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**Explaining success and failure in
international river basin management –
Lessons from Southern Africa¹**

Abstract

Home to 15 international river basins and affected by growing water scarcity, the region of Southern Africa is often considered a “hydropolitical hot spot” prone to wars over transboundary water resources. Rejecting this widespread “water wars hypothesis”, the paper discusses four selected cases of regional water co-operation and asks if and how these initiatives have provided guidance for the resolution of transboundary problems along Southern African waterways. To what extent have the existing international river basin management schemes been successful in resolving the problems that prompted their creation? And what are the pathways to success and failure in the managing of international rivers?

Drawing on regime theory, the author develops an analytical framework that explains the success of international water regimes with the complex interplay of (1) *Problem factors* - the incentive structure of the respective problem and the underlying problem pressure; (2) *process factors* - the political tools to balance incentive structure and reduce transaction costs; (3) *institutional factors* - the institutional regime design; (4) *country-specific factors* - the political, socioeconomic and cognitive capacities of the member countries; and (5) *factors of political context* - the political context between member countries and third-actor support. The empirical findings offer some valuable insight into the conditions for success of international river basin management. While the hypothesized role of problem, process and institutional factors is largely confirmed, it is especially the (often neglected) integration of country specific and contextual factors that is of particular interest: The high relevance of national capacity deficits, political instabilities and strained bilateral relations illustrates that a thorough discussion of success and failure in international river basin management requires a more systematic consideration of these influencing factors.

¹ This article summarizes the findings presented in Lindemann (2005).

1. Introduction: Southern Africa and the challenge of international river basin management

Almost all of the world's largest rivers cross national borders. According to recent estimates, there are 263 international river basins² that account for 60% of the global freshwater resources, cover 45,3% of the world's land area and host 40% of the global population (Klaphake / Scheumann 2001: 7). The use of these international river basins leads to numerous problems and conflicts among riparian countries that include disputes over water quantity, pollution, dam schemes, flood protection or navigational issues. The great majority of these conflicts derive from the *upstream-downstream structure of international rivers*. While most water-related conflicts arise upstream where abstractions or pollution compromise the availability of water downstream, activities downstream can also lead to conflict since they may create an obstacle of upstream actors' access to the sea (Bernauer 1997: 162).

One can generally identify two approaches in resolving water-related conflicts in international river basins. On the one hand, there are *general principles of international water law* through which victims of water conflicts might seek remedy. Unfortunately, this "vertical" water law remains essentially a "soft law"³ that has provided very little guidance in resolving trans-boundary water conflicts (Birnie und Boyle 2002). Against this background, we focus on "*horizontal*" initiatives for international river management between two or more riparian states at the river basin level, which seem to hold more potential for the resolution of trans-boundary water conflicts. Horizontal cooperation along international waterways is omnipresent. The FAO has counted 3.600 international water treaties for the period between 805 and 1984 (cited after Wolf 1997). If one excludes the numerous treaties on navigational issues, there are still more than 400 different treaties on international rivers (Wolf et al. 2003: 32).

These treaties vary substantially according to the subject and the extent of the agreed cooperation (Hartje 2002: 22). The great majority is functional in scope, e.g. the adopted approach is demand-oriented and focuses on the resolution of specific problems in the river basin (Marty 2001: 22). Functional forms of cooperation include (1) *agreements on the development of joint projects* such as dam schemes or flood protection – a type of cooperation that is still dominant as it reflects the traditional, infrastructure-oriented development paradigm (e.g. Rio

² River basins or catchment areas are defined by their common mouth, which is either the point where the river flows into the sea or an inland delta.

³ As early as in 1966, the *Helsinki Rules* of the International Law Association (ILA) established guidelines for a "reasonable and equitable" use of international river basins but remained rather vague and contradictory (Beach et al. 2000: 9). The *UN Convention on the Law of the Non-Navigational Uses of International Watercourses* (1997) does not resolve the main contradictions and has not yet entered into force.

Grande, Senegal). Furthermore, there are (2) *agreements on the allocation of water*, comprising the allocation of specific water quantities between riparians in mostly semi-arid or arid regions (e.g. Aral Sea, Incomati). Functional forms of cooperation finally also include (3) *agreements on water pollution problems*, which have been growing in number since the late 1960s (e.g. Danube, Tijuana). Beyond functional cooperation there are also (4) *integrated approaches to international river basin management* that focus on the river basin as a whole and try to resolve the existing hydrologic, ecologic and socio-economic problems through holistic policies. The integrated approach has been widely endorsed and promoted by international organisations, NGOs and scientists (Teclaff 1996: 384) but suffers from a so far very limited practical application (Hartje 2002: 23).

Southern Africa is certainly among the world's most interesting regions in the field of international water since few regions offer as much contrast. Due to the region's relative water scarcity⁴, the 15 international basins in the Southern African Development Community (SADC) are regularly included among the world's hydropolitical hot spots, second only to the arid and hostile Middle East (Wolf 2003: 1). Water scarcity in Southern Africa is firstly a problem of *inadequate supply* since levels of water availability are highly volatile due to climate and weather extremes.⁵ But water scarcity is also *demand-induced* since – *ceteris paribus* – the water available per capita tends to diminish due to both increasing industrial/agricultural development and average annual population growth of more than 3% (Mohamed 2003: 213). Lastly, there is also a structural aspect to the problem of water scarcity in Southern Africa: Due to colonial and postcolonial settlement policies, the available water resources are extremely unequally distributed and mostly located far outside the urban areas (Swatuk 2002). Altogether, water resources are relatively scarce, extremely volatile and mostly located in international river basins – a fact that makes the international river basins crucial for the development of the entire region (Granit 2000: 2).

