create a safe environmental system, etc.), while water can also serve as a tool in exercising power (restricting other's access, flooding, polluting, etc.). Access to water is the key to a healthy population, thus securing a good starting position in international relations.

According to the United Nations, some 42 % of the world's surface is covered by international river basins, with 2.8 billion people living there (Carvalho-Resende, 2017), a population that is expected to strongly increase in the next decades. Together with economic development and climate change, pressure on existing water resources will increase. Hence, water rivalry will intensify, making it more important than ever to find agreements, and suggesting that power and water will be interrelated increasingly in the future. Water is the key to gain power and exercise power.

The lack of literature on the power-water-cooperation nexus is unfortunate, as it reveals an insufficiency in already existing debates: many concepts as hydro-hegemony, norm development, or economic approaches like benefit sharing or efficiency to water have the power concept lying behind, still it is only rarely analysed explicitly. Part of the problem might be a too limited power concept since the term is often closely linked to realistic schools.

However, referring back to Barnett and Duvall (2005), water is a perfect example of how manifold power sources and ways to exercise it are:

1. Compulsory power as a direct action by an agent, i.e. withhold water intentionally

from another state,

2. Institutional power as a diffuse demand by an agent, i.e. regulating the access and use of water with institutions and design water discourses that demand a certain way to argue,
3. Structural power as a direct consequence of a system, i.e. determination of interest in and behaviour towards the resource by a state's identity in relation to others,
4. Productive power as a diffuse consequence of a system, i.e. that water allocation is built on certain norms and values that can be reshaped and newly imprinted, thus become guidelines in the future and give advantageous bargaining positions to its producer

It is crucial to include and understand the power-concept that promotes or hinders international water cooperation; the fact that some states argue on the base of either the no-harm or the equitable use principle, thereby giving it a priority and refusing to build the debate on the other, gives strong justification for how power is exercised directly. States which can set the agenda of a debate are in a better bargaining position (Yetim, 2003, 9). All sources of power support a state's standing in water cooperation. To initiate cooperation shows the will to a shared agreement, while it allows at the same time to strategically design the setting, establish a certain culture of debate, and imprint norms that are to be valued (ibid.). Hence, to alter the status quo might be a good way to increase power for the hegemon, as he can dictate the rules, promote an agreement mirroring his interests, and enforce it on weaker states that profit from having the certainty rather than nothing at all (Zeitoun and Warner, 2006, 447; El-Sayed and Mansour, 2017).

A skilful hegemon will find an acceptable share for other riparians, to decrease the risk of alliances against him (ibid.). By including other incentives than water, the hegemon can offer beneficial arrangements that cannot be neglected by others (Dombrowsky, 2010, Dinar, 2009). Then it becomes very unlikely that a weaker state challenges the agreement and risks a conflict; steering the management of a water body remains in the control of the powerful state. From the hegemon's perspective, one further advantage of initiating an agreement is, that the debate remains local and under his control. It will then not move in the realm of international organisations, which might set other agendas, work in an already established way that does not benefit powerful states, or even give weak states power sources that encourage counter-hegemonic action (Zeitoun and Warner, 2006, 454f). Weaker states, however, can profit from a broader set of players, that allow interactions that assimilate interests over time

(Wendt, 1992). This shows that the hegemon can be less powerful in the international field since non-traditional power sources endanger his position. By recognising this fact, it becomes clear why most agreements are not subject to international organisations, but rather take place between riparians only.

5.2 Cooperation on Water

"An agreement benefits all parties"- is often argued, but seldom explained in the above-mentioned literature. While it might be a fact that there is no open conflict, and there is an effort to find agreements, this must not be a reason for states to formulate treaties. In contrast, it might also be the case that power relations define the situation: there would be conflict, if one weak party tried to challenge the existing order or if various states were in similar power positions and there would be agreements if the hegemon decides that this would give his position more stability (Daoudy, 2008, 90).

As argued by game theorists, the precondition for a cooperative on water resources is that all parties perceive having a benefit from it, compared to the case of unsolved dispute or rivalry. States cooperate when they profit and get into a conflict when their interests differ in how to manage the watercourse. Cooperation might be easier to establish when there is little disagreement between the parties, however, it becomes more important the more the rivalry and disunity are experienced (Warner, 2012, 179). In water relations, the main hindering factor to cooperation is rivalry about the resource, since water is not unlimited. When water becomes scarcer, as is the case due to higher demand nowadays, a paradox occurs: on the one side, states want to secure as much as possible for themselves, on the other side doing so works cheaper and more reliable with agreements regulating the flow and allowing the construction of water infrastructure without time pressure (Tilmant and Kinzelbach, 2012).

International organisations encourage cooperation to avoid war, thereby exercising power by designing a setting for debates, that tries to replace unequal power relations between states by shared principles, or through other incentives like funds or foreign support.

