



Thinking inside the basin: Scale in transboundary water management



Transboundary water management is widely advocated to be implemented at the basin level, and a growing body of basin-level institutions have been formed in transboundary waters. However, transboundary water cooperation has also occurred at a range of non-basin scales. In the Syr Darya River Basin of Central Asia, more than 120 agreements were found to exist at a tributary scale. Analysis of the contents of these agreements revealed that their focus is practical. In the Shire catchment within the Zambezi River Basin of Southern Africa, there appears to be scope for upscaling fit-for-purpose cooperation tailored to suit four contextual issues. Ultimately, there may be a need to complement basin-scale focus with focus on scales inside the basin. Solutions to certain water issues may be effectively delimited at geographies other than the full basin.

Key messages

- While international best practice generally recommends basin-level approaches in transboundary water management, implementation of basin-level management frameworks does not preclude complementary approaches at other scales.
- Smaller-scale transboundary frameworks, tailored to specific issues, may constitute a fit-for-purpose approach that helps achieve practical progress in the context of broader basin-level approaches.
- There may be a need to achieve greater alignment between institutional design of transboundary water law and local contexts to which such law applies.

Context: Basins and institutions in transboundary waters

Transboundary water management: Importance of the basin. Water management and transboundary water management are widely advocated to be best implemented at a basin scale. The Dublin Principles of 1992 stated that “[t]he most appropriate geographical entity for the planning and management of water resources is the river basin...” (WMO 1992). Sadoff et al. (2008) suggested that “[m]odern shared water treaties ideally should ... regulate the use of the water resource at the appropriate hydrographic scale – the basin.” INBO and GWP (2012) recommended “...that the agreements and strategies, programmes, financing arrangements and controls are designed at the basin level...”

Basin-level management and convergence in formats of transboundary institutions. Emphasis on basin-level management has contributed to a growing body of basin-level transboundary water laws and associated proliferation of river basin organizations (RBOs). While these developments reflect a reduced potential for conflict and an improved capacity to manage water across countries, the growth of transboundary water institutions may have also engendered a desire

to streamline the approach to their development toward a common blueprint. Institutional development according to a common blueprint may be better than no institutional development, yet it’s worth noting that common formats are often applied to basins that are facing very distinct issues and conditions. Application of common approaches across basins is likely due in part to: i) limited knowledge on how to tailor RBOs to basin-specific conditions and issues; and ii) growing emphasis on the development of RBOs at the basin scale, a scale at which issues are more general and institutions may be able to follow a more generic format.

Principle meets practice: Diversity in the scale of transboundary water cooperation

At what scale does transboundary water cooperation occur? To answer this question, approximately 215 treaties – obtained from the largest database of transboundary water law (utilized by Giordano et al. 2014) – were classified into one of six categories (Table 1): shared waters, full basin, tributary/sub-basin, border waters, infrastructure and other portion of basin. Shared waters refer to common waters between two or more countries without defining scale limits, e.g., utilization of

TABLE 1. Diversity in the scale of global transboundary water law.

| Scale | Definition/Explanation | Percentage of global treaties |
|---------------------|---|-------------------------------|
| Shared waters | Applies to all shared waters between two or more countries. | 13% |
| Full basin | Applies to a river’s entire hydrological area, catchment area and watershed. | 21% |
| Tributary/sub-basin | Applies to the tributary and associated sub-basin. | 7% |
| Border waters | Applies to watercourses in the border or frontier areas between riparian countries. Focus of the treaty is specifically limited to specific border water areas rather than broader shared waters. | 24% |
| Infrastructure | Applies to specific infrastructure in a shared waterway. | 22% |
| Other | Applies to a distinct portion of a basin, but not delineated along logical hydrologic boundaries, such as a sub-basin, and not focused on specific border areas or particular infrastructure. | 13% |

waters of common interest between South Africa and Namibia. Full basin refers to treaties applicable to an entire basin or basins, e.g., the Senegal River Basin. Tributary refers to treaties applicable to a tributary or tributaries within a basin, e.g., the Cuareim River, which is a tributary of the Uruguay River. Border waters refer to portions of watercourses that delimit or cross a boundary between two or more countries, e.g., the portion of the Rio Grande that straddles the USA-Mexico border. Infrastructure refers to treaties applicable to the construction, maintenance or operation of infrastructure, e.g., Lesotho Highland Water project. Other refers to treaties applicable to distinct portion(s) of a basin, e.g., Ganga waters in Farakka.