On the other hand, Southern Africa now has more experience in negotiating water treaties and implementing joint management bodies than any other region on earth, save the European

⁴ Recent calculations for Southern Africa reveal that water is already scarce in a number of local basins, reaching availability levels of 1000 cu m or less per capita per annum. By 2025, on the basis of data on renewable supplies and demographics, it is expected that Malawi and South Africa will face absolute water scarcity, and Lesotho, Mauritius, Tanzania and Zimbabwe will be water stressed; while Angola, Botswana, DRC, Mozambique, Swaziland and Zambia are likely to experience water quality and availability problems in the dry season" (Hirji et al. 2002: 7). Despite undeniable deficits - the designation of entire countries as water scarce is methodologically problematic since water scarcity is a complex and regionally varying phenomenon (Schiffer 2001: 4) - the indicators give an impression of Southern Africa's current and coming water crisis.

⁵ The climate in the region is characterised by staggering evaporation rates, extreme variations in precipitation over the year and recurrent floods and droughts (Chenje and Johnson 1996). These extremes – that are expected to worsen in the context of global climate change – make that the North and the East of the region are relatively

Union” (Wolf 2003: 1). While some of the management schemes in Southern Africa’s international river basins date back to colonial times, most of the 24 international water treaties in the region have been negotiated since the mid 1980s. In the light of the *Southern African water crisis*, the existing efforts for international river management are of great importance. This is why we *ask if and how these initiatives have provided guidance for the resolution of trans-boundary problems along international waterways*. To what extent have the existing international river basin management schemes been successful in resolving the problems that prompted their creation? And what are the pathways to success and failure in the managing of international rivers?

2. Theoretical and methodological framework

Problems of international river basin management have so far been discussed in a mostly descriptive and unsystematic way (for an excellent literature review see Bernauer 2002). Against this background, we develop a research framework that will allow for more systematic and theoretically guided comparison (3.1). This is followed by methodological considerations on how to apply the developed research framework to Southern African case studies (3.2).

2.1 The research framework

In order to explain success and failure in international river basin management, we make use of international regime theory⁶. Treaties on international rivers are conceptualised as *water regimes* defined as norm- and rule based cooperation for the political resolution of problems and conflicts in the field of international river basin management. Asking for the conditions for success of these international water regimes involves two interrelated, but analytically separated questions: (1) Under which conditions are the riparian states prepared to form institutions to address transboundary problems? (2) And what are the determinants of the effectiveness of those institutions? The focus is therefore on the determinants of *(water) regime formation* and *(water) regime effectiveness* – the two dependent variables.

The concept of regime formation is almost self-evident. A water regime is formed when riparian countries engage upon norm- and rule based cooperation for the political resolution of problems and conflicts in the field of international river basin management. The concept of regime effectiveness, on the other hand, is more problematic. The most intuitively appealing sense of effectiveness centres on the degree to which a regime eliminates or alleviates the

wet (Democratic Republic of Congo, Angola and Zambia), while the South and the West receive very little rainfall (Namibia, Botswana, South Africa, Zimbabwe).

⁶ “International regimes are sets of implicit or explicit principles, norms, rules and decision-making procedures around which actor’s expectations converge in a given area of international relations“ (Krasner 1983: 2).

problem that prompts its creation (Young 1999: 4). However, this “problem-solving approach” is misleading since it is usually very difficult to establish a causal relation between the effects of a regime and the state of a given problem.⁷ Against this background, we complement the “problem-solving approach” with a political interpretation of regime effectiveness that focuses on behavioural change (e.g. Keohane / Levy 1996; Young 1999): Regime effectiveness becomes the extent to which the water regime prompts *behavioural change* on the part of the relevant actors leading to an improved management of the respective problem.

But what are the determinants – the independent variables – of water regime formation and effectiveness? Drawing on regime theory - especially the work by Frank Marty (2001) who, from a social sciences perspective, has contributed one of the very few theoretically guided analysis of international river basin management – we distinguish five groups of independent variables: (1) Problem factors; (2) process factors; (3) institutional factors; (4) country-specific factors; and (5) factors of international context.

(1) Problem factors

It is intuitive to assume that problems of international river basin management are not equally easy to resolve. In general, we can distinguish between *problems related to transboundary externalities* and *collective problems* (Marty 2001: 35-36). Most problems are related to *transboundary externalities* due to the “upstream-downstream structure” of international rivers. Negative externalities arise when the upstream country imposes costs on the downstream country without compensating it for the inflicted harm (e.g. in the case of water abstraction or pollution upstream). Positive externalities, on the other hand, are less frequent and exist when one riparian country produces a public good without receiving full compensation for its efforts (e.g. the provision for flood control upstream). Other problems in international river basins are of a *collective nature*, e.g. floods or common development projects. These problems are collective since they impose (more or less equal) costs on all affected riparian countries – direct costs in the case of transboundary floods, opportunity costs in the case of under-utilised river development potentials. Problems related to transboundary externalities and collective problems differ fundamentally with respect to the underlying incentive structure of the relevant actors: In the case of collective problems incentives tend to be symmetrical, while transboundary externalities are usually characterized by asymmetric incentive structures. This is why there is reason to believe that problems related to transboundary externalities are more difficult to resolve than collective problems (Marty 2001: 37).