However, the interesting fact with water is that there is no substitute, and the lack of water can put a whole state at risk. On the other side, cooperation can increase the overall productivity of a water body, a strong incentive to cooperate even in disadvantageous positions (Sadoff and Grey, 2002, 396ff). Also, compensations can help to offset unfavourable positions or concerns over equitable distribution to involve all riparians in negotiation (ibid.).

As will be shown in the case application, cooperation is even sensible for maintaining power; as it cements existing relations. It is important to note that benefitting from cooperation cannot be assumed to be the same as winning. It is hard to imagine a

game in which all parties win, yet for the simple fact that in reality not all factors and consequences are known; situations can turn out to be different than expected, or even the interests of a state can change. In the end, what counts is whether states perceive to have profited, not whether they have or not in absolute terms (Sadoff and Grey, 2002, 396). But also, winning would mean that all own goals are represented through the cooperation while gaining or benefitting yet happens when one can influence the respective debate in the course to get closer to his best interests. As Finnemore and Sikkink (1998, 904f) argue, the automatic internalisation of new norms is extremely powerful in serving its authors position, as it becomes natural and thus hard to discern.

Also, certainty and predictability can yet be the trigger for cooperation (Lopes, 2012, 256). Unlike other potential conflict situations between states, the dependency on water encourages cooperation, since conflict is a "worst for all" scenario. Conflicts are cost-intensive, they disrupt the living of a whole population, and the chances to end up better than before are small in water issues (the only option to change the broader setting would be to occupy foreign territory and thus alter the own power position) (Dinar, 2009). Sustainable water management can take place domestically or to a greater extent through international cooperation and joint management. Although this does not exclude the possibility of war, it certainly reduces war as an easy way to go. Often, the prevention of further harm is more sensible than conflict (Yoffe et al., 2001).

5.3 Norms in the International Field

Norms and principles in the international field are designed to be acceptable and sensible for all international actors. While the sovereignty of states is generally taken for granted, norms appeal to morality and the wish of social recognition in a (world) society (Wendt, 2004, 293f). Some of such norms are in continuous debates, being permanently reinvented (according to the zeitgeist (Finnemore and Sikkink, 1998, 909)), while other are assumed to be relatively fixed (long-term moral standards as the human rights (ibid. 906ff)), strategically corresponding to the needs of international actors (Hurd, 2008, 13). When norms emerge, international organisations are useful platforms to share and establish them, as they can imprint them as principles to discourses. Distinctive of norms and principles is that they fully rely on voluntary respect. Norms serve as guidelines for water cooperations, but they are formulated broad enough to be 1. applicable to whatever water body and 2. to be accepted by states, which will only happen when they do not interfere with states' internal politics. Besides, there is no central authority with the prerogative of interpretation. In water issues, this becomes important when weighing a factor towards an equitable and no harm allocation scheme "by its importance in comparison with that of other relevant

factors” (United Nations Treaty Collection, 2020, Art.6). Since these factors include geological, social, and economic aspects, as well as an analysis of uses, plans, and consequences (ibid.), it becomes apparent that the translation into an agreement requires intense discussion and will not necessarily result in a “truly equitable” distribution (Vink, 2014, 749f; Finnemore and Sikkink, 1998, 893).

Despite their unclear adoption, norms express power structures in the sense of pre-defining what arguments are permitted, valuable, and convincing (Habermas, 2015).

While international organisations often serve as an incubator for norms, processes of their development happen wherever norms are tried to be translated into practice as is the case with water norms when finding locally binding agreements. While on the international organisations level, we assume equality or at least equity between states, on a regional level and concerning a real-world issue, states will try to interpret the norms in their favour. Norms remain in the ambiguity of exercising power themselves and being subject to it.

5.4 Norms and Power

Norms and power stand in a two-sided relation to each other: First, if norms are established in institutions and generally accepted in the discourse structure, they exercise power (see above). Second, this power is original to the state or states who created, spread, adapted, or renewed those norms, since their interpretation is beneficial to them, and if diffused further, creates a space in which they can promote their interests with reference to those same international norms. Hence, a good line of argumentation and clear framing is likely to be understood and accepted by other states, which in turn makes it powerful. Leong and Lejano (2016) also speaks of a “thick narrative”, meaning that formerly unconnected norms and practices merge to a shared conglomerate in the core that defines further resource handling. Similar to traditional alliances, a shared focus on strong and fitting norms creates power with the possibility of overthrowing the status quo (here the current commonplace interpretation of water norms) (Raymond et al., 2014, 4f). Using norms to construct water agreements can be the golden path, even for weaker states, to jointly overcome hegemonic structures: As (O’Neill et al., 2004, 162ff) show, such social change is a consequence of an individual’s action and can be strengthened through iterated cooperation of various actors.