In practice, transboundary water management has occurred at a range of scales. Treaties are distributed across all scales. The largest proportion of treaties (24%) apply to border waters (Table 1). Among the other treaties, 22% apply to infrastructure, 21% apply at full basin scale, 13% apply to shared waters and 13% apply to the other scale. The least number of treaties (7%) apply to the tributary scale.

Smaller-scale treaties focus on specific goals and larger-scale treaties focus on broader processes. Treaties concluded at smaller scales often focus on specific goals such as flood control and hydropower. In contrast, larger-scale treaties more often focus on organization and policy development, data and information exchange, and conflict resolution. Interestingly, though perhaps not surprisingly, the proportion of treaties concluded at larger scales is increasing and those at smaller scales is decreasing.

Case study: Small transboundary tributaries in the Syr Darya River Basin, Central Asia

Small transboundary tributaries (STTs) in the Syr Darya River Basin. One of the two main rivers in the Aral Sea Basin, the Syr Darya, and its associated watershed are 219,000 km² in size, generate an annual flow of 37 km³ and are shared by four Central Asian republics: Kyrgyzstan, Tajikistan, Uzbekistan and Kazakhstan (Figure 1). The Syr Darya watershed contains an abundance



FIGURE 1. Syr Darya River Basin and its small transboundary tributaries.

of tributaries, many of which are small and transboundary. A STT is a non-main stem river with a drainage basin of less than 10,000 km² in area which crosses at least one international boundary.

Extensive water cooperation at a tributary level in Central Asia. Approximately 123 agreements were found to apply to STTs, including 101 primary agreements, 21 protocols to primary agreements and one amendment. This set of agreements represents a major expansion in the total number of transboundary global freshwater law. Moreover, this set of transboundary agreements constitutes the most voluminous body of international water law applicable to one river basin. Water cooperation at tributary level – gauged on a decadal basis – peaked at the beginning of the twenty-first century.

Small is practical: Emphasis of tributary-focused transboundary water law is practical. Treaties on STTs often focus narrowly on technically-oriented issues, such as water allocation and infrastructure, and less on legally-oriented issues, such as conflict resolution and amendment mechanisms. Water allocation appears to be the central focus in STTs in the Syr Darya River Basin. Such a focus on water allocation is at odds with global evidence at a range of scales, which indicates that treaties increasingly focus on softer issues. One possible reason for the greater emphasis on water allocation in STTs is due to the fact that practical issues may be driving practically-oriented cooperation in such tributaries, while water cooperation at other scales may be more politically and less technically oriented.

Case study: The Shire catchment, Zambezi River Basin, Southern Africa

The Shire catchment. The Shire catchment comprises one portion of the broader Zambezi Basin and forms part of the Lower Zambezi Basin, which together covers Lake Malawi and the Shire

River system (Figure 2). The Shire River originates as an outlet at the southern edge of Lake Malawi and flows 415 km southwards where it joins the Zambezi River. As flows into Lake Malawi are currently unregulated and the effect of decision making upstream of the lake outlet is estimated to be minimal, focus was placed on the Shire catchment downstream of the lake. The catchment covers an area of approximately 49,000 km², generating a mean annual runoff of approximately 15.7 km³. Of its coverage, 35,000 km² is in Malawi and 14,000 km² in Mozambique; hence, approximately 71% of the catchment is in Malawi and 29% in Mozambique. More than 4 million people live in the river's catchment; approximately 3.6 million in Malawi and approximately 0.6 million in Mozambique.

Water cooperation at the Zambezi Basin level. The level of collaboration between Malawi and Mozambique on water issues is currently limited. At a broader Zambezi Basin level, Malawi and Mozambique cooperate within the framework of the Southern African Development Community (SADC) Water Resources Technical Committee. Some cooperation is also achieved through the Zambezi Watercourse Commission (ZAMCOM), of which Angola, Botswana, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe are member states. Malawi has not yet ratified this agreement, but nonetheless participates as an observer.

