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TRANSBOUNDARY WATER MANAGEMENT: WHO DOES WHAT, WHERE?

*Analysing the Data in SIWI's Transboundary Water
Management Database*

Kyungmee Kim

Karin Glaumann

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Note to the reader: In 2011, Swedish Water House initiated a project to map what regional and international actors are doing within Transboundary Water Management (TWM). This was a response to the very limited, fragmented and often case-specific nature of TWM knowledge. The lack of collated knowledge on the TWM actors can hinder effective cooperation among them. The actor-based mapping aimed to assist the identification of “knowledge gaps” and needs for further actions to promote objective decision-making, thereby helping to form a framework for resource allocation in TWM. A database was created from the collected information that gives a snapshot of the activities, tools and projects led by different actors working with various transboundary water issues.

Summary

In 2011 the Swedish Water House conducted a mapping of regional and international actors working in transboundary water management (TWM), which aimed to assist the identification of “knowledge gaps” and needs for further actions that could lead to more informed decision-making in water management. It also sought to promote objective decision-making, thereby helping to form a framework for resource allocation in TWM. Based on the mapping a database was created. The on-going activities of 94 actors, and more than 700 transboundary river and lake basins, aquifers and large marine ecosystems¹ can be found in the database. Similar efforts made previously have focused on legal frameworks or on capacity building through sharing project information (IWLEARN, 2012; WWF *et al.*, 2010; UNWAIS, 2012; TFDD 2007). The TWM mapping and database takes a broader focus and an actor-based approach.

The complexity and significance of TWM have been reiterated by researchers, politicians and water professionals. The socio-economic disparity as well as power asymmetries between the riparian countries is one of the obstacles to cooperation of TWM institutions. The development of physical infrastructure is often a sensitive issue, but one of the main driving forces of cooperation in some cases.

The primary objectives of TWM cooperation can be divided into three categories: 1) maximum utilisation of the common good (utilitarian approach); 2) conflict

prevention; 3) maintaining ecological sustainability.

This report analyses the findings from the database. It shows that more actors working with transboundary water issues focus their efforts on Africa than in any other region. Furthermore, most activities are located in transboundary rivers, while other basin types receive less attention. The three basins with the largest number of actors working with TWM are the Nile, Volta and Mekong.

According to the analysis of three basins with the most active number of TWM actors (the Nile, the Volta, the Mekong River Basin), the utilitarian approach appears to be the most prominent objectives of the current actors’ activities. Activities to maintain ecological sustainability are more prevalent in the Mekong River Basin, where information management has been successful and led by the strong institutional capacity of the transboundary basin organisation, Mekong River Commission. Conflict prevention activities are not as prominent in practice as they are in academic literature on transboundary water issues. None of the actors in the database involved in the Nile, Volta and the Mekong, are focused on conflict prevention as their main objective. Actors also provide different tools aimed to support transboundary water management, often in the form of publications. Most of the tools developed are broad and cover several aspects of TWM. The most common are tools providing information on how to construct legal frameworks.

¹ Transboundary basin borders are from International Water Learning Exchange & Resource Network (IWLEARN: www.iwlearn.net)

Introduction

Knowledge on Transboundary Water Management (TWM) is limited, fragmented and often case-specific. As a response to this, the Swedish Water House conducted a mapping of regional and international actors aiming to assist the identification of “knowledge gaps” and needs for further actions that can lead to more informed decision-making in water management. It also sought to help actors form a framework for resource allocation in TWM. Information was mainly collected through desktop research. Reports, policy documents and other material shared through websites of the various actors constituted the basis for information collection. A limited number of electronic interviews were also conducted with individuals responsible for TWM issues in their respective organisations. The survey was conducted over three months (October–December 2011) and a database was created based on the information collected. It is built around a visualised map showing the activities of different actors working on transboundary water issues (see Figure 1).

Some earlier efforts have been taken to collate information on the legal frameworks and agreements on TWM activities. One example is the Transboundary Freshwater Dispute Database (TFDD) developed by the Oregon State University’s Department of Geosciences, in collaboration with the Northwest Alliance for Computational Science and Engineering. It contains

a wealth of data for researchers studying international water conflicts, such as information on 450 international fresh water related agreements. Based on the TFDD database, Wolf *et al.* (2003) identified the basins at risk of conflict through comprehending biophysical, socio-economic and geopolitical data between 1948 and 1999. The WWF/UK Department for International Development (DFID) review of the ‘international architecture’ related to transboundary water resources management from 2010 is another example. Through regional assessments, interviews and literature reviews it analysed the global state of TWM in order to suggest improvements to the international architecture, defined as legal arrangements and institutions governing transboundary water resources.

When it comes to collecting information on TWM projects and tools, two initiatives stand out. The UN-Water Activity Information System Plus (UNWAIS+), developed by the UN-Water Decade Programme on Capacity Development, contains information on transboundary water projects carried out by UN-Water members, partners and associated programmes. The Global Environment Facility’s (GEF) International Waters Learning Exchange and Resource Network (IW:LEARN) holds information of GEF International Waters projects, including case studies, transboundary diagnostic analyses and strategic action programmes. Although the main focus is on



Figure 1 Transboundary Water Management Database

information about specific projects, there are also some tools shared, which are mainly provided in the form of reports. Both initiatives aim to enhance knowledge on TWM, by engaging in “learning by sharing”.

This database takes a broader focus, providing information on the different type of activities that are taken on by TWM actors. Organisations can use it as a base for discussion on future activities and decrease the risk of duplication. Researchers can use it to identify research needs and water managers and decision-makers to identify working models and tools that facilitate river basin management.

Currently the database holds 94 actors, from six actor groups: River Basin Organisations, Regional Economic Communities (RECs), International Financial Institutions (IFIs), UN agencies, International Non-Governmental Organisations and Intergovernmental Organisations (INGOs). There are additional actor groups that play an important role in TWM, such as donor agencies that have not been included at this stage. Although these are not included in the current database, its interactive format allows for the addition of new actors, projects, tools and activities in the future.

TWM actors are broadly defined as any regional or international organisation, institution or network working with TWM. Through the map, which includes more than 700 basins, on-going activities in various basins

can be found. For each actor, an overall description of the type of TWM activities is given, complemented by project-specific information where this was available. Information on tools, in most cases in the form of policy-recommendations or basin-related data, is also included for some actors. It is important to note that some of the information gathered in this database was taken from the actor’s websites and it may reflect an organisation’s ambitions rather than the activities they are actually implementing.

This report presents the main findings from the mapping exercise based on the current state of the database (June 2012). The following section provides a brief overview of TWM as well as a review of the different ways states cooperate and their motivation to do so. This is followed by analysis of the findings of the mapping exercise, including the geographical focus of actors and the type of activities given attention.