Accessing power through norms is especially interesting for traditionally non-powerful states. This challenges the traditional concept of power since it allows power relations to change relatively easily and at low costs. For powerful states, this means that the way to remain in their position must be a cooperative one since then they can deter-

mine the discourse and set the agenda (Daoudy, 2008), rather than being forced from an alliance to accept their interpretation. It is interesting to add that Western states have yet established such a routine by giving a certain amount of power to developing states (via a voice in the UN committees, funds, etc.), while designing the rules for international behaviour, thus transferring the power from themselves to institutions, which represent themselves in their virtues (Barkawi and Laffey, 2006). Here, the shift from compulsory power to diffuser concepts like institutional power, structural power, or even productive power becomes visible, as illustrated by O'Neill et al. (2004, 156f, 168) through an analysis on how non-state actors gain influence by imprinting and promoting international norms. The same can be observed in international organisations, that help weak states to improve their bargaining position (Schneider, 2011).

Power analysis contributes to explain the outcome of international water cooperation. The debate for agreements on water bodies gives the hegemon a space to frame the discourse referring to international norms, thereby increasing his bargaining power and obtaining favourable results. But also for weaker states setting the agenda, designing the culture of debate, or even adapting the setting to the own arguments by reframing norms can result in power gains.

As will be illustrated in section 6, states tend to choose the narrative that benefits them; they refer to generally applicable principles but put them into a line of argumentation that goes along with their goals. It must however be noted, that while treaties are often built on normative rules, the debate on water is not always about the resource itself; norms can also be exploited as arguments for non-related disputes (El-Sayed and Mansour, 2017, Lylekian, 2016).

Since open conflicts on water are rare and least favourable for all parties, traditional power sources have little explanatory power on this issue. I argue that framing the debate can cause strong power shifts, and even change the hydro-hegemonic position, due to its manifold tactics and its sustainability in the long-run. Power relations can change, when bargaining is applied skilfully, as I will show on the example of the Nile in section 6.

6 CASE APPLICATION: THE NILE

6.1 The Nile Basin

The Nile has long been in the interest of academic research, both in the natural and social sciences. Its sheer length of approximately 6650 km makes it a river crossing various territories and giving life to a great variety of people, animals, and plants. Its relevance throughout the centuries made it a cultural symbol, especially in water-scarce regions where it was the only source of fresh water. This also made the Nile a matter of constant disputes, culminating after the era of colonisation and intensifying until today. Although there have been many attempts, there is still no comprehensive agreement between all eleven riparian states. Today, the population of Nile basin countries consists of 487.3 million people, with 53% depending exclusively on its water (Nile Basin Initiative, 2016/17a). The two main contributors to the Nile are the Blue and the White Nile (around 85% resp. 15%), the former originating from the Ethiopian highlands, the latter crossing all other riparians while making its way north from Burundi, Ruanda, and Tanzania, passing Uganda, and South Sudan, merging with the Blue Nile in Sudan and flowing into the Mediterranean Sea in Egypt. Parts of the Democratic Republic of Congo, Kenya, Chad, the Central African Republic, and Eritrea also belong to the catchment areas of the Nile Basin (see figure 7). In terms of power, Egypt with its long culture of ancient civilisations has been the Nile's uncontested hydro-hegemon for a long time. Yet in 3100 BC, Egypt started to build advanced irrigation systems, thus making a water-scarce region flourish. Most other nations were and partly still are much less developed. Ethiopia, long times the only stable African kingdom apart from Egypt and situated in the humid mountainous regions, did not depend exclusively on the Nile water. Until today, Egypt and Ethiopia are the most powerful nations of the Nile Basin, however, their competition on Nile water has increased, and so did political tensions. Skilful Ethiopian tactics challenge the old power relations, making it possible to think of a radical shift in hegemonic status.

6.2 Colonial Heritage

British colonial rule in the Nile Basin began in the 19th century and remained until the 1950/60s, when North and East African states became officially independent (Egypt became independent in 1922, but remained under strong British influence). Ethiopia is an exception since it was the only independent nation in Africa during colonial times (except for a short occupation by Italy during the Second World War). With the Anglo-Egypt agreement of 1929 Britain reinforced Egypt's traditional rights to the Nile's water. Sudan was the only other country that was guaranteed a slight share too. 30 years later, the treaty was adapted to increased amounts of water for both Egypt and Sudan

Ethiopia's new Nile dam



Figure 7: Map of the Nile River and its Riparian States, drawn from BBC (2020)

(1959) with fixed numbers of annual flow (Republic of the Sudan and the United Arab Republic, 1959).