⁷ Environmental problems, for example, typically lead to a multitude of initiatives, which have an impact on the problem but are not necessarily linked to the existence of a related environmental regime (Young 1999: 5).

Beyond incentive structures, problems in international river basin management vary according to the amount of *problem pressure* involved – e.g. the perceived visibility of a given problem (Jänicke 1999: 77). Recurrent floods, for example, involve more problem pressure than the threat of water scarcity in the year 2025 and should therefore lead to more political pressure to tackle the given problem.

Hypothesis 1: Problem factors, e.g. the underlying incentive structures and problem pressure influence the prospects of water regime formation: While collective problems facilitate the formation of water regimes, the latter are more difficult to achieve in the case of transboundary externalities. The higher the problem pressure involved, the better the prospects for the creation of effective water regimes.

(2) Process factors

Moving beyond the purely functional logic of the early 1980s (e.g. Keohane 1984), regime analysis has come to realise that incentive structures do not entirely determine the prospects of regime formation – a „turn to process in regime analysis“ (Schramm Stokke 1997: 58). This is why there is reason to focus on political tools that help to transform the given constellation of interests and thereby promote international water cooperation. These “process factors” can be divided into mechanisms to balance incentive structure and instruments to reduce the transaction costs of regime formation (Marty 2001: 38).

Mechanisms to balance incentive structures facilitate the resolution of problems related to transboundary externalities. Balancing incentive structures involves the creation of new or additional incentives – usually in form of costs. A riparian country without an immediate incentive to participate in an international dam project, for example, needs to be convinced that the maintenance of the “status quo” would involve costs and therefore reduce its well-being. Direct cost incentives derive from the immediate utility of the problem solving mechanism (e.g. flood control, hydro-electricity), while indirect cost incentives stem from “package solutions” – expected benefits in policy areas that are not directly related to international river basin management, e.g. royalties or sanctions (Marty 2001: 40-41).

Secondly, the creation of water regimes is facilitated by *instruments to reduce the transaction costs of regime formation*. Transaction costs have for a long time been identified as a main obstacle to the formation of international regimes (Keohane 1984: 87). In the context of international river management, we can distinguish between *information costs* and *negotiation costs* (Marty 2001: 42ff.). Information costs are mainly related to uncertainty about (a) the nature of the respective problem; and (2) the behaviour of the other parties and/ or third actors. Negotiation costs, on the other hand, derive from communication problems, fragmented

decision-making procedures or a high number of involved actors. The formation of international water regimes therefore requires the development of political tools that minimise both information and negotiation costs, e.g. confidence-building meetings at the technical level; the exchange of data, the implication of independent experts.

Hypothesis 2: Asymmetric incentives and transaction costs are important obstacles to regime formation. The creation of international water regimes therefore requires the development of political tools that (1) balance asymmetric interests through direct or indirect cost incentives; and (2) minimise the underlying information and negotiation costs.

(3) Institutional factors

Problem and process factors determine the prospects of regime formation. But what determines the effectiveness of international water regimes? Most authors assume a central relationship between the institutional design of a regime and its effectiveness (e.g. Brown-Weiss / Jacobson 1998; Victor et al. 1998; Mitchell 2001) – institutional design matters. Again drawing on the work by Marty (2001: 45-49), we assume that successful water regimes need to be specific, feasible, flexible, open and equipped with a centralized organization structure.

Specific regimes are problem oriented and incorporate precise rules and procedures that structure the relevant actors' behaviour with view to a better management of the problem at hand. If these precise rules and procedures are missing, there is scope for interpretation and rule avoidance and the effectiveness of the regime is bound to suffer. *Feasible regimes* chose their goals according to the available financial and personal resources: If the respective goals do not take account of the resources at hand, the regime effectiveness can be expected to decrease. Given the fact that resources to solve problems related to international river basin management are usually limited, there is reason to assume that water regimes tend to be more effective if their goals are of limited scope (Marty 2001: 47). *Flexible regimes* include institutional mechanisms that allow adapting to changes in the problem structure. A lack of flexibility is likely to lead to reduced regime effectiveness since the existing problem solving strategy may prove inadequate to cope with changing circumstances. Furthermore, effective water regimes need a *centralized organisation structure*. In the case of a centralized organisation structure, the regime functions are exercised by one central actor - usually in the form of an international organisation. This should facilitate coordination, communication and monitoring and lead to more regime effectiveness. *Open regimes*, finally, allow for a high degree of public participation. If non-state actors are involved in the decision-making process, this should increase the available knowledge as well as the legitimacy of the respective regime and foster its effectiveness (Marty 2001: 49).

Hypothesis 3: The effectiveness of a water regime varies with its institutional design: The more specific, feasible, flexible and open and the more centralized its organization structure, the higher the effectiveness of the water regime.