Overview of Transboundary Water Management

Approximately 40 per cent of the world's population lives near river and lake basins that are shared by two or more countries (Sadoff and Grey, 2005), and even a larger share depend on these transboundary basins for their livelihoods. Some 263 transboundary lake and river basins have been identified and account for 60 per cent of global freshwater flows (Giordano and Wolf, 2002). In addition, approximately 300 transboundary aquifers systems are supporting roughly 2 billion people globally. With growing pressure on freshwater resources, transboundary water resources management is an important regional and international public good (Nicol *et al.*, 2001; Jägerskog *et al.*, 2007).

The complexity of TWM has been addressed by several authors (Earle *et al.*, 2010; Giordano and Wolf, 2003; Phillips *et al.*, 2005). Part of the complexity includes the process of reaching consensus among the riparian countries to create an intergovernmental transboundary basin organisation. A host of factors, such as different levels of socio-economic development between states, institutional capacity, infrastructure development, and the level of trust, affect TWM and cooperation on water resources. Differences in socio-economic development between riparian countries contribute to differences in the demand for and use of transboundary waters. For example, the 10 countries bordering the Nile vary significantly when it comes to socio-economic devel-

opment (figure 2). The regional powerhouse Egypt has roughly 18 times higher Gross National Income per capita than the Democratic Republic of Congo. A strong national economy often translates into better social development including education, health and to reduced poverty and inequality. Furthermore, a country's institutional capacity to manage water is closely linked to the level of socio-economic development. In some riparian countries, poverty slows institutional capacity building. Not only institutional capacity, but also skilled human resources are essential to generate sound water management.

The best way of managing transboundary water resources is through an integrated approach. In practice, however, many transboundary basins lack the required institutions to prevent and resolve conflicts and to coordinate resource sharing. Low levels of trust between institutions and strong political influence by the national decision makers in these matters can also prevent cooperation on TWM (UNDP, 2006). When the riparian countries have unequal capacity to manage their shared waters, the trust between them becomes harder to achieve.

Another challenge in TWM is the slow development of physical infrastructure. Low levels of socio-economic development often lead to underdevelopment of physical infrastructure. In terms of mitigating the blue water

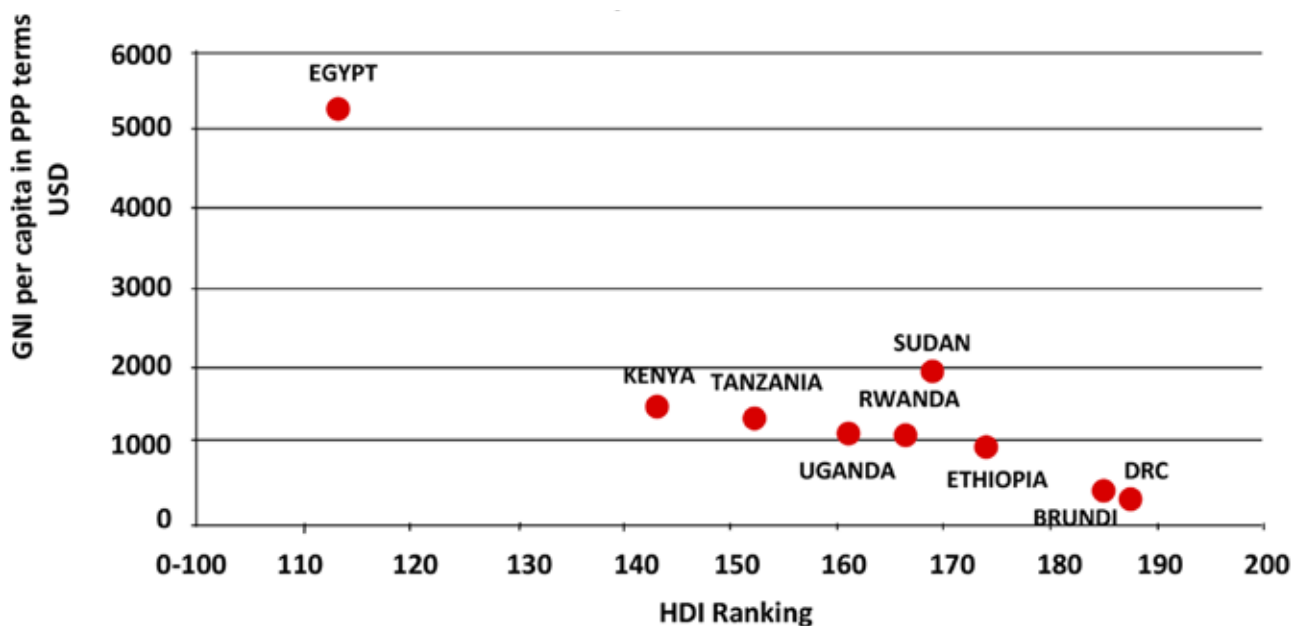


Figure 2 Socio-Economic Development Indicators of the Nile Riparian countries (UNDP 2012)²

² The data of South Sudan for the year 2011 is not available (UNDP 2012)

shortage, construction of multipurpose storage facilities can mitigate the impacts of hydro-climate variability. Particularly in Africa, the need to build more water infrastructure for irrigation has been addressed by both high-level politicians and peasant farmers. Infrastructure development in contested transboundary basins, however, can invoke controversies over water allocation. Despite the existing challenges in TWM, cooperation on transboundary waters has a long history. TWM cooperation often begins with activities to promote trust-building and information-sharing. Building reliable and accountable institutions to manage transboundary waters is an essential part of TWM cooperation, but it is certainly not the end goal of actors and their activities. Promoting cooperation in TWM is more a process-oriented activity rather than an outcome-oriented.

The Regional Water Governance Project of the University of Arizona (definitions adopted from Gerlak 2007:4, see figure 3), divided transboundary water cooperation into three categories:

1. Shallow cooperation: Characterised by ‘loose institutional cooperation’, where there is no official headquarters or formalised bureaucratic mechanisms of cooperation. Instead there may be shifting structures such as joint committees, coordination teams, technical teams, task forces, or partnerships.

2. Intermediate cooperation: Characterised by a ‘more sophisticated level of bureaucratic organisation’, where regular meetings are held between the parties, and there is a permanent headquarters or secretariat with independent staff. This organisation is not financial independent, and may, for instance, be dependent on donor funding.
3. Deep cooperation: Characterised by ‘a high degree of bureaucratic organisation and financial independence’. Such institutional arrangements qualify as formal international organisations, as they ‘institutionalised collective decision-making and oversight in governance.’

In order to reach deep cooperation, it is essential to establish sufficient bureaucratic organisation to assure some stability of management.