Those treaties granted veto power against all upstream uses of the water (Abseno, 2013, 194). All other riparians were not represented or acknowledged in those treaties, nor were they consulted. In consequence, when becoming independent the upper riparian states opposed to complying with the treaty, arguing they haven't signed to it (Mekonnen, 2010, 434f). Egypt and Sudan, in contrast, insisted on their beneficial rights on the Nile water and were unwilling to set up a new treaty that would have given shares to all riparians. This status remained unsolved through the coming decades, with upstream states, even against their will, de facto respecting the bilateral treaty of Egypt and Sudan (Dinar and Nigatu, 2013, 13). There was no legal basis to claim water rights and challenge the imposed order until the 1966 Helsinki Rules, which were drafted from the International Law Association, and became customary law only over time (Abteu and Melesse, 2014, 567). The decades after the end of colonisation were then only characterised by technical cooperation: the 1967-1992 HYDROMET (Hydrometeorological Surveys Project of the Upper Nile) and the 1993-1999 TECCONILE (Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile) (Nile Basin Initiative, 2016/17*b*). The chronic of Nile specific agreements and international principles (see figure 8) illustrates this process. It shows that international norms on non-navigational water uses emerged only in the second half of the 20th century. Specific agreements, often bilateral, emerged earlier but were imposed by Western third states rather than riparians. A transition to cooperative management of water resources can be observed in the aftermath of colonisation, when norms shifted from total to limited territorial sovereignty on natural resources.

6.3 The New Millennium

In the 1990s efforts began to intensify comprehensive cooperation on the Nile waters. Many authors spoke of a new era in the Nile's history, hoping for trust-based cooperation fostered by the international community through donor incentives, as successful on other international rivers (Appelgren and Klohn, 1997, 93). In 1999 the Nile Basin Initiative was founded to find a new agreement with all riparian states. But although having numerous debates and negotiations in different settings (bilateral, comprehensive, with third-party mediation), no solution was found. Especially the old cleavage of interests between upstream and downstream riparians on how to integrate the existing treaty remained. Egypt and Sudan would only agree to a treaty that would respect the old order, thereby remaining in an advantageous and powerful position (Abseno, 2013, 193). Egypt's argumentation was built on morality and traditional rights and cultural identity: the Nile as "Egypt's bloodline" (El-Sayed and Mansour, 2017, 236) became