Existing water cooperation in the Shire catchment. Discussions with personnel at relevant water authorities, including Administração Regional de Águas do Zambeze (ARA-Zambeze) in Mozambique and the Shire River Basin Management Programme in Malawi¹, were conducted to identify priority transboundary water issues. Results of the discussions suggest four key water issues of transboundary importance: flooding, aquatic weeds (water hyacinth), navigation and future water infrastructure development (Figure 3). The importance of flooding was manifested in conclusion of the *Agreement on the Establishment of the Joint Water Commission* (2003), which was

¹ Input was also sought from other notable actors such as the World Bank, African Development Bank (AfDB) and European Commission.

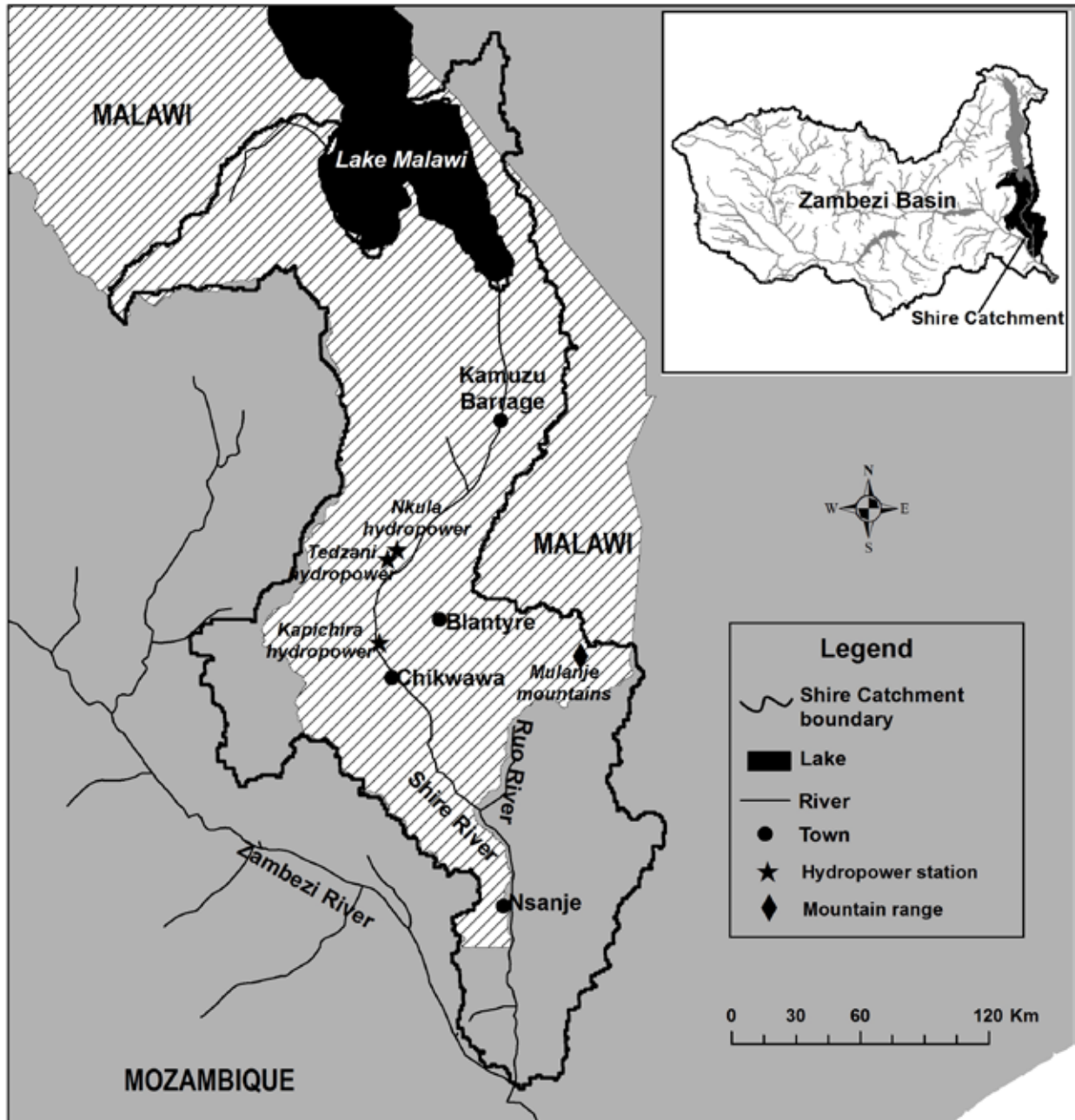


FIGURE 2. Shire catchment.

signed in response to the devastating floods in 2001. The importance of navigation is reflected in *The Feasibility Study for the Navigability of Shire-Zambezi Waterways* supported by the African Development Bank (AfDB).