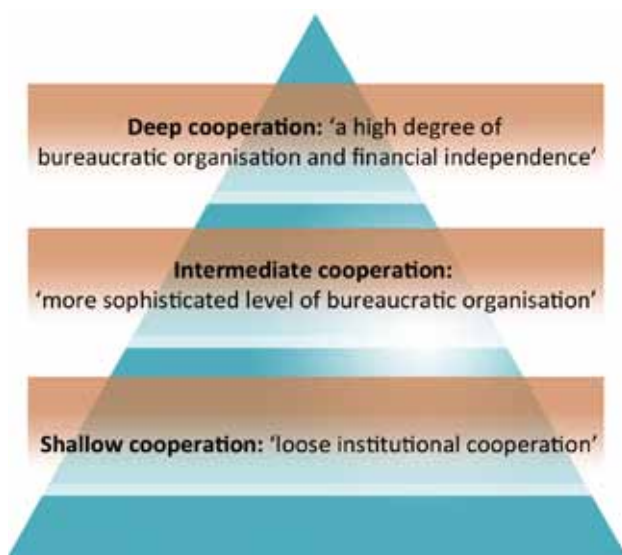


Figure 3 Levels of Cooperation (adopted from Gerlak 2007:4)

“Whisky is for drinking, water is for fighting over”

Mark Twain

Transboundary water management (TWM) is a political process: political borders divide the transboundary watershed; politicians make decisions on transboundary water resources; and political structures of the riparian countries affect TWM significantly (Earle *et al.*, 2010). This means that the management of transboundary water is heavily influenced by ‘hydropolitics’.

Organisations involved in TWM at the local, regional and international level are increasingly focusing on ways to navigate hydropolitics to enhance the cooperation in TWM. Over the past two decades, the discourse on hydropolitics has evolved. Earlier discussions emphasised the risks of water conflicts as the consequence of the competition over transboundary water (Bullock and Darwish, 1993; Gleick, 1993; Starr 1991). Later scholars argued against the ‘water wars’ thesis and focused on the potential for ‘water cooperation’ (Alam 2002; Allan, 2002; Beaumont, 1994; Homer-Dixon 1999; Swain, 2001; Wolf 1999). Wolf (1999) showed this trend with empirical data by comparing the datasets of water-related conflicts and treaties, which revealed that only seven minor conflicts over water have been recorded while 145 water-related treaties have been signed between 1918-1994.

One argument to explain why there have been few physical conflicts over water is that water scarce regions

are able to import virtual water from the water abundant countries, mainly through the international food market (Allan, 2002). Thus, their large-scale water needs (for the production of agricultural products) can be more easily solved through international food trade than they can be by engaging in physical conflict with a neighbour over water resources. Beaumont (1994) proposed that the water wars will be avoided in the Middle East because the improved water use efficiency in irrigation in the region will reduce pressure on local resources. Alam (2002) argued further that avoiding conflicts over water has encouraged the cooperation transboundary water, and showed how this occurred in the contested Indus Basin.

The key question that follows is: “Why do riparian countries choose to cooperate on water issues?”

After water cooperation became the dominant discourse in TWM, questions on ‘what qualifies as good cooperation?’ and ‘how does the power asymmetries affect the cooperation?’ have become more important. Power relations are asymmetric in transboundary river basins, which often lead to inequitable and sub-optimal use of water resources between riparians (Allan and Mirumachi, 2010: 19). The forms and fields of power can be categorised into geographical power, material power, bargaining power and ideation power (See figure 4, Cascao & Zeitoun, 2010: 31-32). The basin hegemons may influence others in agenda setting and decision making by executing these various forms of power over other riparians. When all the riparian countries disagree on the fairness and justice in TWM, the cooperative management of the shared water may become more difficult.

The quality of cooperation has become another centrum of debate in TWM. The existence of a water treaty on data-sharing and other interventions such as technical assistance and decision support system do not ensure effective cooperation (Daoudy and Kistin, 2008). Many TWM actors and their activities are primarily focusing on establishing TWM regimes. Understanding of “cooperation” is loosely-defined and does not necessarily call for solving ‘all relevant issues’ under the name of cooperation (Jägerskog and Zeitoun, 2009; Molle, 2008). In fact, some treaties stand for much more than what the riparian countries can achieve in reality. The quality of cooperation needs to be addressed and prioritised by the transboundary water policy-makers (Jägerskog and Zeitoun, 2009).

Followed by the shift of the TWM research focus from conflict to cooperation, the existing and newly established TWM organisations put emphasis on cooperation in their objectives and activities.

The diverse objectives of TWM cooperation can be summarised into three categories; to maximise utility (including water use efficiency and benefit sharing from the transboundary water use);

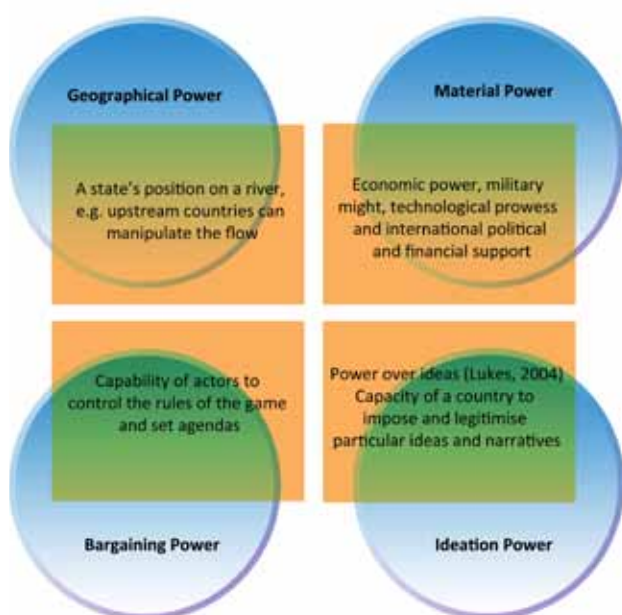


Figure 4 Forms and Fields of Powers (Cascao & Zeitoun, 2010: 31-32)

to prevent conflicts and improve the regional stability; and to maintain ecological sustainability (figure 5). An actor and a single project/activity can have multiple objectives, or the front-line objectives and the underlying objectives can be mismatching. Thus, the difficulties lie in categorising the objectives of TWM under the principle of mutually exclusive and collectively exhaustive.

Maximum Utilisation of the Global Common Good

Water has been taken into consideration as a global common good since the United Nations Conference on the Human Environment held in Stockholm, 1972. TWM cooperation often aims to enhance water supply, water availability, water resource development, and water use efficiency; and these activities have the rationale of maximising utility of the common resource in the utilitarian model. Under the utilitarian model, cooperation among the multilateral actors is the key to stakeholders reaching the maximum utilisation of common goods (Oye, 1986). Based on the Dublin Principles of 1992, Integrated Water Resource Management (IWRM) applied in TWM promotes better coordinated management in order to maximise economic and social welfare without compromising the ecological sustainability (GWP, 2012). Many actors in TWM promote IWRM to improve water management. Coherent manners in managing water and other important natural resources cannot be overlooked. Handling the basin data modelling and scenario planning are crucial for managing the transboundary waters more effectively. In addition, human and institutional capacity building, for example, is one of the activities that contribute to maximise the effective use of transboundary waters. National governments and transboundary basin organisation officials can benefit from training courses in TWM.