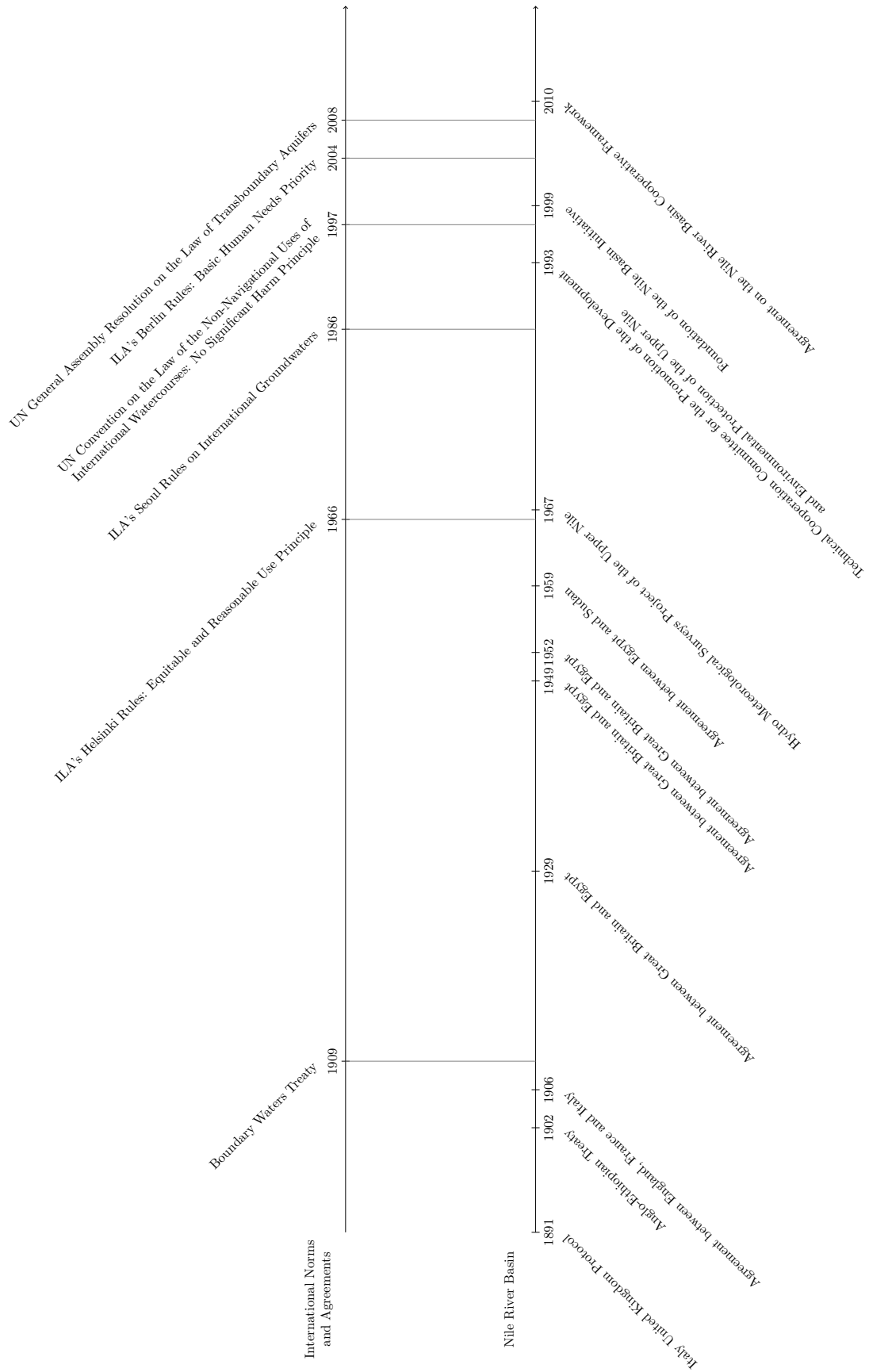


Figure 8: Time Line of International Principles on Non-Navigational Water Uses (Upper Line) and Nile Specific Agreements (Lower Line).

the illustration of Egypt's need for Nile water for irrigation, also the whole Egyptian life is built on and around the existence of the Nile. The symbolic language Egypt used in debates was however replaced by the emphasis on the no-harm principle with the introduction of the UN water convention in 1997 (Yohannes and Yohannes, 2013, 5). Ethiopia, in contrast, with a new interest in the Nile's water for hydropower generation, increasingly based its claims on scientific facts, such as the advantage of storage basins in their territory with much less evaporation (Demin, 2015, 204; Yohannes and Yohannes, 2013, 6). The different ways of argumentation are a hint on why no agreement could be found. The promising air rapidly faded, the agreement was further delayed by Egypt in the assumption that upstream developing states were not to challenge the situation genuinely (Yetim, 2003, 11), until in 2010 the NBI was reestablished as a great joint initiative for the Nile's water management including all states except Egypt and Sudan.

The situation intensified when Ethiopia announced to finally build Africa's biggest hydropower dam on the Blue Nile. While Egypt naturally opposed those plans, Ethiopia skilfully worked on an increasingly powerful position using various sources without directly challenging Egypt: the dam would reward them physically with exploration potential, at the same time promoting relations to other regional states due to hydropower trade (including Sudan), and foster relations with foreign investors and engineers (Demin, 2015, Hammond, 2013). Also, Ethiopia made itself be known on the international level by making peace with Eritrea, which was even rewarded with the peace prize for prime minister Abiy Ahmed. Furthermore, Ethiopia showed a willingness to negotiate a deal before realising the dam to comply with international norms, while at the same time demanding the African Union rather than a Western organisation to lead the debate; a smart move that would benefit Ethiopia more than Western-backed Egypt (Ethiopian News Agency, 2020). Using those various channels, Ethiopia managed to stepwise increase its bargaining power, while outmanoeuvre Egypt's hegemonic position. Yet in 2003, Yetim (2003, 7f) observed: "In the long run neither Egypt nor Sudan can deny the upper watercourse states' right to use the Nile[...]. Furthermore, the failure to date of Egyptian efforts to persuade the upper watercourse states to recognise its share of the Nile waters can be interpreted as an indication of Egypt's weaknesses as a hegemonic state to impose a comprehensive agreement for the Nile".

6.4 Current Development

Just recently, it seems that Egypt, long recognised as the Nile's hydro-hegemon and most powerful nation loses its dispute with Ethiopia about the Grand Ethiopian Renaissance Dam (GERD), releasing an opportunity for a major power shift in the region.

Even without an agreement found, Ethiopia started building the GERD in 2011 against Egypt's protest. At the moment of writing, the dam is build to 75%, and the first filling was conducted in the rainy season of July 2020. From the beginning of the construction work onwards, an agreement ideally including all riparians, but at least Ethiopia and Egypt, was tried to negotiate. The 2015 Declaration of Principles on the Grand Ethiopian Renaissance Dam between Ethiopia, Egypt, and Sudan demonstrates the states' will to cooperate under the principle of equitable use (Nanni, 2016, 640f), however it remained a signal. Under the mediation of various international actors like the World Bank, the United States, and the African Union, no deal was found so far (Taye et al., 2016, 4).