(4) Country-specific factors

Determinants of international regime effectiveness are not restricted to institutional regime design but also include country-specific characteristics (Mitchell 2001: 13). The latter comprise all those specific features of regime member countries that influence the implementation and thereby the success of the respective regime (Brown-Weiss / Jacobson 1998: 7). Despite the obvious difficulty to integrate country-specific factors into an analytical framework – they range from cognitive-informational capacities, political-institutional attributes and economic-technological context to aspects of political culture and individual leadership – we make an attempt to consider and systematise their influence.

Of central importance is the *concept of capacity*⁸: Regime member countries have very different capacities to implement the agreed standards and/ or to impose behavioural change on relevant national actors. Against this background, deficits in the effectiveness of environmental regimes can to a considerable extent be attributed to insufficient implementation capacities (Haas et al. 1993; Brown-Weiss / Jacobson 1998). But what exactly are the capacities that determine water regime effectiveness?

First, we consider the *economic-technological capacities* of regime members as an important influencing factor. It is an intuitive assumption that the socioeconomic situation of a member country will affect the prospects of a regime: Levels of economic development vary a lot between countries and lead to very different scopes of action, especially between developed and developing countries. More specifically, we need to look at the economic-technological capacities of the national water sectors. If the latter do not possess sufficient (1) financial and administrative resources to plan and administer international water projects; and (2) technical capacities for data generation and project implementation, water regime effectiveness is likely to suffer. Secondly, there is reason to take into account the impact of *political-institutional capacities*. Given the impossibility to consider the influence of different political systems and regime types in this paper, we limit our analysis to the role of political stability. If the regime member countries are characterized by high levels of political stability, there a good prospects for high water regime effectiveness.

⁸ The concept of capacity is mainly used in comparative policy analysis (e.g. Jänicke 2002).

Hypothesis 4: The effectiveness of water regimes varies with country-specific factors: The higher the (1) economic-technological; and (2) political-institutional capacities of the member countries, the more effective is the water regime.

(5) Factors of international context

Beyond country-specific factors, the effectiveness of international regimes is influenced by factors related to international context (Mitchell 2001: 12). Here, we first need to take into account the *state of the bilateral relations between regime member countries*, which results from historical and current interactions and conditions the pattern of communication and the level of trust. The state of bilateral relations is judged by the existence/ non-existence of foreign policy conflicts between member countries: If bilateral relations are strained by historical or current foreign policy conflicts, there is no trust basis for the implementation and/ or further development of the water regime and its effectiveness is bound to suffer.

Furthermore, the effectiveness of international regimes varies with the *influence of international organisations* (Breitmeier 1997; Brown-Weiss / Jacobson 1998). This influence is exercised through multiple channels: International organisations provide financial resources, offer their technical and cognitive expertise and act as “independent” mediators between conflict parties. Even though these activities are not *per se* positive, there is reason to assume that the support of international organisations promotes water regime effectiveness, especially in the developing world where financial, technical and cognitive resources are particularly scarce. In analogy, the effectiveness of international regimes is influenced by the *activities of non-state actors networks* that comprise international NGOs, local interest groups, journalists, policy experts or academics (Brown-Weiss / Jacobson 1998: 7; Mitchell 2001: 13). These networks mobilise and transfer knowledge about the problem at hand, initiate political campaigns and thereby contribute to a public debate that impacts on the evolution of the respective regime and should usually enhance its effectiveness.

Hypothesis 5: A water regime depends on its international context. Water regime effectiveness increases (1) the better the state of bilateral relations between regime members; and the higher the support by (2) international organizations; and (3) non-state actors networks.

Table 1 summarizes the different components of the outlined research framework.