Conflict Prevention

When the TWM discourse shifted from water wars to water cooperation, academia and policy makers began to focus on how to reduce conflict through TWM cooperation (Phillips *et al.*, 2006; UNEP, 2004; Wolf *et al.*, 2005; Zeitoun and Mirumachi, 2008). Conflict prevention aims to foster regional stability and peace through TWM, a good example of this being the From Potential Conflict to Cooperation Potential programme managed by UNESCO's International Hydrological Programme (UNESCO-IHP, 2012). Conflict prevention is one of the main objectives of TWM cooperation and it is connected to the enhancement of the quality of cooperation between the riparian countries. The institutional efforts on building dialogues between riparian countries and providing them with a platform to negotiate are often lacking. A study carried out by WWF and DFID pointed out the absence of



Figure 5 Purpose of TWM Cooperation

institutions that has been mandated to exclusively promote, initiate, facilitate and coordinate transboundary initiatives (WWF *et al.*, 2010: 27). Some TWM actors and activities that promote conflict prevention provide training courses to river basin organisations and national water officials how to raise awareness of decision makers and diplomats about their obligation to respect their citizen's right to water (PCCP, 2003).

Maintaining Ecological Sustainability

Young (1989) argues that the institutional bargaining power of environmental governance can be maximised when all members of the regime are exposed to environmental impact. For example, the on-going UN-led climate change negotiation has been struggling to reach the agreement that is accepted by all emitters. When all the emitters are not the party of the agreement, collective action problem such as free riding can occur. In the case of TWM, solving the environmental problems is most effective when all the riparian countries, polluters and exposed members, participate in the regime. Some TWM cooperation began with solving the transboundary environmental problems such as eutrophication (e.g. the Baltic Sea), water resource depletion (e.g. the Aral Sea) and water pollution (e.g. the Black Sea). The transboundary environmental impact caused by weakly coordinated TWM can damage people's livelihood and the human development of a region. The international environmental NGOs such as IUCN, Wetland International and WWF are actively working to enhance the ecological sustainability through TWM cooperation.

Box 1. Why capacity building in TWM is needed

Frequently the people placed in charge of managing transboundary waters come from engineering or hydrological backgrounds – skills vital for the successful development of water resources and provision of water services. However, most of these individuals are not equipped with the skills needed to engage in international negotiations and the development of legal frameworks for TWM. Knowledge on international water law, hydro-politics, negotiations, conflict resolution, stakeholder participation and strategic communications is essential to effective TWM. Hence it is important to develop targeted capacity building aimed at the organisations nationally responsible for the management of TB waters. International agreements a state has entered into take precedence over national law, thus the domestic legal framework needs to be brought in-line with international agreements in order to implement the various provisions. As international agreements are implemented at the local level it is important to build capacity amongst actors

at this level – both within various spheres of government (provincial or state, municipal etc) as well as amongst NGOs, civil society, academia and the private sector.

Capacity building initiatives can also address power disparities between states. Typically the more powerful basin state (the hegemon) has greater resources to draw on – including human expertise. They are thus able to dominate and shape the discourse and control the pace and direction of negotiations. By building the capacity of less powerful basin states a contribution is made to allowing them to negotiate more effectively and generally participate in a more meaningful way in joint management frameworks. This “levelling of the players” is a vital first step in correcting power imbalances on a regional and basin level.

Anton Earle
Director, Capacity Building, SIWI

Where are Actors Working?

In the database, 94 actors have been identified from six groups: international financial institutions, intergovernmental organisations, UN agencies, regional economic commissions, international NGOs and transboundary basin organisations.

The number of actors working in each transboundary basin that has been gathered in the database is shown in Table 1.³ The results indicate that the Nile River Basin features the largest range of actors and projects, with 19 actors and 19 currently active projects. The Volta River Basin, with 15 actors and 8 projects, the Mekong River Basin with 12 actors and 13 projects and the Okavango River Basin, with 11 actors and 10 projects, follow as the basins with the highest quantity of TWM activity. The list goes on with the Senegal (10 actors) and the Lake Victoria Basin (10 actors), the Niger (10 actors), the Aral Sea Basin (9 actors) and the Congo-Zaire River Basin (8 actors).

Geographically, 10 out of the 17 basins with the highest quantity of TWM actors and projects are in Africa. Other continents (except North America) have similar numbers of transboundary basins, but Asia and Europe have 5 basins altogether, and South America has 2 basins that rank within the 17 most active basins. According to the International Water Basin Register (2002) by the Oregon State University, the most transboundary rivers and lakes are located in Europe (69 rivers). In Africa, 59 rivers and lakes are identified, and 56 in Asia. In South America and North America, the number

of transboundary rivers and lakes are less (38 in South America and 40 in North America). In this respect, the number of existing basins per continent and the most popular basins for TWM actors are asymmetrical. Some of the TWM projects are connected to the socio-economic development and ecological conservation of the region.

The international development agencies/donors have realised that the key factor of the success in international cooperation projects is meeting the demand of the basin states. In cases where the demand from the region is clear and out-spoken, the international actors seem to be more actively involved (see the example of the Nile Basin Initiative and the Mekong River Commission). Most of the actors that are working on the global level are the UN Agencies. Furthermore, some regional economic organisations are working on regional basis.

In terms of the geographical distribution of transboundary basin organisations/initiatives, Africa also has the most transboundary basin organisations (18 basin organisations), followed by Europe (10), South America (6), Asia (6) and North America (4) (Figure 6).⁴

Regional Differences

The relatively large number of transboundary basin organisations and initiatives in Africa demonstrates a high regional demand for better transboundary water management. Africa has experienced severe freshwater shortages due to rainfall variability, and insufficient

³ The number of actors includes the transboundary basin organisations

⁴ Note on the definition of organisations/initiatives in the database: In the database, the narrow definition of organisations is adopted. The broader sense of organisations includes both standing and non-standing organisations, institutions, society and legal mechanism. Yet in this database, the organisations/initiatives that have a mandate to manage the entire basin are included, i.e. the basin organisations/initiatives that are operating in a tributary of the basin are excluded.

infrastructure. The density of transboundary basin organisations in Africa can be interpreted as part of an attempt to tackle these problems. Another factor is the significant influence of the international aid donors in the region. The multilateral dialogues and institution building have been promoted by the international donor community to enhance TWM. Many transboundary basin organisations in Africa receive support from the international aid donors.