The reason for Egypt to oppose the dam is officially the risk of a decrease in water flow (Sudan shares this concern, however, is also interested in the hydropower) (El-Sayed and Mansour, 2017, 235). In addition to physical uncertainty, however, Egypt suddenly finds itself in a typical downstream situation, being exposed to the goodwill of powerful upstream states. As noted above, this is partly a consequence of not securing a major share earlier, thus allowing the situation to aggravate. Ethiopia corresponds with what academia calls "capacity building" (Yetim, 2003, 5), and shows that it has the will and capabilities to take the region's leading position, not with compulsory power, but by interweaving other sources of soft power: storage capacities, regional electrical development, domestic support, framing the country in a positive light with a democratic election and the peace prize. This suggests, that Egypt is not only concerned about the water flow in general, but rather feels a loaded gun from Ethiopia targeted on itself: Ethiopia now could restrain the flow, thus putting enormous pressure on Egypt.

Also, international support does no longer benefit Egypt alone. The emergence of China as a big player in African affairs changed the situation, especially through their promotion of unilateral projects (Dinar and Nigatu, 2013, 3), and Ethiopia became one of China's closest partners (Kfir, 2020). Summing up the latest news, it becomes clear that Egypt gambled away its beneficial position for a new Nile treaty due to its delaying policy, while Ethiopia becomes increasingly invulnerable. When the United States restrained funds for the dam as punishment for the unilateral start of filling (BBC 03.09.2020, 2020), it did not provoke the intended reaction from Ethiopia, since the construction costs are mainly self-financed (Taye et al., 2016, 3) and the US share is low (Kfir, 2020). Ethiopia still presents itself open for negotiation (Al Monitor 06.10.2020, 2020), but it increasingly dictates the terms (Helal, 2020), i.e. its condition to negotiate under the mediation of the African Union, which is composed of many states, that would benefit from the dam in the future. Egypt, in turn, still wants to find

a deal on diplomatic ways, however, it repeatedly threatens that "all options remain on the table" (El-Sayed and Mansour, 2017, 236; Abdelhadi, 2020) in case no agreement is found. In reaction, Ethiopia put a flight ban above the dam for security reasons (Al Jazeera 05.10.2020, 2020). On the international level, US President Donald Trump even added fuel to the fire by stating: "They [Egypt] will end up blowing up the dam." (Al Jazeera 24.10.2020, 2020). The latest news is that all three involved states resume talks brokered by the African Union (Al Jazeera 27.10.2020, 2020)

The case study shows that power and cooperation are closely linked in water issues: Egypt's hesitation, to set up a new treaty that would strengthen its hegemonic position by reducing the incentive to challenge it, might result in an unforeseen power shift. Even the bigger picture of potential Western support does not resolve this situation. Ethiopia, on the other side, linked with other states on various levels, uses cooperation to gain power and resettle the Nile's water handling. Whether this tactic renders successful in the long run, cannot be assessed in this work, but the fact remains that Ethiopia is increasingly unassailable due to a broadly rooted power position.

7 DISCUSSION

The literature review, analysis, and case application give strong justification for the influence of power relations in international water cooperations. Still, there are some limitations to be kept in mind.

Methodologically, the power term has not been included in the machine-made systematic search query, although related terms, i.e. hegemony were included. If assuming a methodological bias, the resulting publications could be biased when it comes to the relevance of power. However, such bias is not expected in a structured search: While not the whole literature universe could be included, chosen publications represent a random pick, that is congruent to it. Hence, the lack of power-related literature indicates a literature gap. Bias is further not assumed, as the obtained literature was broadly interdisciplinary.

Hence, the power term in international water cooperation research is underrepresented, especially when taking power as a central explanation for the outcome of agreements. This is problematic because the power concept often lies behind many of the described cases and theories, without being defined explicitly. Furthermore, this hinders understanding and explain the effect of power in a constantly changing and increasingly complex context.

Another related methodological issue is the low node importance between the resulting search terms. This indicates again a very broad field of disciplines engaged with the topic. While this allows to have a very comprehensive picture, it also bears the risk of losing detail. Widening the cut-off line of node importance was a relevant action to be taken to keep the limits of this work.

It is noteworthy, that although most publications referred their results to practical situations, only very few water bodies were included in the literature body. This can be a language bias; the search was only conducted in English. One rarely named example is the Mekong river, which is surprising, as it originates from China as one of the world's most powerful states, has many dam projects that severely affect downstream states, and is currently periodically in the international news. This lack of literature might be explained through untranslated Chinese publications.

While the literature body results from a broad range of disciplines, most publications remained in their respective realm. This indicates that there is potential to gain a deeper understanding in future interdisciplinary research.

As to the contents of this work, it has been shown that most agreements rest on an application of international principles, as their negotiation is at least partly normative. This however does not mean that state actors let go of their national goals for moral

commitments, rather they translate norms in a way that benefits them above other actors. The sovereignty of interpretation of generally applicable principles is thus one major source of power, as it can affect the debate itself, but also the whole setting in which debates take place.