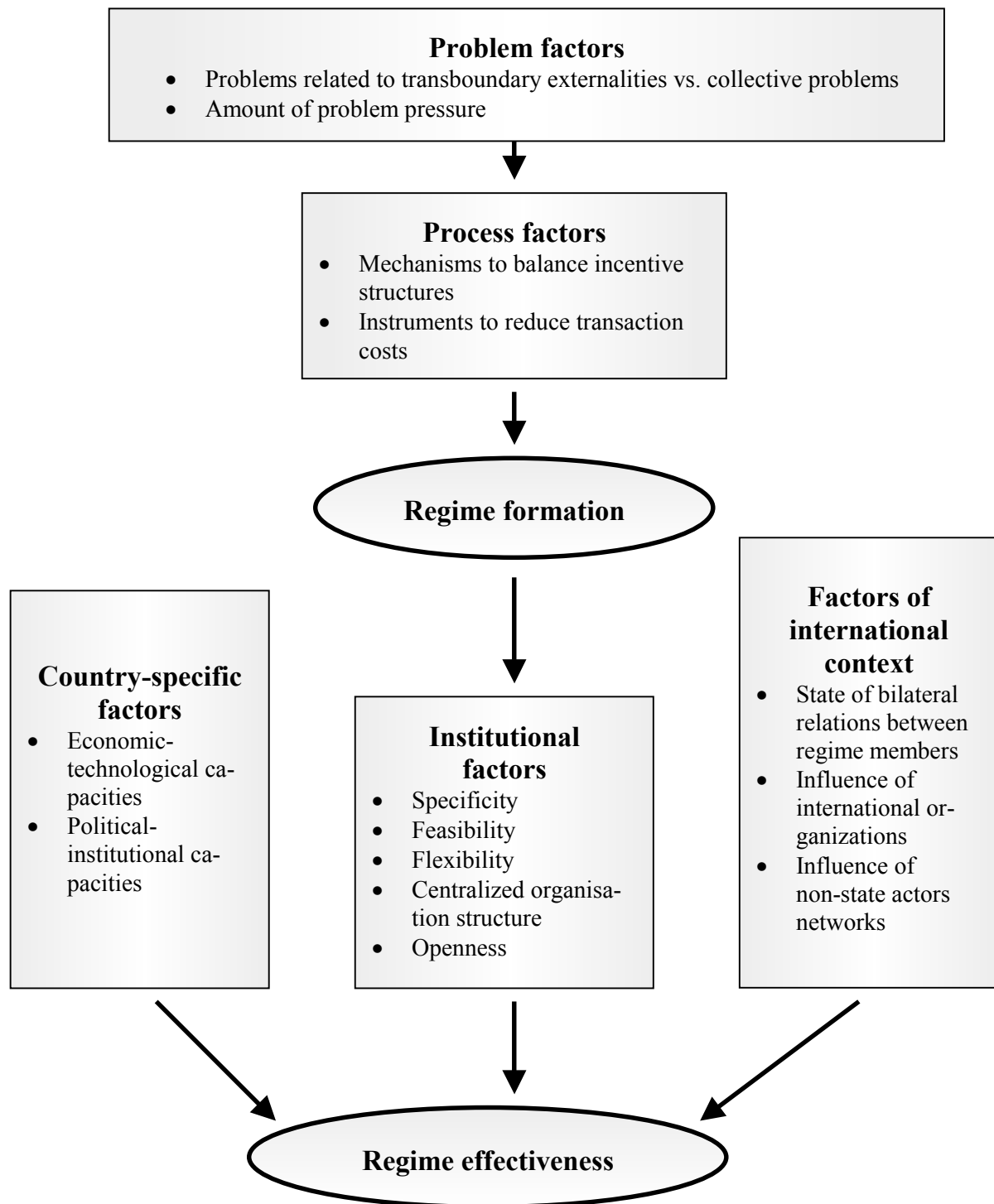


Table 1: Political determinants of water regime formation and water regime effectiveness

2.2 Methodological considerations

In order to apply our research framework, we conduct *qualitative case studies* that follow an approach of “structured and focused comparison” (George / McKeown 1985) defining and standardizing the data requirements for each case study according to the theoretically deduced variables. Afterwards, we do process tracing, e.g. we focus “on whether the intervening vari-

ables between a hypothesized cause and an observed effect move as predicted by the theories under investigation” (Bennett 2004: 22). Due to the indeterminacy of the research design - we have more inferences to make than implications observed (King et al. 1994: 119) – we cannot identify *causal effects*. However, this apparent shortcoming stems from a conscious decision: We think of the developed research framework as a means to systematize the most important determinants of water regime effectiveness – not as an empirical generalization.

With respect to the *selection of cases*, it is necessary to ensure variation in the explanatory variables, while allowing for the possibility of at least some variation on the dependent variable (King et al. 1994: 140ff.). On the basis of these selection criteria, we come to select four cases of Southern African water regimes: (1) The Permanent Water Commission on the Okavango River Basin (OKACOM); (2) the Zambezi Action Plan (ZACPLAN); (3) the Zambezi River Authority (ZRA); and (4) the Lesotho Highlands Water Project (LHWP).

The findings of these four case studies are based on the examination of primary and secondary sources. Where necessary and possible, additional data was generated through telephone interviews and email exchange with selected water experts in the region.

3. Empirical findings

With respect to the empirical findings of the four case studies, we first assess the effectiveness of the four water regimes (3.1) and then identify the political determinants of water regime formation and effectiveness (3.2).

3.1 Assessing water regime effectiveness

The first water regime under investigation is the *Permanent Water Commission on the Okavango River Basin* (OKACOM). The endoreic Okavango River originates in Angola, crosses Namibia and then discharges into the world famous Okavango Delta in Botswana. While so far little Okavango water has been used, growing water needs since the early 1990s have led to plans for an increased water use and provoked tensions between the three riparian countries (Ashton 2003: 170). Against this background, the riparian countries created OKACOM in 1994 to agree on the conservation, development and utilization of common water resources (OKACOM Treaty 1994). Since then, OKACOM deserves credit for successfully institutionalising conflict potential, generating continuous dialogue at the political level and conducting a *transboundary diagnostic analysis*. While some behavioural change can thus be observed, the three riparian countries remain mainly concerned with national interests and sovereignty (Swatuk 2003: 129) and a river basin wide political perspective is far from being

achieved (GEF 2002: 12). Despite some achievements and undeniable potential for improvement, OKACOM's effectiveness remains therefore rather limited.