In Asia, only 5 transboundary basin organisations have been established. In terms of the number of transboundary rivers, Asia (57) has almost as many as Africa (59) (TFDD International River Basin Register, 2002). The relatively small amount of transboundary basin organisations in Asia also correlates to multilateral co-operation being less common across the continent, where bilateral agreements and cooperation are more prevalent. For example, the Ganges-Brahmaputra-Meghna River

Basin has no river-basin wide agreement. Instead, a number of bilateral treaties have been signed in the tributaries of the basin (the Kosi, the Ganges, and the Mahakali River Basin). India and Bangladesh signed an agreement on the water quantity of the Ganges River flow passing the Farakka Barrage in West Bengal in 1996. India and Nepal also signed a treaty on Mahakali River in 1996 regarding water quantity, hydro-power and flood control. The development potential of the Ganges-Brahmaputra-Meghna River is immense. In order to realise the potential, the regional perspective needs to be strengthened (Biswas, 2008). The Indus River Basin is a similar case. India and Pakistan has a bilateral treaty covering water quantity, flood control and disaster relief. The agreement does not include other riparian countries or mandates to establish a permanent organisation that is responsible to manage the entire Indus basin.

Table 1 Number of TWM Actors by Basins (top 15 in the list)

	Transboundary Water Basins	Type of Basin	Number of Actors	Number of Projects	Geographical location
1	The Nile River Basin	River	19	19	Northern, Eastern and Middle Africa
2	The Volta River Basin	River	15	8	Western Africa
3	The Mekong River Basin	River	12	13	South Eastern and Eastern Asia
4	The Okavango River Basin	River	11	10	Southern, Eastern and Middle Africa
5	The Senegal River Basin	River	11	9	Western Africa
6	The Lake Victoria Basin	Lake	10	7	Eastern Africa
7	The Niger River Basin	River	10	6	Western, Northern and Middle Africa
8	The Aral Sea and Aral Sea Basin	Lake	9	4	Central Asia
9	The Congo-Zaire River Basin	River	8	10	Middle, Eastern and Northern Africa
10	Northwest Sahara Aquifer System	Aquifer	7	7	Northern Africa
–	The Zambezi River Basin	River	7	7	Southern, Eastern and Middle Africa
11	The Sava River	River	6	6	Southern and Western Europe
12	The Lake Tanganyika Basin	Lake	6	5	Eastern and Middle Africa
13	The Ganges-Brahmaputra-Meghna River Basin	River	6	4	Southern, Eastern and South-Eastern Asia
14	The Kura-Araks River Basin	River	6	4	Eastern Europe, Western and Central Asia
15	The Amazon River Basin	River	6	3	South America
–	The Rio de la Plata River Basin	River	6	3	South America

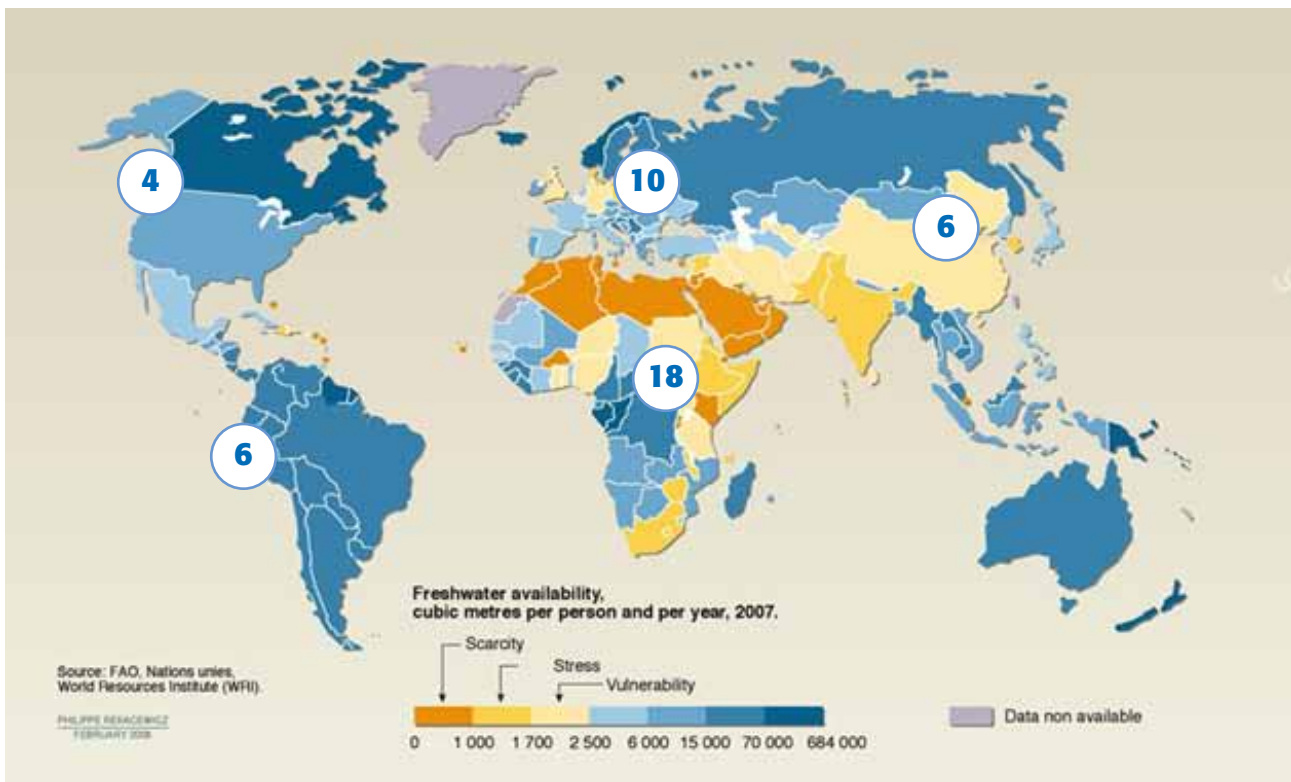


Figure 6 Number of Transboundary Basin Organisations by Continents

Which Basin Types Receive More Attention?

Transboundary lakes and aquifers seem to receive less attention from TWM actors than river basins. Only three lakes and only one aquifer are presented in the list of the top 15 most active TWM basins (table 1). According to the database, there are TWM actors working on 96 projects in the transboundary river basins (table 2). By comparison, only 29 actors are working on the transboundary lakes and 15 actors on the transboundary aquifers. There are 64 large marine ecosystems (LME) worldwide, but among the TWM actors, only three are working in the LMEs. There are several possible reasons for this disparity. TWM cooperation on transboundary river basins has been developed for many decades; the global assessments and resource mobilisations have been formalised up to certain level. Work on other types of transboundary basins, such as lakes and aquifers, is still in infancy (See the case of transboundary aquifers: Puri and Aureli, 2005).

Table 2 Number of Actors and Projects by Types of Transboundary Water Basins

ACTIVITIES SPREAD ACROSS BASIN TYPES		
BASIN TYPE	ACTORS	PROJECTS
LME	4	2
Lakes	27	26
Rivers	69	96
Aquifers	7	21

In Focus: The Nile, Volta and Mekong

Based upon the information gathered to date in the database, this paper analyses the actors and their projects and tools within the most active transboundary basins: The Nile, the Volta and the Mekong River Basin.