Traditional concepts like hydro-hegemony or market-oriented theories are too simplistic to explain the complexity of water cooperation. Current research demonstrates the attempt for advanced analysis of interwoven aspects in this topic. However, the implicit use of the power term and the disregard of non-state actors' influence, be it international organisations or grass-root movements, proves a still naive (state-centric) power understanding.

This work has shown that power is suited to explain when and how cooperation on water bodies occurs if the power term is carefully defined to the corresponding situation and prevailing factors of power exercise are taken into account. Different power concepts all play a role in explaining the outcome of water cooperation. In contrast to other theoretic models, power analysis allows making real-world policy recommendations.

Whether framing power is superior to other sources of power could not be proven, rather the convergence of different power sources seems to be the key to hydro-hegemony (or a similar unbiased concept). As shown in the case example, Ethiopia acted competently in not challenging Egypt in its strengths, but rather to create a beneficial setting out of which new power sources were accessible. While for Egypt, compulsory power alone is not sufficient to maintain the status quo, for Ethiopia this traditional power concept might come to relevance in case the dam was attacked.

It is to note that the threshold between cooperation and dispute on water is very narrow: Cooperation often happens as a reaction to dispute to prevent escalation. This indicates, that neither conflict nor cooperation on international watercourses can be analysed alone, rather they must be seen as the two sides of a coin. It is further remarkable that while the power term is present in debates on water conflicts, it is not present in studies on cooperation. This also indicates neglect of underlying power environments that imprint all international relations, be it cooperation or conflict.

8 CONCLUSION

This work intended to explore the role of power in international water cooperation. It showed that water relations between states are a very complex and often highly politicised issue, which has been a topic in a broad range of disciplines. From an International Relations perspective, however, the disregard of the power term in these discussions is striking. Water and power are closely connected, yet through enabling survival and development, but also as a means of coercion. When built on a comprehensive power concept, power analysis has enormous explanatory power for international water relations.

Being more concise, this means that predominant power structures are not taken into account. It is argued that water cooperation reflects international norms. This can be the case out of naturally human, moral, political, or even economic efficiency reasons. But it is overlooked that norms themselves represent power relations, as they cause rules and practices for international behaviour. Promoting some and condemning other actions is a massive interference in identity and relation-building processes between states.

Water, being not interchangeable, is a sensible topic that unifies efforts to comply with norms and to increase personal gains. Hence, future allocation models and theoretic approaches should include the effects of power relations as one determining factor.

The case study illustrated that water is not a peaceful topic, although being deeply interwoven with moral principles. Water politics is a power game. Power is present in the control of territory and resources and the sovereignty of interpretation. Water agreements have a high chance to be beneficial to powerful states, who can securitise their position. Egypt's power position is weakened due to a lack of cooperative will in times when it would have profited in the long-run, while Ethiopia profits from its riparian position, its future exploitation power, and its general standing on the regional and international level.

Further case-specific work can complement the results of this work, giving insights into the weighting of the effect of different power sources and in-depth views on the mechanism of cooperation finding. On the more practical side, the effect of power shifts among riparians on existing cooperative frameworks can be further explored.