The situation along the Zambezi River is even more difficult. Shared by Angola, Zambia, Zimbabwe, Namibia, Botswana, Malawi, Tanzania and Mozambique, the Zambezi is the region's largest river basin and „a veritable artery of life and development” (Söderbaum 2002: 118) for the eight riparian countries. While the Zambezi is generally rich in water, both weather extremes and population growth have put increasing pressure on the available water resources. As early as in 1987, the Zambezi riparian countries agreed on a “Zambezi Action Plan” (ZACPLAN) aiming at an environmentally sound management of the Zambezi River basin (ZACPLAN Treaty 1987). The comprehensive action plan consists of 19 sub-projects and envisages, among others, the development of a regional water law, the creation of a common monitoring system and the elaboration of an integrated management plan for the entire basin. However, the “ZACPLAN has not functioned as a powerful locomotive to promote environmentally sound management of the Zambezi river basin with participation of riparian countries, to the extent it was originally supposed to do” (Nakayama 1999: 398): The implementation of the ambitious water regime has been considerably delayed and only two of the sub-projects have led to visible results. Almost 20 years after the creation of the ZACPLAN, an integrated basin wide management is still a distant vision and the basin remains an “arena of different national interest in which the various riparian states are developing diverging policies and plans that are usually not compatible” (Chiuta 2000: 153). Since no behavioural change can be observed, the ZACPLAN can be qualified as ineffective.

While the ZACPLAN has so far been a failure, bilateral attempts for an international management of the Zambezi stretch between Zambia and Zimbabwe have proved more successful. Faced with electricity shortages after World War II, North and South Rhodesia felt the urgent need for a coordinated development of the common water resources – a need that led to the construction of the huge Kariba Dam between 1955 and 1976 (Tumbare 2002: 107). After the end of the federation in 1963, the two countries established the Central African Power Corporation (CAPCO) to allow for the continued operation of the Kariba Dam. In 1987, Zambia and Zimbabwe decided to replace the CAPCO with the Zambezi River Authority (ZRA) “to obtain for the economic, industrial, and social development of the two countries, the greatest possible benefit from the natural advantages offered by the waters of the Zambezi River and to improve and intensify the utilization of the waters for the production of energy and for any other purpose beneficial to the two countries” (ZRA Treaty 1987). The focus of the ZRA remains on the operation of the Kariba Dam but is extended to additional river development

projects and environmental measures to combat the increasing water pollution. Within its limited mandate, the water regime can be regarded as relatively effective. The ZRA is “well established in its role as an operation and maintenance organization” (Rangeley et al. 1994: 42) and has recently done environmental capacity-building through the elaboration of an Environmental Monitoring Programme (EMP). On the downside, the water regime has failed to plan and implement additional river development projects, which indicates that the ZRA “could be perceived as a single task regime with little scope for spill over into broader co-operation” (Mutembwa 1998).

The *Lesotho Highlands Water Project (LHWP)* is situated in the Orange River basin shared by Lesotho, South Africa, Botswana and Namibia. The upstream part of the river basin features two fundamentally different riparian countries: The mountainous Kingdom of Lesotho, a least developed country but relatively rich in water, and South Africa, the region’s political and economic giant suffering from mounting water scarcity – especially in the Gauteng Area that hosts 40% of the country’s population and produces half of its wealth (Turton 2004: 272-273). In this context, South Africa has since the late 1950s pursued plans to transfer water from the water rich Senqu River in the Lesotho Highlands to the Vaal River in the Gauteng Area – a project that materialized with the signing of the LHWP between South Africa and Lesotho in 1986. The LHWP aims to enhance the use of the Senqu River by transferring - in four phases until 2020 – 70 m³/s of water to South Africa and by utilizing the transferred water to generate hydro-electric power in Lesotho, which also receives financial compensation in the form of royalties (LHWP Treaty 1986). Phases 1a and 1b of the LHWP have been successfully implemented establishing a complex delivery system of dams and tunnels that currently diverts 29 m³/s of Senqu water to South Africa (Colombani 2003: 93). The LHWP can be considered as highly effective in the sense that it creates a “win-win situation” for both countries „which would both be losers otherwise” (Conley / van Niekerk 2000: 137): While South Africa receives cost effective water to back up its economic growth, Lesotho benefits from both royalties and hydro-electricity to accelerate the development process of the country.

3.2 Political determinants of water regime formation and effectiveness

How can we explain these different levels of water regime effectiveness? First of all, the case studies show that *the underlying incentive structures do indeed influence the prospects of water regime formation*: In the cases of OKACOM and ZACPLAN - both characterised by the threat of transboundary externalities - the initial constellation of interests proved an obstacle for cooperation, while the relatively symmetric incentive structures in the case of the ZRA – a collective problem - clearly facilitated the establishment of a water regime around the Kariba

dam. However, we should not exaggerate the importance of incentive structures, which do not entirely determine the prospects of regime formation but rather serve as an indicator of a given initial situation that can be transformed during the negotiation process: As seen in the case of the LHWP, initially asymmetric incentive structures can be changed into “win-win situations”. Also, taking a closer look at the ZRA case we realize that the incentives of cooperation partners are almost never fully symmetric. Even if two riparian countries are affected by the same problem – electricity shortages in the case of the ZRA – the degree of their affectedness or their preferred solutions may differ and thus hinder water regime formation.

Furthermore, the empirical findings confirm the *amount of problem pressure as a relevant influencing factor*. As the case of ZACPLAN clearly illustrates, a lack of problem pressure may prevent far-reaching water cooperation:

„[T]here is not a real issue on the Zambezi. The Zambezi has got so much water and so little is used, and there is no real threat. You can manufacture threats if you want, but nobody is interested in that” (Piet Heyns, Interview 17.08.2004).