The Nile Basin

Total Area: 3,031,700 km²

Riparian Countries: Burundi, Central African Republic, Democratic Republic of the Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Uganda, United Republic of Tanzania.

Transboundary Basin Organisation: Nile Basin Initiative. Involved Actors: African Development Bank (AfDB), Centre for Environment and Development for the Arab Region and Europe (CEDARE), Community of Sahel–Saharan States (CEN-SAD), Economic and Social Commission for western Asia (ESCWA), Economic Commission for Africa (UNECA), Food and Agriculture Organisation (FAO), Global Environment Facility (GEF), Intergovernmental Authority on Development (IGAD), International Water Management Institute (IWMI), Nile Basin Initiative (NBI), Sahara and Sahel Observatory (OSS), Southern African Development Community (SADC), UNEP-DHI Centre for Water and Environment, UNESCO's Institute for Water Education (UNESCO-IHE), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), Water Governance Facility at SIWI (WGF), World Bank.

The Nile Basin is a working place for the most TWM actors. The conflict of interests among the 10 riparian countries has a long history that continues to evolve, and is a major regional issue with global ramifications. At present, the Nile Basin is facing political challenges. Six of the upstream countries (Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda) have signed the Cooperative Framework Agreement (CFA). Egypt and Sudan have deferred to the current CFA arguing that it is not recognising their water rights and uses as the old agreements from 1929 and 1959.

The Nile Basin Initiative (NBI) is an intergovernmental organization with 10 member states (Burundi, DR Congo, Egypt, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda) and 1 observer (Eritria). NBI was created to assist the member states in identifying and preparing investment project within the Nile. Contributions from the member states and several multilateral and bilateral donors are supporting NBI financially. The contentious CFA is part of NBI's regional institution to govern the Nile Basin. NBI aims to achieve its goals through its Shared Vision Programme, Strategic Action Programme and the Subsidiary Action Programme.



Figure 7 Map of the Nile Basin (satellite image by NASA)

Three international financial organisations including the Global Environment Facility (GEF), the African Development Bank (AfDB) and the World Bank are active in the Nile Basin. GEF and the World Bank focus on promoting regional cooperation and security while the African Development Bank provides capacity building to enhance integrated water resource management for national officials (but not exclusively within the Nile Basin). Although GEF and the World Bank have a similar goal to promote cooperation in the river basin, their activities have different emphasis. Both GEF and the World Bank work closely with the NBI to provide financial and technical support. GEF supported the Nile Transboundary Environmental Action Programme under the NBI's Shared Vision Programme. The role of international financial organisations in the Nile Basin is to act as financial supporters of the projects for other actors and various programmes/projects of NBI.

Among the UN organisations, UN Environment Programme (UNEP), UN Development Programme (UNDP), UNESCO-IHE and the Food and Agriculture Organisation (FAO) of United Nations are active in the Nile Basin. UNEP is especially leading the area of climate change through policy intervention, technology

transfer and investment in key infrastructures. UNEP has worked closely with NBI. UNEP and UNESCO-IHE have been participating in Regional Climate Modelling of the Nile Basin Project. Another UN related organisation is the Sahara and Sahel Observatory (OSS) that was established under the UN Convention to Combat Desertification (UNCCD). FAO's Water Development and Management Unit enhances water use efficiency and productivity. UNDP has been working in the area of capacity building, advocacy, research and financial support in TWM.

Several regional organisations including the UN Economic and Social Commission for Western Asia (ESCWA), UN Economic Commission for Africa (UNECE), Southern African Development Community (SADC) and Community of Sahel – Saharan States (CEN-SAD) are active in the Nile Basin. ESCWA, UNECE and SADC provide institutional and human capacity building to the member states. UNECE also provides technical support to the member states and the River Basin Organisations. SADC conducts work on regional water resource planning and development, infrastructure development and water governance. CEN-SAD supports other regional organisations by offering them a discussion point and providing them information on transboundary waters in the region.

In 2012, 19 projects are on-going in the Nile Basin. Some projects target the Nile Basin exclusively but others work with several basins including the Nile. Most projects are conducted by a lead organisation and its partners provide support in the specialised areas. Among the 19 projects in the Nile Basin, a majority provide technical support in terms of information management and capacity building. Within information management, most support is given to the management of the basin's hydrological data. A number of projects intend to enhance TWM decision-making through modelling and scenario planning on water allocation. Capacity building projects mainly focus on institutional development targeting national water management ministries and transboundary basin organisations. Acting as a platform for networking and discussion appear to be an important aspect of the capacity building activities. There are some projects that are focusing on the nexus between the climate change and water. Few projects seem to focus on legal frameworks, conflict resolution and ecosystem conservation.

The Volta River Basin

Total area of basin: 412,800 km²

Riparian countries: Burkina Faso, Ghana, Togo, Mali, Benin and Ivory Coast

Transboundary Basin Organisation: Volta Basin Authority

Actors: African Ministers' Council on Water (AMCOW), Community of Sahel – Saharan States (CEN-SAD), Economic Commission for Africa (UNECA), Economic Community of West African States (ECOWAS), EU Water Initiative (EUWI), Global Environment Facility (GEF), Global Water Partnership (GWP), Green Cross International, International Union for Conservation of Nature (IUCN), International Water Management Institute (IWMI), Stockholm Environment Institute (SEI), UNEP-DHI Centre for Water and Environment, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), Volta Basin Authority.

The Volta River Basin is shared by Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo. It lies in the semi-humid to semi-arid region in West Africa, which has seen changes in the climate in recent years that have led to a shortened growing season and more erratic rainfall (GLOWA, 2009). Most of the river's water is used for irrigation and hydropower generation (Gao and Margolies, 2009). The Volta Basin Authority (VBA) was created by the six riparian countries in 2006. VBA includes all the riparian countries and its mandate is to promote the integration of IWRM in basin management and the development of joint projects and works. Further institutional development of VBA is necessary for achieving its mandates and objectives.

At present, 15 actors are presented in the Volta River Basin, representing the various actor groups included in the database: international financial institutions (GEF), regional organisations (Community of Sahel, UNECA & ECOWAS), intergovernmental initiatives (AMCOW & EUWI), UN agencies (UNDP, UNEP & UNEP-DHI) and international NGOs (Green Cross International, IUCN, IWMI & SEI).

The number of projects that are identified in the database (7 projects) is proportionally smaller than that of the Nile (19 projects). Similar to the Nile Basin, technical assistance (information and data sharing) and capacity building were identified as the most common work areas. Among the small number of samples, promoting stakeholder participation is the most notable work area by the actors in the Volta. Some projects noted stakeholder participation as a component of their activities. There are two projects that focus on ecological conservation. GEF is financing a comprehensive project that promotes the ecological sustainability, capacity building and stakeholder participation. IUCN operates a project that focuses on ecological sustainability by reforestation and rehabilitation of a small reservoir.