Fit-for-purpose upscaling. Using gradational levels of cooperation on water as a guide (Table 2), three options were proposed that are tailored to suit the Shire catchment. First, a coordination-oriented form of cooperation is focused on the




FIGURE 3. Kamuzu Barrage, Shire River, Malawi. The height of the Kamuzu barrage is currently being augmented to allow for greater water control (photo: Jusipbek Kazbekov).

establishment of a joint committee that serves as a platform for data exchange and research on the issues of flooding, aquatic weed management and rules for navigation. Second, a collaboration-oriented form of cooperation is focused on adopting joint flood and weed monitoring practices, and possibly an agreement on a joint taxation and maintenance program for navigation. Finally, a third, action-oriented form of cooperation would center on the construction, operation and maintenance of joint infrastructure work.

Decision points. Decision points were flagged within and across issues that need to be negotiated

to achieve meaningful cooperation. Within issues, potentially contentious points hinge around the nature of a cost-sharing regime for navigation, and the modalities of cost sharing for any infrastructure or river maintenance programs. Across issues, key scope for progress may be achieved through finding ways for riparian countries to satisfy each other's interests for mutual benefit. For example, upstream areas of Malawi could incorporate downstream areas of Mozambique more concretely into flood planning and management activities. In return, Mozambique could offer concessions to Malawian vessels that wish to navigate from Nsanje to the Indian Ocean (and vice versa).

TABLE 2. Levels of cooperation.

| | No to low cooperation  | | | High cooperation |
|-----------------------------|--|--|------------------------|------------------|
| Sadoff and Grey 2005 | Unilateral | Coordination | Collaboration | Joint activity |
| Zeitoun and Mirumachi 2008 | Ad hoc | Technical | Risk aversion | Taking risks |
| <i>Synthesized approach</i> | No cooperation | Coordination and assistance, often technical | (Active) collaboration | Joint action |

Three recommendations for rolling out cooperation in the Shire catchment. As for specific, constructive ways forward in the Shire catchment, three recommendations are provided. First, start small. Avoid the temptation for more ambitious cooperation straightaway, and instead begin with low-intensity, coordinative cooperation that can identify the best opportunity for upscaling. Second, catalyze cooperation, and exploit respective riparian advantages and interests through bundling of issues as appropriate. Third, and more broadly, utilize adaptive and bottom-up approaches in conjunction with top-down water cooperation approaches. The set of issues identified through consultation and the set of instruments used to respond to such issues diverge from conventional approaches often employed. More effective and sustainable institutions may be those that are built in response to contextual realities rather than global norms, and contextual realities may lie at scales other than the basin.

Conclusions

Complement basin-scale focus with a focus on scales inside the basin. Solutions to certain water issues (e.g., dam operation, flood prevention, pollution control, conservation works) may be effectively delimited at geographies other than the full basin. Accordingly, there may be a role

for crafting transboundary water law that is tailored to suit such geographies. Management frameworks at scales within basins may no doubt need to be navigated carefully due to basin interconnectedness, as developments in a particular sub-basin will affect downstream areas. Nonetheless, focus on a selective part of a basin may constitute more achievable or ‘second best’ forms of water management that may foster practical progress.

Do not overlook focus on practical issues to achieve practical progress. In conclusion, it would seem that the proliferation of cooperation at a full basin scale, in recent decades, can be associated with an increase in softer, more politicized and arguably more precarious cooperation—reflected in the number of RBOs struggling to secure riparian funding. It would equally appear that meaningful, practically-oriented water cooperation occurs at more local scales. While ultimately good water management is likely to require harmonization of basin and local developments, it seems that the potential to harness and build on momentum at the local level may not be receiving the attention it deserves. The bottom line here is that there is no generic best approach to balancing scales in transboundary river basin management; recommendations provided immediately above indeed call for adapting to context.

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Front cover photo: Sangzar tributary in the Amu Darya River Basin, Central Asia (photo: Zafar Gafurov, IWMI, Central Asia).

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