In the ZRA and LHW cases, on the other hand, high problem pressure linked to the visible problems of electricity or water shortages facilitated the creation of more comprehensive problem solving mechanisms. These findings indicate that purely proactive initiatives for international river basin management that are not linked to clearly identified problems may lead to half-hearted solutions and implementation deficits.

With respect to the *role of process factors*, we had expected that asymmetric incentive structures were to be balanced by direct or indirect cost incentives to pave the way for water regime formation. This assumption was only confirmed in the case of the LHWP where Lesotho agreed to arrange for a water transfer when South Africa offered the payment of royalties and the provision of hydroelectricity in return. In the cases of OKACOM and ZACPLAN, on the other hand, the riparian states created rather weak problem solving mechanisms that do not touch upon incentive structures. This is due to low problem pressure (as in the case of ZACPLAN) as well as to high transaction costs resulting from a lack of hydrological data (especially in the case of OKACOM). Also, we need to take into account the time perspective since it took several decades to balance incentive structures in the case of the LHWP.

Secondly, we had assumed that the establishment of water regimes required the use of political tools to reduce the transaction costs of the regime formation process – an assumption that was confirmed by all cases under investigation. Information costs are usually reduced through shared (feasibility) studies that generate new information and establish a common knowledge basis, while preferred strategies to reduce negotiation costs include the implication of “inde-

pendent” experts as well as confidence-building meetings at the technical level. Nevertheless, it is striking to note that the formation of all four water regimes under investigation was to an important extent facilitated by “situative” political events: The “post-apartheid democratic moment” in the case of OKACOM, the first African Ministerial Conference on the Environment (AMCEN) in the case of the ZACPLAN, the establishment of the federation between Rhodesia and Nyasaland in the case of the ZRA and the regime change in Lesotho in the case of the LHWP. This indicates that the formation of international water regimes is not entirely in the hands of the riparian countries, but also requires favourable situative events that can hardly be integrated in explanatory frameworks.

With view to explaining the effectiveness of the four water regimes, we first need to emphasise that regime formation and effectiveness are closely interrelated in the sense that problem and process factors do not only determine the prospects of regime formation but also impact on the effectiveness of the problem solving mechanisms: While the balancing of incentives in the case of the LHWP leads to a mutual interest in implementation and thereby promotes regime effectiveness, asymmetric interests and the absence of problem pressure in the ZACPLAN case lay the foundation for the ineffectiveness of the water regime.

As regards to the hypothesized importance of institutional regime design, the empirical findings firstly confirm that *specificity is advantageous*: While the LHWP and the ZRA are problem-oriented and contain specific rules and procedures that effectively guide the actors’ behaviour, the ZACPLAN is little more than a series of vague projects that do not include any concrete rules and procedures. Furthermore, especially in the light of the region’s limited resources for international river basin management, it is not advisable to burden a water regime with the multiple and highly complex goals of the integrated management approach since this may endanger the feasibility of the undertaking (as seen in the case of the ZACPLAN). This does not affect the desirability of integrated river basin management but raises questions concerning its feasibility. The case of the LHWP demonstrates that it may be more promising to start with limited but problem-oriented regimes that can then be extended over time.

Also, the case studies indicate that *water regimes should contain elements of flexibility*. The strictly “output-oriented” ZACPLAN with its 19 subprojects proved overly rigid and little conducive to implementation (Granit 2000: 7-8). The advantages of a flexible approach are further illustrated by the LHWP that allows for a continuous monitoring and adjustment of regime provisions: In the light of changing circumstances – the water needs in South Africa had initially been overestimated – the project phases 2-4 were put on hold in a problem-oriented manner. Furthermore, the empirical findings confirm the hypothesized *importance of*

a centralized organisation structure. As seen in the OKACOM and ZACPLAN cases, the lack of a centralized institution for project planning and coordination – for example in form of a river basin secretariat – has a clearly negative impact on water regime effectiveness. This is confirmed by the LHWP experience where the initially decentralized organisation structure proved ineffective and had to be centralised. With respect to assumed need for regime openness, the case study findings are less clear. While the ZACPLAN is the only water regime that provides for public participation, openness has not been a characteristic of the decision making process of the regime and decisions have been taken in groups of limited representation (Lamoree / Nilsson 2001: 35). Even though recent attempts to increase public participation in OKACOM and the LHWP have proved beneficial, the findings do not allow definite conclusions on the relevance of regime openness.

Assessing the *relevance of country-specific factors*, we find that water regime effectiveness indeed varies with economic-technological capacities. The OKACOM and ZACPLAN case studies unveil striking capacities deficits in the national water sectors, which lack the financial, technical and administrative capacities to plan and implement projects of international river basin management. The high capacities of the South African *Department of Water Affairs (DWA)*, on the other hand, have proved crucial for the success of the LHWP. With view to the influence of political-institutional capacities, we can observe a striking lack of political stability: Almost all countries in the region having suffered from protracted civil war and violent conflict throughout the past decades, political instability is a major obstacle to effective water cooperation. The case of Angola in the context of OKACOM is exemplary: Due to decades of civil war only ended in 2002, the Okavango Basin in Angola is still littered with landmines and hardly accessible - a situation that prevents project preparation, in particular the generation of hydrological data - and thereby limits OKACOM's effectiveness (Porto / Clover 2003: 78).