Figure 8 Map of the Volta River Basin (by University of Bonn)

The Mekong River Basin

Total basin area: 787,800 km²
 Riparian Countries: China, Myanmar, Vietnam, Lao PDR, Thailand and Cambodia
 Transboundary basin organisation: Mekong River Commission
 Actors: Asian Development Bank (ADB), Association of Southeast Asian Nations (ASEAN), Conservation International, Economic and Social Commission for Asia and Pacific (ESCAP), International Union for Conservation of Nature (IUCN), International Water Management Institute (IWMI), Stockholm Environment Institute (SEI), United Nations Environment Programme (UNEP), United Nations University (UNU), World Bank and World Wildlife Fund (WWF).

The Mekong River Basin is comprised of six riparian countries, with China and Myanmar located upstream and Vietnam, Lao PDR, Thailand and Cambodia located downstream. The history of TWM cooperation in the Mekong River Basin can be traced back to 1960s, when the Mekong Committee was formed. Although the 1995

Mekong Agreement signed by the downstream countries declares ‘basin-wide’ management, the upstream countries, China and Myanmar, have not signed the agreement. The 1995 Mekong Agreement affirms the possibility of extending the signatories of the agreement to the other riparian countries. Hence, in theory, the membership of the Mekong River Commission (MRC) can be extended to the entire basin in the future. Since 1996, China and Myanmar have been participating in the MRC Dialogue Meetings as dialogue partners. Due to the limited participation of the upstream countries, the actors’ geographical work area is mainly focused on the lower part of the Mekong Basin.

From the database, 11 actors conducting work on the Mekong are identified. Half of them are international NGOs (Figure 10). These international NGOs are mainly focusing on the environmental issues (IUCN, WWF, Conservation International, International Water Management Institute and the Stockholm Environment Institute).⁵ However, the projects implemented by the NGOs are not only limited to the promotion of ecological sustainability. For example, IUCN is active in running a project to raise awareness and to open up dialogue with the upstream countries. Another interesting fact is that most of the projects within the Mekong River Basin are implemented by MRC. Compared to the examples of the Nile and the Volta, a larger portion of projects concentrate on providing support to the transboundary basin organisation, MRC. The transboundary basin organisations also focus more on the legal framework and dialogues/negotiations. This may be explained by the relatively wide range of activities under the MRC, including IWRM, stakeholder participation, ecological sustainability, information management, modeling and scenario planning as well as climate change adaptation and mitigation.

Institutional capacity building and stakeholder participation are actively promoted within projects of the actors working in the Mekong. In terms of information management, the activities in the Mekong River Basin are not only limited to standardising and sharing data and information but also work to disseminate this information to decision-makers. IWRM is promoted by the transboundary basin organisation and other actors not only in their projects but also in the overall planning stage (e.g. Basin Development Plan Project by MRC, see MRC, 2011).

⁵ It is noted that the local NGOs that are active in the Mekong River Basin are not currently included in the database. The further development of the database can widen the range actors.



Figure 9 Map of the Mekong River Basin (by United Nations)

Comparing the Nile, Volta and Mekong Basins

According to SIWI’s database, the composition of the actors varies between the basins (figure 7). In the Nile Basin, UN agencies and international NGOs are prominent actors. The presence of intergovernmental organisations and regional organisations is also strong. Three out of the four major international development banks and financial organisations (AfDB, ADB, World Bank and GEF) are represented. The strong presence of the UN agencies and international financial organisations reflect the clear demand for international support within the Nile Basin. The international NGOs are working as facilitators and experts in the basin to support the implementation of the projects.

From the case of the Volta Basin, the legal framework has been settled by the establishment of Volta Basin Authority. However the number of projects is significantly lower (7 projects) and the support from the international financial institutions appears to be less than it could potentially be. The international NGOs’ activities in the Volta cannot be clearly identified from the database.

The Mekong River Basin has a long history of TWM cooperation and attracts a large number of actors. The MRC has strong institutional capacity and has been successful in planning, initiating and implementing projects in the basin.

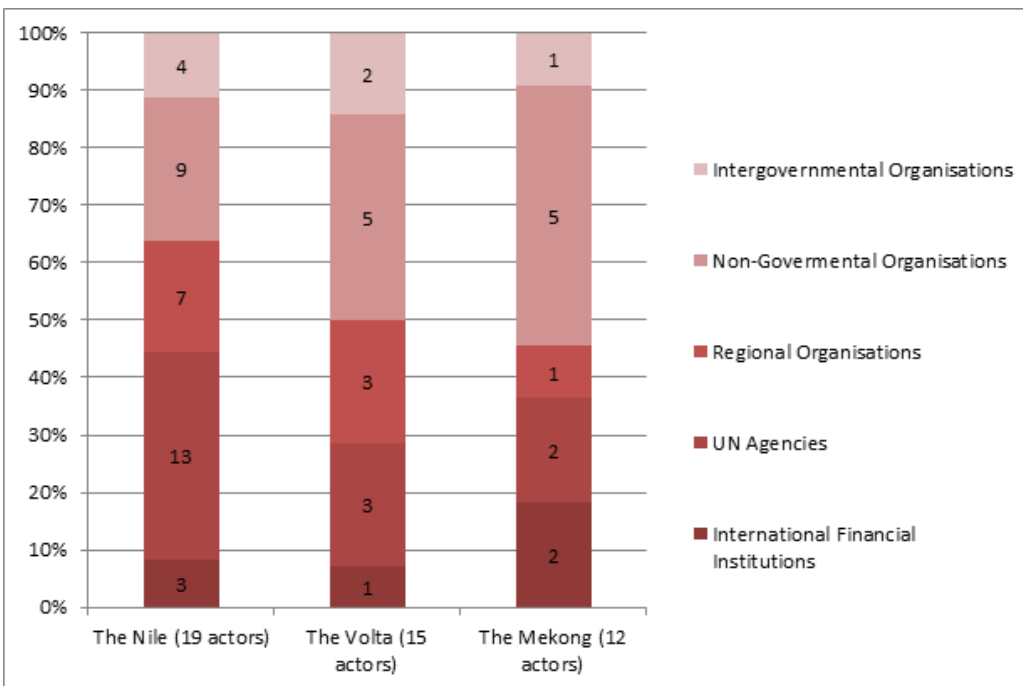


Figure 10 The type of actors in the Nile, Volta and Mekong Basin^{6,7}

⁶ “Regional Organisations” include the UN Economic Commissions and Communities.

⁷ Transboundary Basin Organisations are not included in counting for the figure.

What are TWM Actors Promoting?