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A R Code for Literature Review

```
1 >library(litsearchr)
2 ### Import Results from naive searches from folder.###
3 naiveimport <- import_results(directory = "./naivesearch/",filename = NULL, save_dataset
  = FALSE, verbose = TRUE)
4 > table(naiveimport$database)
5           revtools           Scopus WoS_Core_Collections
6           17           204           40
7 ### Apparently, ProQuest search was counted to revtools. (2 + 15 =17)###
8 ###Remove duplicates from database. Quick method first, then similarity.###
9 dedupe_stage1 <- remove_duplicates(naiveimport, field = "title", method = "quick")
10 > table(dedupe_stage1$database)
11           revtools           Scopus WoS_Core_Collections
12           17           183           40
13 > dedupe_stage2 <- remove_duplicates(dedupe_stage1, field="abstract", method
  ="similarity")
14 > table(dedupe_stage2$database)
15           revtools           Scopus WoS_Core_Collections
16           16           183           36
17 > naiveresults <- dedupe_stage2
18 ##### Final results are stored.Total 235 papers. Now they are raked for keywords. These
  keywords are merged with the keywords defined by the paper's authors in "all_keywords".
  ###
19 > raked_keywords <- litsearchr::extract_terms(naiveresults, method="fakerake", min_freq
  = 2, ngrams = TRUE, n=2)
20 > keywords<- paste(naiveresults$keywords, collapse = ":")
21 > real_keywords <- litsearchr::extract_terms(keywords, method="fakerake", min_freq = 2,
  ngrams = TRUE, n=2)
22 > all_keywords <- unique(append(raked_keywords, real_keywords))
23 ### Write to .csv to manually remove syntax errors###
24 > write.csv(all_keywords, "./keywords.csv")
25 ### Reimport clean keywords ###
26 all_keywords_reg = read.csv("./keywords.csv")
27 > all_keywords_reg <- as.character(all_keywords_reg[,2])
28 ### create dataframe which sorts keywords to papers where they occur, cocurence matrix
  build graph of this cocurence matrix ###
29 naivegraph <- litsearchr::create_network(search_dfm = dfm, min_studies = 3,
  min_occurrences = 3)
30 dfm <- create_dfm(naiveresults$text, type = "keywords", keywords = all_keywords_reg)
31 ### Network is designed, and nodes are ordered after strength. Then a cutoff line is
  calculated, weaker nodes are excluded. ###
32 > naivegraph <- litsearchr::create_network(search_dfm = dfm, min_studies = 3,
  min_occurrences = 3)
33 > plot(sort(igraph::strength(naivegraph)), ylab="Node strength", main="Ranked node
  strengths", xlab="Rank")
```

```

34 > cutoff <- litsearchr::find_cutoff(naivegraph, method = "cumulative", percent = .65
,diagnostics = TRUE, importance_method = "strength")
35 > reducedgraph <- litsearchr::reduce_graph(naivegraph, cutoff_strength = cutoff[1])
36 searchterms <- litsearchr::get_keywords(reducedgraph, savekeywords = FALSE, makewordle =
FALSE)
37 ### Manually group searchterms in .csv file. Groups: Power, Resources, Actors. ###
38 > searchterms_grouped = read.csv("./search_terms4selected.csv")
39 > power_terms<-as.character(searchterms_grouped$x[which(stringr::str_detect
(searchterms_grouped$Group, "Power"))])
40 > resources_terms<-as.character(searchterms_grouped$x[which(stringr::str_detect
(searchterms_grouped$Group, "Resources"))])
41 > actors_terms<-as.character(searchterms_grouped$x[which(stringr::str_detect
(searchterms_grouped$Group, "Actors"))])
42 ### Write all groups into one list ###
43 > final_searchterms<-list(power_terms,resources_terms, actors_terms)
44 ### Let Litsearchr write a boolean search. ###
45 searchquery<- litsearchr::write_search(groupdata = final_searchterms, languages =
"English", stemming = TRUE, exactphrase = TRUE, writesearch = FALSE, verbose = TRUE)
46 ### Reimport of final search results to remove duplicates. ###
47 > searchimport <- import_results(directory="./fullsearch/", filename = NULL,
save_dataset = FALSE, verbose = TRUE)
48 > deduplicate_stage1 <- remove_duplicates(searchimport, field="title", method="quick")
49 > deduplicate_stage2 <- litsearchr::remove_duplicates(deduplicate_stage1, field
="abstract", method="similarity")
50 >write.csv(deduplicate_stage2$title, "./titles.csv")
51 >write.csv(deduplicate_stage2, "./titleabstract.csv")
52 ##### Now manual selection process. ###

```

B Adapted Pre-Search Queries

Scopus: TITLE-ABS-KEY (("geographic determinism" OR "Environmental determinism" OR resources OR territory) AND (negotiation OR "unequal power" OR communication OR "key position" OR "international cooperation" OR "relative power" OR "regional hegemony" OR diplomacy) AND ("international waters" OR "transboundary rivers"))

Web of Science: TI=(("geographic determinism" OR "Environmental determinism" OR resources OR territory) AND (negotiation OR "unequal power" OR communication OR "key position" OR "international cooperation" OR "relative power" OR "regional hegemony" OR diplomacy) AND ("international waters" OR "transboundary rivers")) OR AB=(("geographic determinism" OR "Environmental determinism" OR resources OR territory) AND (negotiation OR "unequal power" OR communication OR "key position" OR "international cooperation" OR "relative power" OR "regional hegemony" OR diplomacy) AND ("international waters" OR "transboundary rivers")) OR AK=(("geographic determinism" OR "Environmental determinism" OR resources OR territory) AND (negotiation OR "unequal power" OR communication OR "key position" OR "international cooperation" OR "relative power" OR "regional hegemony" OR diplomacy) AND ("international waters" OR "transboundary rivers")) OR KP=(("geographic

determinism" OR "Environmental determinism" OR resources OR territory) AND (negotiation OR "unequal power" OR communication OR "key position" OR "international cooperation" OR "relative power" OR "regional hegemony" OR diplomacy) AND ("international waters" OR "transboundary rivers"))

ProQuest (Worldwide Political Science Abstracts and IBSS/ International Bibliography of the Social Sciences): noft(("geographic determinism" OR "Environmental determinism" OR resources OR territory)) AND noft((negotiation OR "unequal power" OR communication OR "key position" OR "international cooperation" OR "relative power" OR "regional hegemony" OR diplomacy)) AND noft(("international waters" OR "transboundary rivers"))