Finally, the case studies reveal the *importance of factors of international context*. The region is characterised by a history of political tensions, which go back to the anti-colonial liberation wars, the conflict with the Apartheid-State in South Africa and the dynamics of the Cold War. Even though tensions have eased since the early 1990s, bilateral relations are still strained by historically rooted conflicts and distrust. This problem has exercised a very negative impact on the water regimes under investigation. In the case of the ZRA, for example, the historical debate about the benefits of the federation between North and South Rhodesia – now Zambia and Zimbabwe – created the perception of historically disadvantaged states and communities, issues which still inform debate about the ZRA and prevent more far-reaching water coopera-

tion (Mutembwa 1998). Lastly the empirical findings underline the *relevance of third-actor support*. In a region suffering from considerable development deficits, the activities of international (donor) organisations are of great importance: The GEF in the case of OKACOM, the World Bank in the case of the LHWP as well as UNEP in the case of the ZACPLAN all play an important role with respect to the mobilisation of financial resources and/ or national capacity building. Despite the undeniable benefits of these activities, we should not overlook their negative side-effects, e.g. problems related to slow and overly bureaucratic project implementation (the GEF in the OKACOM case) or a lack of ownership (UNEP in the case of the ZACPLAN). Beyond international organisations, the cases of the LHWP and especially of OKACOM illustrate that the activities of non-state actors networks can significantly contribute to capacity-building and to the launch of an informed public debate.

„I think that the activities of organizations that are working together with OKACOM (...) are complementing the activities of OKACOM in areas where OKACOM would not have been effective. OKACOM is a government organization but it is much better for an NGO to work with people on the ground than for government officials to do it. So it is a huge advantage to have this complementarity in the activities of these other organizations (Piet Heyns, Interview 17.08. 2004).

4. Conclusions

The findings of the four case studies can be summarized as follows:

- The characteristics of a given problem in international river basin management influence the chances of water regime formation: If the underlying cooperation incentives are largely symmetric and the involved problem pressure is high, there are good prospects for the creation of effective water regimes.
- To reduce the transaction costs of water regime formation, countries typically rely on common studies for data generation and project preparation, the mediation of international experts and trust-building meetings at the technical level. If in addition asymmetric interests are balanced through cost incentives, we can expect far-reaching and effective water regimes.
- Effective water regimes need adequate institutional design: Water regime effectiveness is enhanced by problem-oriented and flexible management approaches that take account of the available resources and are equipped with a centralized organisation structure.

- The effectiveness of international water regimes varies with country-specific capacities: Sufficient economic-technological capacities in the national water sectors and political stability lay the foundation of water regime effectiveness.
- The successful management of international river basins requires a favourable international context: If the bilateral relations between regime members are characterised by mutual trust and cooperation and third actors – international organisations and/ or non-state actors – support capacity building and civil society participation, there are good prospects for water regime effectiveness.

How can we judge the relevance of these findings? As already mentioned, we are unable to draw causal conclusions since the developed research framework does not allow for the identification of single effects. This means that we do not know to what extent the failure of the ZACPLAN can be attributed to asymmetric incentives, the lack of problem pressure, inadequate regime design or national capacity deficits. Also, we face a typical dilemma of multi-case comparisons: As the nature, scope and context of the water regimes under investigation are quite different, one might question the comparability of the four cases:

“Regimes are specific and embedded in history, geography and culture. There is no one size fits all. They are needs driven. This is where many commentators make a mistake in my view by comparing apples to eggs...” (Anthony Turton, Email 30.07.2004).

Nevertheless, this is no reason to abandon multi-case comparisons. When understood as a systemisation of the most important driving forces and not as an empirical generalization, the findings do offer some valuable insight into the conditions for success of international river basin management. Here, it is especially the integration of country specific and contextual factors – so far largely neglected in the literature on international river basin management – that is of particular interest: The high relevance of national capacity deficits, political instabilities and strained bilateral relations illustrates that success and failure in international river basin management need to be discussed beyond the traditional “institutional design matters” approach. Of course, one may object that capacity deficits and instabilities are unusually developed in the Southern African region. But since large parts of Asia, Latin America and Eastern Europe face at least similar problems, there are good reasons to pay greater and more systematic attention to these influencing factors.

With view to giving practical policy advice, it may seem unattractive to recommend the build-up of national capacities or the creation of a favourable political context since this is less feasible than the adoption of a certain institutional design – at least in the short term. Neverthe-

less, there is reason to believe that national capacity building and the creation of a favourable political context both at the national and international level is the key to success in international river basin management – in Southern Africa but also in the developing world as a whole. This means that “neutral” third parties, e.g. international organisations and non-state actors need to intensify their efforts for capacity building and mediation between conflict parties (Turton 2003: 98). Finally, the findings of the Southern African case studies should lead to caution with respect to the today omnipresent claims for integrated river basin management – especially in the context of developing countries. This does not mean that we need to question the general practicability of the integrated approach as done by Marty (2001: 398). But against the background of the experiences with the ZACPLAN, it seems more promising to first bundle the scarce resources and capacities in a problem-oriented and functional manner before considering extending and integrating the management approach over time.

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