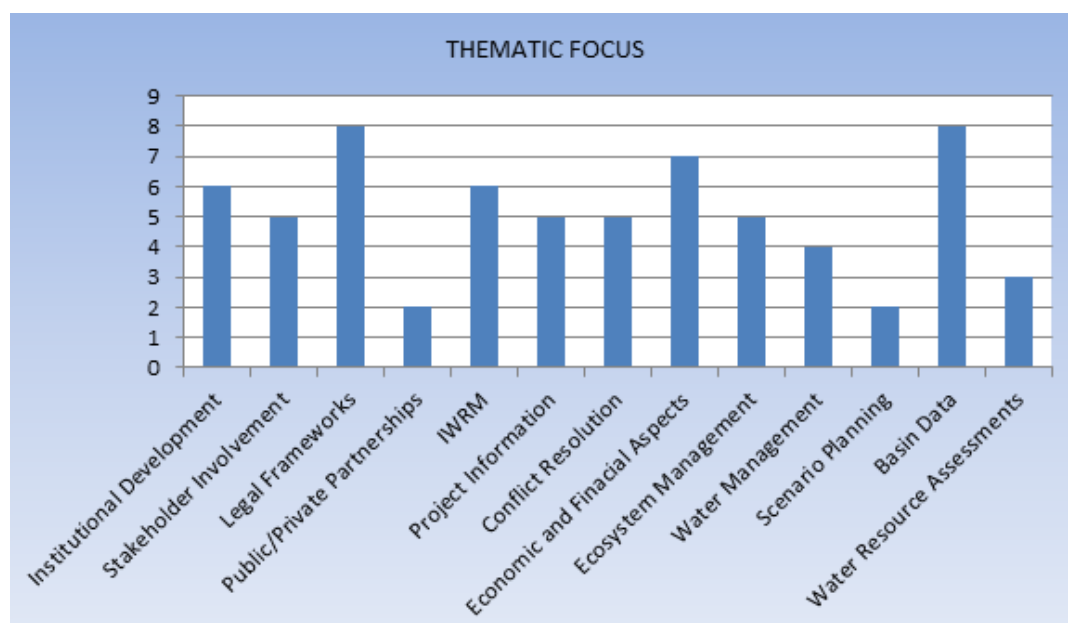
There is a wide range of TWM tools promoted by the actors. The study has mapped all recommendations made by the actors in the database that have been shared through reports, databases, portals and toolboxes. Reports share more explicit recommendations while databases generally share supporting river basin data i.e. water demand, climate, hydrology, population, land use.

Many of the actors support transboundary basin organisations through technical assistance and capacity building. Actors also provide different tools aimed to support TWM, often in the form of publications. Most of the tools developed are broad and cover several aspects of TWM. The most common are tools providing information on how to construct legal frameworks. Many recommendations are based on case studies with associated lessons learned based on project experiences. The target group is often broad, defined as “practitioners and stakeholders working with TWM”. Most of the tools developed are broad and cover several aspects of TWM. Global Water Partnership is a prime example of an actor providing a range of tools on various subjects through its toolbox. This toolbox contains policy briefs, technical briefs and perspective papers as well as huge sections of case studies and references in each tool. More specifically it provides information on water policies, legal frameworks, financing, institutional capacity building and water management.

The figure below shows the thematic focus of the recommendations provided by the various actors. Among the categories, tools providing basin data and information on how to construct legal frameworks are most common. Most of the basin data is provided by RBOs and aims to support capacity building within member states

and their own organisation. These tools are limited to specific basins, although they might be useful for other actors outside the river basin. FAO’s information system on water and agriculture AQUASTAT provides similar information on a global scale. AQUASTAT monitors and reports on water resources and agricultural water use in member countries and contains information on climate, dams, river sediment yields, water related investments and more. Some actors also share recommendations on IWRM, financing and institutional development. Stakeholder involvement, conflict resolution, ecosystem management, project information are other topics with relatively good coverage while less recommendations are available on public/private partnerships, water resource assessments and scenario planning.

Interactive tools from which different scenarios can be analysed provide useful insights for decision-makers and water-managers. They illustrate the potential impacts and uncertainties of different choices and decisions. Such tools can also be adapted to different contexts since input data is replaceable. This study only found two such tools; SIWI’s TWO Analysis and Stockholm Environment Institute’s Water Evaluation and Planning system (WEAP). The TWO Analysis is a methodology for optimising benefits for development and economic growth and clarifies trade-offs in developing transboundary water resources. The TWO framework helps stakeholders understand both opportunities and trade-offs in four key areas: hydropower and power trading, primary water use in agriculture, urban growth and industry, and environmental and ecosystem services. WEAP is a model-building tool, used to create simulations of water demand, supply, runoff, evapotranspiration, infiltration,



crop irrigation requirements, in-stream flow requirements, ecosystem services, groundwater and surface water and surface storage, reservoir operations, and pollution generation, discharge and in-stream water quality, all under scenarios of varying policy, hydrology, climate, land use, technology and socio-economic factors.

Figure 11 Thematic focus of the TWM tools

Conclusion

The report shows that more actors working with transboundary water issues focus their efforts on Africa than anywhere else. Of the ten basins with the largest amount of active TWM actors, only one is located outside Africa. Furthermore, most activities are located in transboundary rivers, while other types of transboundary basins, such as aquifers and large marine ecosystems, receive little attention from TWM professionals. The three basins that receive most attention by the actors are the Nile, the Volta and the Mekong River Basin.

The analysis of these three basins shows that the primary objective behind most of the actor's activities is the maximum utilisation of the common good (utilitarian approach). A wide range of technical assistance to the transboundary organisation is one example. Technical assistance to the information management, including standardising the basin data, information sharing and hydrological modelling of the basin, are the most commonly activities in the case studies. The utilitarian approach ensures such basic elements of TWM are applied to enhance the water use efficiency and to development the water resources more effectively. Capacity building is applied as an instrument of improving the utilisation of the transboundary waters. The large demand for capacity building in TWM is represented in the high relative number of TWM projects and actors.

In the Nile River Basin, it is indicated that the support for establishing the legal framework and gathering elementary basin data is still strongly needed to the transboundary basin organisation and national government entities. Majority of projects in the Nile are focusing

on the information management and capacity building activities that do not necessarily trigger the controversial debates around TWM. Gathering hydrological data and making it available is one of the basic elements of the effective water management. In the Volta River Basin, actors and projects focusing on stakeholder participation and ecological sustainability seem to prevail compared to the Nile and Mekong River Basin.

Activities to maintain ecological sustainability are more prominent in the Mekong River Basin, where the information management has been successful and the strong institutional capacity of the transboundary basin organisation, MRC, has provided leadership. The various ecological sustainability concerns – such as ecological conservation, water quality, fisheries and transboundary environmental impact assessment – feature strongly in MRC's activities. Conflict prevention activities are not as prevalent in practice as they are in the academic literature on transboundary waters.

These findings are based on the current state of the database and new interesting findings may be found as the database continues to expand, as the number and type of actors increases. There is also potential to develop search functions and other features to provide a more 'user-friendly' interface. By doing so, the hope is that through the database contribute to improved coordination, cooperation and learning between actors working with TWM and provide insights into new opportunities to address knowledge gaps that can lead to more informed decision-making on transboundary waters.

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